# AYDIN ADNAN MENDERES UNIVERSITY
# COURSE INFORMATION FORM

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|---|---|---|---|---|---|---|---|---|
| Course Title | | Artificial Neural Networks Methods | | | | | | |
| Course Code | | BİS525 | | Couse Level | | Second Cycle (Master's Degree) | | |
| ECTS Credit | 8 | Workload | 200 *(Hours)* | Theory | 3 | Practice | 0 | Laboratory | 0 |
| Objectives of the Course | | Students will make familiar with the basics of artificial neural networks methods and with their applicability to various problems including time series, regression, clustering, classification and dimension reduction. | | | | | | |
| Course Content | | Theory and application of regression, classification, time series and data reduction. | | | | | | |
| Work Placement | | N/A | | | | | | |
| Planned Learning Activities and Teaching Methods | | | Demonstration, Project Based Study, Individual Study | | | | | |
| Name of Lecturer(s) | | | | | | | | |

## Assessment Methods and Criteria

| Method | Quantity | Percentage (%) |
|---|---|---|
| Midterm Examination | 1 | 40 |
| Final Examination | 1 | 60 |

## Recommended or Required Reading

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|---|---|
| 1 | Zurada, J. M. (1992). Introduction to artificial neural systems (Vol. 8). St. Paul: West publishing company. |
| 2 | Haykin, S. S., Haykin, S. S., Haykin, S. S., Elektroingenieur, K., & Haykin, S. S. (2009). Neural networks and learning machines (Vol. 3). Upper Saddle River: Pearson education. |
| 3 | Hagan, M. T., Demuth, H. B., Beale, M. H., & De Jesús, O. (1996). Neural network design (Vol. 20). Boston: Pws Pub.. |
| 4 | Öztemel, E. (2003). Yapay sinir ağlari. PapatyaYayincilik, Istanbul. |

## Weekly Detailed Course Contents

| Week | | Weekly Detailed Course Contents |
|---|---|---|
| 1 | Theoretical | Real and artificial nerve cells |
| 2 | Theoretical | History of artificial neural networks |
| 3 | Theoretical | Purposes of use of artificial neural networks |
| 4 | Theoretical | Structure and basic elements of artificial neural networks |
| 5 | Theoretical | Examination of activation functions |
| 6 | Theoretical | Perceptrons |
| 7 | Theoretical | Multi-layer perceptrons |
| 8 | Intermediate Exam | Midterm exam |
| 9 | Theoretical | Forward and feedback networks |
| 10 | Theoretical | Artificial neural networks according to learning algorithms |
| 11 | Theoretical | Training of artificial neural networks and performance measures |
| 12 | Theoretical | Adaptive resonance theory (Art) networks |
| 13 | Theoretical | Recycled networks (Elman Network) and other artificial neural network models |
| 14 | Theoretical | Prediction, classification and clustering with ANN. |
| 15 | Theoretical | Literature review and discussion |
| 16 | Final Exam | Final exam |

## Workload Calculation

| Activity | Quantity | Preparation | Duration | Total Workload |
|---|---|---|---|---|
| Lecture - Theory | 14 | 0 | 3 | 42 |
| Assignment | 1 | 10 | 0 | 10 |
| Seminar | 1 | 15 | 2 | 17 |
| Reading | 5 | 4 | 1 | 25 |
| Individual Work | 10 | 0 | 2 | 20 |
| Quiz | 14 | 2 | 1 | 42 |
| Midterm Examination | 1 | 20 | 2 | 22 |

| Final Examination | 1 | 20 | 2 | 22 |
|---|---|---|---|---|
| | | Total Workload (Hours) | | 200 |
| | | [Total Workload (Hours) / 25*] = **ECTS** | | 8 |
| *25 hour workload is accepted as 1 ECTS* | | | | |

## Learning Outcomes

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|---|---|
| 1 | To be able to define basic neural network models |
| 2 | To be able to use commonly used ANN models and learning algorithms for a specific application |
| 3 | To learn the principles of generalization ability with supervized and unsupervized learning |
| 4 | To be able to learn the advantages and limitations of ANN |
| 5 | To be able to make applications about classification and regression problems by using artificial neural networks |

## Programme Outcomes *(Biostatistics Master)*

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|---|---|
| 1 | To be able to  understand the interdisciplinary interaction releated with biostatistics. |
| 2 | to be able to use Theoretical and practical knowledge at the level of expertise. |
| 3 | To be able to nterpret the information by integrating information from different disciplines and create new information |
| 4 | To be able to nalyze the problems encountered by using research methods |
| 5 | to be able to conduct a study as an independent specialist |
| 6 | To be able to formulate solutions for complex unpredictable problems encountered by developing new approaches and  taking responsibility. |
| 7 | To be able to resolve problems in environments that require leadership. |
| 8 | To be able to evaluate and direct knowledge and skills with a critical approach at the level of expertise. |
| 9 | To be able to to give statistical advise at the begining stages of preparing health related projects |
| 10 | To be able to get the knowledge and the ability of using statistical packages |

## Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

| | L1 | L4 |
|---|---|---|
| P1 | 3 | 3 |
| P2 | 5 | 4 |
| P3 | 4 | 4 |
| P4 | 4 | 5 |
| P5 | 5 | 5 |
| P6 | 4 | 5 |
| P7 | 3 | 5 |
| P8 | 4 | 4 |
| P9 | 5 | 5 |
| P10 | 4 | 4 |