Course Description Form	
Course Code and Name	5091329 Hybrid Intelligent Systems
Course Semester	Fall - Spring
Catalog Content	Artificial neural networks, fuzzy systems, evolutionary algorithms, hybrid artificial intelligence techniques.
Textbook	(1) Jang, J.S.R, Sun, C.T., Mizutani, E., "Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence", Pearson Education, 1996. (2) Goonatilake, S., Khebbal, S., "Intelligent Hybrid Systems", John Wiley & Sons Ltd, 1995. (3) Fuller, R., "Introduction to Neuro-Fuzzy Systems", Springer-Verlag, 2000. (4) Da Ruan, "Intelligent Hybrid Systems: Fuzzy Logic, Neural Networks, and Genetic Algorithms", Kluwer Academic Publishers, 1997. (5) Haykin, S.S., Plunkett, K., Bechtel, W., "Artificial Neural Nets and Genetic Algorithms", Springer-Verlag, 2003.
Supplementary Textbooks	-
Credit	8
Prerequisites of the Course (Attendance Requirements)	-
Type of the Course	Elective
Instruction Language	Turkish
Course Objectives	Learning artificial neural networks, learning fuzzy systems, learning evolutionary algorithms, learning hybrid artificial intelligence techniques.
Course Learning Outcomes	1. Knowledge on artificial neural networks principals and usage of ANNs for real world tasks and their implementation. 2. Knowledge on fuzzy systems, applications and implementation. 3. Knowledge on evolutionary algorithms, applications and implementation. 4. Knowledge on hybrid artificial intelligence techniques and ability of their implementation.
Instruction Methods	The mode of delivery of this course is face to face
Weekly Schedule	1.Week Fuzzy systems 2.Week Evolutionary Algorithms 3.Week Artificial neural networks 4.Week Artificial neural networks - fuzzy systems 5.Week Artificial neural networks - fuzzy systems 6.Week Fuzzy systems - evolutionary algorithms 7.Week Fuzzy systems - evolutionary algorithms 8.Week Artificial neural networks - evolutionary algorithms 9.Week Artificial neural networks - evolutionary algorithms 10.Week Artificial neural networks - fuzzy systems - evolutionary algorithms 11.Week Artificial neural networks - fuzzy systems - evolutionary algorithms 12.Week Artificial neural networks - fuzzy systems - evolutionary algorithms 13.Week Hybrid systems applications 14.Week Hybrid systems applications
Teaching and Learning Methods *(These are examples. Please fill which activities you use in the course)*	Weekly theoretical course hours: 3 Reading Activities: 1 Internet browsing, library work: 1 Report preparing: 5 Preparing a Presentation: 8 Presentations: 1 Preparation of Midterm and Midterm Exam: 22 Final Exam and Preparation for Final Exam: 38

Assessment Criteria

	Numbers	Total Weighting (%)
Midterm Exams	1	20
Assignment	6	20
Application		
Projects	1	20
Practice		
Quiz		
Percent of In-term Studies (%)		60
Percentage of Final Exam to Total Score (%)		40
Attendance		

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course Hours	14	3	42
Weekly Tutorial Hours			
Reading Tasks	14	1	14
Studies	14	2	28
Material Design and Implementation			
Report Preparing	8	5	40
Preparing a Presentation	2	8	16
Presentations	2	1	2
Midterm Exam and Preperation for Midterm Exam	1	20	20
Final Exam and Preperation for Final Exam	1	38	38
Other (should be emphasized)			
Total Workload			200
Total Workload / 25			8
Course Credit (ECTS)			8

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Reaches the expansion of knowledge by conducting scientific research in the field of engineering and evaluation, interpretation and application of information.					X
2	Has extensive and in depth knowledge including the latest techniques, methods applied and their limitations in engineering.				X	
3	Completes and applies knowledge by using scientific methods by using limited or missing data and integrates information from different disciplines.			X		
4	Be aware of new and developing practices of the profession, examines and learns when needed.			X		
5	Defines and formulates problems related to the field, develops methods to solve them and applies innovative methods in solutions.				X	

	6	Develops new and / or original ideas and methods, designs complex systems or processes and develops innovative / alternative solutions in their designs.				X	
	7	Designs and applies theoretical, experimental and modeling based researches, examines and solves the complex problems encountered in this process.				X	
	8	Works effectively in disciplinary and multidisciplinary teams, leads such teams and develops solution approaches in complex situations, works independently and takes responsibility.				X	
	9	Communicates oral and written using a foreign language at least at the level of European Language Portfolio B2.		X			
	10	Conveys the process and results of the studies in written and oral form in a systematic and clear manner in national and international environments within or outside the field.			X		
	11	Knows the social, environmental, health, security, legal aspects of engineering applications; project management, and business life applications and be aware of the constraints of these engineering applications.		X			
	12	Considers social, scientific and ethical values in the stages of data collection, interpretation and announcement and in all professional activities.			X		

The Course's Lecturer(s) and Contact Information	Name Surname: Prof. Dr. M. Ali AKCAYOL E-mail address: akcayol@gazi.edu.tr