

| <b>COURSE DESCRIPTION FORM</b>   |   |
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| <b>Course Code and Name</b>  | CENG466 PERCEPTRON NETWORKS AND APPLICATIONS<br>(TECH.ELECT.)   |
| <b>Course Semester</b>   | 8   |
| <b>Catalog Content</b>   | Developing models in multi-layered sensors and understanding non-linear relationships   |
| <b>Textbook</b>  | Neural Networks: A Comprehensive Foundation, Simon Haykin, Pearson Education Inc. Leicestershire U.K 1999   |
| <b>Supplementary Textbooks</b>   | - Neural Networks for Pattern Recognition, C. Bishop, Oxford University Press, 1995<br>- Principles of Neurocomputing for Science and Engineering, F.M.Ham and I.Kostanic, McGraw Hill, 2001  |
| <b>Credit</b>  | 6   |
| <b>Prerequisites of the Course</b><br>( Attendance Requirements)   | -   |
| <b>Type of the Course</b>  | Elective  |
| <b>Instruction Language</b>  | English   |
| <b>Course Objectives</b>   | The object of this course is to teach the artificial neural networks. Additionally, learning to solve classification problems are among the target of this course.  |
| <b>Course Learning Outcomes</b>  | At the end of this course, the students will be able to<br>1. Teaching the artificial neural networks and introduction to evolutionary computing theory with applications<br>2. Overlap he mathematical and computing models and structures, feed-back and feed-forward neural networks, Artificial neural network training algorithms, supervised and unsupervised learning techniques.<br>3. Develop the perceptron network applications  |
| <b>Instruction Methods</b>   | The mode of delivery of this course is face to face   |
| <b>Weekly Schedule</b>   | Week 1. Artificial neural networks (ANN) and evolutionary computation theory and practice<br>Week 2. Biological structures<br>Week 3. Neural networks and nerve cells<br>Week 4. Neuron modeling<br>Week 5. Simple neurons<br>Week 6. Neuron modeling<br>Week 7. Perceptrons<br>Week 8. Mathematical and calculation models and structures<br>Week 9. Mathematical and calculation models and structures<br>Week 10. Back and feed forward networks<br>Week 11. Multilayer Perceptrons<br>Week 12. ANN learning algorithms<br>Week 13. Consultant and advisor without learning techniques<br>Week 14. Perceptron network applications |
| <b>Teaching and Learning Methods</b><br>(These are examples. Please fill which activities you use in the course) | Weekly Theoretical Course Hours: 3<br>Reading Tasks<br>Studies<br>Material Design and Implementation<br>Preparing Reports<br>Preparing Presentation<br>Presentation<br>Midterm and Studying for Midterm   |

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|   | Final and Studying for Final                  |  |                               |                               |   |   |   |
| <b>Assessment Criteria</b>  |   | <b>Quantity</b>  | <b>Total Contribution (%)</b> |                               |   |   |   |
|   | Midterm Exams                                 | 1  | 20                            |                               |   |   |   |
|   | Assignment                                    | 5  | 20                            |                               |   |   |   |
|   | Application                                   | 0  | 0                             |                               |   |   |   |
|   | Projects                                      | 1  | 20                            |                               |   |   |   |
|   | Practice                                      | 0  | 0                             |                               |   |   |   |
|   | Quiz  | 0  | 0                             |                               |   |   |   |
|   | Percent of In-term Studies (%)                |  | 60                            |                               |   |   |   |
|   | Percentage of Final Exam to Total Score (%)   |  | 40                            |                               |   |   |   |
|   | Attendance                                    | -  | -                             |                               |   |   |   |
| <b>Workload</b>   | <b>Activity</b>                               | <b>Total Number of Weeks</b>   | <b>Duration (weekly hour)</b> | <b>Total Period Work Load</b> |   |   |   |
|   | Weekly Theoretical Course Hours               | 14   | 3                             | 42                            |   |   |   |
|   | Weekly Tutorial Hours                         | 0  | 0                             | 0                             |   |   |   |
|   | Reading Tasks                                 | 8  | 4                             | 32                            |   |   |   |
|   | Studies                                       | 8  | 4                             | 32                            |   |   |   |
|   | Material Design and Implementation            | 12   | 1                             | 12                            |   |   |   |
|   | Report Preparing                              | 1  | 3                             | 3                             |   |   |   |
|   | Preparing a Presentation                      | 1  | 3                             | 3                             |   |   |   |
|   | Presentations                                 | 1  | 1                             | 1                             |   |   |   |
|   | Midterm Exam and Preparation for Midterm Exam | 1  | 10                            | 10                            |   |   |   |
|   | Final Exam and Preparation for Final Exam     | 1  | 15                            | 15                            |   |   |   |
|   | Other ( should be emphasized)                 | 0  | 0                             | 0                             |   |   |   |
|   | Total Workload                                |  |                               | 150                           |   |   |   |
|   | Total Workload / 25                           |  |                               | 6                             |   |   |   |
| Course Credit (ECTS)  |   |  | 6                             |                               |   |   |   |
| <b>Contribution Level Between Course Learning Outcomes and Program Outcomes</b> | No  | Program Outcomes   | 1                             | 2                             | 3 | 4 | 5 |
|   | 1   | Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems |                               |                               |   | X |   |

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|  | 2   | Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes  |   |   | X |   |   |
|  | 3   | Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose |   |   |   |   | X |
|  | 4   | Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies  |   |   |   | X |   |
|  | 5   | Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions   |   |   | X |   |   |
|  | 6   | Ability to work effectively in intradisciplinary and interdisciplinary teams or individually  |   |   |   |   | X |
|  | 7   | Ability to efficiently prepare, evaluate and interpret reports  |   |   |   | X |   |
|  | 8   | Ability to make presentations and conduct effective verbal and written communication in Turkish and English   |   |   |   |   | X |
|  | 9   | Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself  |   |   | X |   |   |
|  | 10  | Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles  |   |   |   | X |   |
|  | 11  | Ability to apply knowledge on project management, risk management and change management   |   |   |   |   | X |
|  | 12  | Awareness of entrepreneurship and innovation, ability to design and build sustainable systems   |   |   |   | X |   |
|  | 13  | Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and security   |   | X |   |   |   |
|  | 14  | Awareness of the legal consequences of engineering solutions  |   | X |   |   |   |
|  | 15  | Ability to apply knowledge on software development process and documentation rules  |   |   |   | X |   |
|  | 16  | Knowledge on standards used in engineering applications   |   |   |   |   | X |
|  | 17  | Awareness of occupational health and security, information security and privacy   |   |   | X |   |   |
|  | <b>The Course's Lecturer(s) and Contact Information</b> |   | Prof. Dr. Şeref SAĞIROĞLU<br>ss@gazi.edu.tr |   |   |   |   |