|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**  **Doctorate Program** | | | | | |
| Code | Course Name | ECTS | T+U+L | T/S | Language |
| Fall Semester | | | | | |
| 522603301 | [RESEARCH TECHNIQUES USED IN NEUROSCIENCE I](#D522601301) | 7.5 | 3+1+0 | COMPULSORY | TURKISH |
| 522603302 | [FUNDAMENTALS OF NEUROSCIENCE](#D522601302) | 7.5 | 3+0+0 | COMPULSORY | TURKISH |
| 522603303 | [SENSORY BIOPHYSICS](#DERS522603303) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 522601600 | SPECIALIZED FIELD COURSE | 5 | 3+0+0 | COMPULSORY | TURKISH |
|  | |  |  |  |  |
| Spring Term | | | | | |
| 522604302 | [RESEARCH TECHNIQUES USED IN NEUROSCIENCES II](#D522602302) | 7.5 | 3+1+0 | COMPULSORY | TURKISH |
| 522604301 | [NEURODEGENERATIVE DISEASES AND THEIR MOLECULAR MECHANISMS](#D522602301) | 7.5 | 2+2+0 | ELECTIVE | TURKISH |
| 522606303 | [DEVELOPMENTAL BRAIN EVOLUTION](#DERS22606303) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522604304 | [GENETIC APPROACH TO NEUROPSYCHIATRIC DISORDERS](#D522604304) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 522604305 | [QUANTUM PHYSICS AND CONSCIOUSNESS](#D522604305) | 7.5 | 2+0+0 | ELECTIVE | TURKISH |
| 522601600 | SPECIALIZED FIELD COURSE | 5 | 3+0+0 | COMPULSORY | TURKISH |
|  | |  |  |  |  |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** **522603301** | | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** | | | |
| **COURSE NAME: RESEARCH TECHNIQUES USED IN NEUROSCIENCE-1** | | | | | |
| **TEACHING THE COURSE**  **STAFF** | **COURSE LANGUAGE**  **Turkish:** X  **English: ** | | **Category of the Course** | | |
| Technical | Medical | Other(……) |
| Prof. Dr. Ferruh YÜCEL  Prof. Dr. Engin YILDIRIM  Prof. Dr. Dilek BURUKOĞLU DÖNMEZ  Prof. Dr. Orhan Tansel KORKMAZ  Doç. Dr. Seçkin TUNCER |  | |  | X |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
| **** |  | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Fall | 3 | 1 |  | 3.5 | 7.5 | MANDATORY | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **1** | **25** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | | **1** | **25** |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | | -- | | | | |
| **SHORT COURSE CONTENT** | | | Introduction of behavioral tests, electrophysiological, microscopic and in vivo techniques used in experimental research in the field of neuroscience. | | | | |
| **COURSE AIMS** | | | To ensure that students studying at a postgraduate level in the field of neuroscience are informed about the methods they may encounter while following current literature and are able to better interpret research results. | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | The aim is for students to understand and interpret research techniques used in current literature and to apply these techniques to the extent that available laboratory facilities allow. | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | Learning the basic experimental techniques used in experimental research in the field of Neuroscience. | | | | |
| **TEXTBOOK** | | | Guide to research techniques in neuroscience, Matt Carrer, Jennifer Shieh, Academic press, 2009. | | | | |
| **OTHER REFERENCES** | | | Cellular and molecular methods in neuroscience research, Adalberto Merighi, Giorgio Carmignoto, Springer, 2002. | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | textbooks, technological equipment (computer, projector, etc.) required for the course and laboratory equipment and supplies for relevant courses. | | | | |

|  |  |
| --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** |
| **WEEK** | **TOPICS COVERED** |
| 1 | Evaluation of behavioral tests used in experimental animals |
| 2 | Locomotor activity, Motor coordination and balance tests |
| 3 | Sensory functions and pain experiments |
| 4 | Spatial learning, memory, social behavior, anxiety and depression tests |
| 5 | Voltage and Patch-Clamp Techniques |
| 6 | Biophysical EEG, EMG and Nerve Conduction Velocity (NCV) Measurement and Electrodes and Their Properties |
| 7 | Biophysical Biopotentials and Their Types and Stimulation of Superficial and Deep Tissues |
| 8 | Neurophysiological Techniques-1 |
| 9 | Neurophysiological Techniques-2 |
| 9 | MIDTERM EXAM |
| 10 | Tissue preparation techniques for microscopic examinations (Fixation, blocking, sectioning) |
| 11 | Dyes used in morphological and functional examination of the nervous system |
| 12 | Microscopic (light, fluorescence microscopy, electron) examination techniques |
| 13 | Analysis methods of microscopic images |
| 14 | General information about stereological methods |
| 15 | FINAL |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| LO 1 | Learning the basic experimental techniques used in experimental research in the field of neuroscience. |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  Prof. Dr. Ferruh YÜCEL  Prof. Dr. Engin YILDIRIM  Prof. Dr. Dilek BURUKOĞLU DÖNMEZ Doç. Dr. Seçkin TUNCER | **Date**  30.04.2025 |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **COURSE CODE: 522603302** | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** |
| **COURSE NAME: FUNDAMENTALS OF NEUROSCIENCE** | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **TEACHING THE COURSE**  **STAFF** | **COURSE LANGUAGE**  **Turkish: X**  **English: ** | **Category of the Course** | | |
| Technical | Medical | Other(……) |
| Prof. Dr. Fatma Sultan KILIÇ,  Prof. Dr. Orhan Tansel KORKMAZ  Dr. Öğr. Üyesi Hakan AY |  |  | **X** |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
| **** | **** | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Fall | 3 | 0 | 0 | 3 | 7.5 | MANDATORY | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **2** | **25** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | |  |  |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | |  | | | | |
| **SHORT COURSE CONTENT** | | | Examining the basic concepts related to the field of neuroscience with a multidisciplinary approach. | | | | |
| **COURSE AIMS** | | | After reviewing the structural and chemical properties of each of the components that make up the nervous system, we will understand how the complex integration that ensures functional functioning between these structures occurs. | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | Acquire the basic knowledge required to understand classical textbooks and current articles in the field of neuroscience. | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | Acquisition of basic information on nervous system anatomy and conduction in the nervous system | | | | |
| **TEXTBOOK** | | | -Essentials of neural science and behavior: Kandel ER, Schwartz,JH, Jessell TM, Appleteon&Lange, 1995.  - Fundamental Neuroscience, Haines DE: Churchill Livingstone, 1997.  -Neuroscience: Exploring the brain: Bears M, Connors BW, PardisoMA, Lippincot&Williams&Wilkins, 2006. | | | | |
| **OTHER REFERENCES** | | | -Neuroscience Online, The Open-Access Neuroscience Electronic Textbook.  http://neuroscience.uth.tmc.edu/ | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | textbooks, technological equipment (computer, projector, etc.) and anatomical models required for the course. | | | | |

|  |  |
| --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** |
| **WEEK** | **TOPICS COVERED** |
| 1 | Cellular and molecular basis of neurophysiology and neuropharmacology |
| 2 | Rest and action potentials |
| 3 | Neurotransmission |
| 4 | Neuropeptides |
| 5 | Synaptic transmission in the nervous system |
| 6 | MIDTERM |
| 6 | Neurotransmitters and Acetylcholine |
| 7 | GABA-Glycine |
| 8 | Glutamate-Aspartate, , Serotonin-Adrenaline |
| 9 | Dopamine Noradrenaline |
| 10 | Interactive review of neuroanatomy |
| 11 | Somatosensory systems, pathways |
| 12 | Parallel processes in the transmission of special senses |
| 13 | Motor systems |
| 14 | Limbic system |
| 15 | Higher cortical functions |
| 16 | FINAL |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| LO 1 | Understanding the anatomy of the nervous system |  |  | **X** |
| LO 2 | Understanding the transmission in the nervous system |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  Prof. Dr. Fatma Sultan KILIÇ  Doç. Dr. Seçkin TUNCER  Dr. Öğr. Üyesi Hakan AY | **Date**  24.03.2025 |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **522603303** | | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** | | | |
| **COURSE NAME: SENSORY BIOPHYSICS** | | | | | | |
| **TEACHING THE COURSE**  **STAFF**  **Doç. Dr. Seçkin TUNCER** | | **COURSE LANGUAGE**  Turkish | | **Category of the Course** | | |
| Technical | Medical | Other(……) |
|  | |  | |  | X |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
| **** | **** | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Fall | 3 | - | - | 3 | 7.5 | ELECTIVE | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **1** | **50** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | |  |  |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | |  | | | | |
| **SHORT COURSE CONTENT** | | | Sensory Perception, Receptors, Receptor Potential, Biophysics of Vision, Biophysics of the Auditory System and Chemical Senses (Taste and Smell) are the main topics of the course. | | | | |
| **COURSE AIMS** | | | To help students who will take the Sensory Biophysics course understand the functioning of the senses that provide information about our environment. | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | To help students who will take the Sensory Biophysics course understand the functioning of the senses that provide information about our environment. | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | Developing the ability to understand the functioning of the senses that provide information about our environment from a biophysical perspective. | | | | |
| **TEXTBOOK** | | | 1- Hoppe W., Lohmann W., Markl H., Ziegler H. (eds): Biophysics, Springer-Verlag, Berlin, 1983  2- Ferit Pehlivan: Biyofizik (13.Baskı), Pelikan Kitabevi, Ankara, 2025. | | | | |
| **OTHER REFERENCES** | | | Esen F, Esen H: BİYOFİZİK Nörobiyofizik, Ankara Nobel Tıp Kitabevleri, 2016. ISBN: 978-605-9215-10-7 | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | A computer that can connect to the internet, along with note-taking tools such as a notebook, pen, and eraser. | | | | |

|  |  |  |
| --- | --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Coding of Sensory Information, Stimulus Type, Stimulus Intensity and Duration |
| 2 |  | Detection of the location of the stimulus, Lateral Inhibition |
| 3 |  | Visual Optics, Cornea and Lens, Optical System of the Eye, |
| 4 |  | Visual Acuity, Photoreceptors |
| 5 |  | Adaptation of Photoreceptors to Ambient Lighting |
| 6 |  | Center-Surround Antagonism, Perception Fields of Retinal Ganglion Cells |
| 7 |  | Depth Perception |
| 8 |  | MID-TERM EXAM |
| 9 |  | Basic Concepts of Sound Waves, Intensity and Sensory Intensity |
| 10 |  | Outer Ear, Standing Waves and Resonance in the Outer Ear Canal, Middle Ear Functions |
| 11 |  | Inner Ear, Cochlea, Basilar Membrane, Organ of Corti |
| 12 |  | Mechanical and Electrical Resonance in Hair Cells |
| 13 |  | Determining the Location of the Sound Source |
| 14 |  | Sense of Taste |
| 15 |  | Sense of Smell |
| 16 |  | END OF SEMESTER EXAM |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | Skills to Collect and Apply Information Regarding Health Sciences |  |  | **X** |
| **LO 2** | Scientific Inquiry and Hypothesis Generation |  |  | **X** |
| **LO 3** | Literature Scanning and Evaluation Skills |  | **X** |  |
| **LO 4** | Ability to Design, Conduct Experiments, Analyze and Evaluate Data |  | **X** |  |
| **LO 5** | Ability to Identify and Use Experimental Tools and Equipment Properly |  | **X** |  |
| **LO 6** | Ability to Work in Interdisciplinary Teams |  |  | **X** |
| **LO 7** | Ability to Identify, Formulate and Solve Medical Problems |  |  | **X** |
| **LO 8** | Ability to Use Computers Effectively in Research and Data Analysis |  |  | **X** |
| **LO 9** | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| **LO 10** | Effective Written and Oral Communication/Presentation Skills |  |  | **X** |
| **LO 11** | Ability to Understand and Apply Professional and Ethical Responsibility | **X** |  |  |
| **LO 12** | Ability to Understand and Apply the Importance of Lifelong Learning | **X** |  |  |
| **LO 13** | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| **LO 14** | Ability to Approach Ethical Problems by Focusing on Basic Concepts |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Doç. Dr. Seçkin TUNCER** | **Date**  2025 |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **522604301** | | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** | | | |
| **COURSE NAME:** | **NEURODEGENERATIVE DISEASES AND THEIR MOLECULAR MECHANISMS** | | | | | |
| **TEACHING THE COURSE**  **STAFF** | | **COURSE LANGUAGE**  **Turkish: X**  **English: ** | | **Category of the Course** | | |
| Technical | Medical | Other(……) |
| **Prof.Dr. Didem TURGUT COŞAN**  **Prof. Dr. Demet İLHAN ALGIN** | |  | |  | X | X  lab |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
| **** | **** | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Spring | 2 | 2 |  | 3 | 7.5 | ELECTIVE | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **1** | **50** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | |  |  |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | |  | | | | |
| **SHORT COURSE CONTENT** | | | Introduction of neurodegenerative diseases such as Alzheimer's, Parkinson's, Motor neuron disease, Epilepsy, which have different clinical features but similar neuropathological mechanisms. | | | | |
| **COURSE AIMS** | | | To introduce the mechanisms that cause neurodegeneration and neurodegenerative diseases | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | To be able to understand the causes of disorders occurring in neurodegenerative diseases at the cellular and molecular level and to develop original projects on these subjects. | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | Understanding of neurodegenerative diseases and their mechanisms of occurrence | | | | |
| **TEXTBOOK** | | | Principles of Neural Science, Fifth Edition (Principles of Neural Science (Kandel) 2012; Bradley, Neurology in Clinical Practice, 2011 | | | | |
| **OTHER REFERENCES** | | | Adams Principles Of Neurology, 2011neurodegeneration Edited by L. Miguel Martins and Samantha HY Loh, ISBN 978-953-51-0502-2, Hard cover, 362 pages, Publisher: InTech, Published: April 11, 2012, - M. Flint Beal, Anthony E. Lang, Albert C. Ludolph. Neurodegenerative Diseases: Neurobiology, Pathogenesis and Therapeutics. Cambridge University Press, Jun 2, 2005 | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | textbooks and technological equipment required for the course (computer, projector, etc.) | | | | |

|  |  |  |
| --- | --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** | |
| **WEEK** | **Date** | **TOPICS COVERED** |
| 1 |  | The concept of neurodegeneration |
| 2 |  | Genetic epidemiology of neurodegenerative diseases |
| 3 |  | Neurodegenerative mechanisms |
| 4 |  | Molecular mechanisms |
| 5 |  | Molecular mechanisms |
| 6 |  | Proteinopathy |
| 7 |  | Methods used in the diagnosis of neurodegenerative diseases |
| 8 |  | **Midterm Exam** |
| 9 |  | Dementias and Alzheimer's disease |
| 10 |  | Amyotrophic lateral sclerosis (ALS) |
| 11 |  | Parkinson |
| 12 |  | Movement disorders |
| 13 |  | Epilepsy and sleep disorders |
| 14 |  | Multiple sclerosis |
| 15 |  | Diseases of the spinal cord |
| 16 |  | **Overview** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | Understanding the molecular and genetic basis of neurodegenerative diseases |  |  | **x** |
| **LO 2** | Understanding of neurodegenerative diseases, diagnostic methods and clinical courses |  |  | **x** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  **Prof.Dr. Didem TURGUT COŞAN**  **Prof. Dr. Demet İLHAN ALGIN** | **Date**  24.03.2025 |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **522604302** | | **DEPARTMENT:** Interdisciplinary Neurosciences | | | |
| **COURSE NAME: RESEARCH TECHNIQUES USED IN NEUROSCIENCES II** | | | | | | |
| **INSTRUCTOR GIVING THE COURSE**  Prof. Dr. Sevilhan ARTAN,  Prof. Dr. Didem COŞAN,  Prof. Dr. Hülyam KURT  Prof. Dr. Demet İLHAN ALGIN  Dr. Öğr. Üyesi Özben Özden IŞIKLAR | | **COURSE LANGUAGE**  **Turkish:** X  **English: ** | | **Category of the Course** | | |
| Technical | Medical | Other(……) |
|  | |  | X |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
| **** |  | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Spring | 3 | 1 |  | 3.5 | 7.5 | MANDATORY | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **1** | **50** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | |  |  |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | | -- | | | | |
| **SHORT COURSE CONTENT** | | | biochemical and molecular techniques and brain imaging techniques used in experimental research in the field of neuroscience and providing information about tests and data analysis methods used in the diagnosis and follow-up of neuropsychiatric diseases. | | | | |
| **COURSE AIMS** | | | To ensure that students studying at a postgraduate level in the field of neuroscience are informed about the methods they may encounter while following current literature and are able to better interpret research results. | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | The aim is for students to understand and interpret research techniques used in current literature and to apply these techniques to the extent that available laboratory facilities allow. | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | Learning the basic experimental techniques used in experimental research in the field of neuroscience. | | | | |
| **TEXTBOOK** | | | Guide to research techniques in neuroscience, Matt Carrer, Jennifer Shieh, Academic press, 2009. | | | | |
| **OTHER REFERENCES** | | | Cellular and molecular methods in neuroscience research, Adalberto Merighi, Giorgio Carmignoto, Springer, 2002. | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | textbooks, technological equipment (computer, projector, etc.) required for the course and laboratory equipment and supplies for relevant courses. | | | | |

|  |  |
| --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** |
| **WEEK** | **TOPICS COVERED** |
| 1 | General information about molecular techniques and their applications |
| 2 | Techniques related to the examination of gene and protein expression, isolation of DNA fragments, cloning, purification and identification of DNA |
| 3 | Gene therapy: Physical, chemical and viral gene delivery |
| 4 | Construction and usage areas of transgenic organisms, manipulation techniques for endogenous genes |
| 5 | Tissue culture techniques |
| 6 | General information about biochemical techniques |
| 7 | Determination of protein expression (Western blot, ELISA, Immunohistochemistry) |
| 8 | Investigation of protein-protein and protein-DNA interactions (electrophoresis, chromatography, co-immunoprecipitation) |
| 9 | Investigation of post-translational modifications |
| 10 | MIDTERM EXAM |
| 11 | General information about brain imaging techniques |
| 12 | Cerebral angiography, CT, MRI, Diffusion MRI, Functional MRI, |
| 13 | Tests used in the diagnosis of neurological diseases |
| 14 | Tests used in the diagnosis of psychiatric diseases |
| 15 | General information about psychological tests and their applications |
| 16 | Assessment in clinical psychology |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | Learning the basic experimental techniques used in experimental research in the field of neuroscience. |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  Prof. Dr. Sevilhan ARTAN,  Prof. Dr. Didem COŞAN,  Prof. Dr. Hülyam KURT  Prof. Dr. Demet İLHAN ALGIN  Dr. Öğr. Üyesi Özben Özden IŞIKLAR | **Date**  24.03.2025 |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE: 5** **22606303** | | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** | | | | |
| **COURSE NAME: DEVELOPMENTAL BRAIN EVOLUTION** | | | | | | |
| **TEACHING THE COURSE**  **STAFF**  **Prof. Dr. Tevfik Erhan COŞAN** | | | **COURSE LANGUAGE**  **Turkish: X**  **English:** | **Category of the Course** | | |
| Technical | Medical | Other(……) |
|  | | |  |  | **X** |  |
|  |  |  |  |  |  |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
|  |  | **X** |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Spring **X**  Autumn | 2 |  | |  | 2 | 5.0 | MANDATORY ELECTIVE  **X** | |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | | **1** | **50** |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Oral examination | | | |  |  |
| Other (………) | | | |  |  |
| **Final Exam** | | | | | **50** |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | General understanding of BRAIN and NEUROLOGICAL EVOLUTION | | | | | |
| **COURSE AIMS** | | | General understanding and following developments and studies on this subject in the world | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | Understanding of studies and understanding in world literature | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | To learn about evolution and brain development | | | | | |
| **TEXTBOOK** | | | Lecture notes | | | | | |
| **OTHER REFERENCES** | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | Source books  Related websites | | | | | |
|  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | WHAT IS EVOLUTION SCIENCE? |
| 2 |  | THE BEGINNING OF THE PRIMITIVE NERVOUS SYSTEM |
| 3 |  | PRIMITIVE BRAIN IN LIVING THINGS |
| 4 |  | FROM PRIMITIVE CREATURES TO THE PRIMAT BRAIN |
| 5 |  | BRAIN IN PRIMATES |
| 6 |  | MIDTERM EXAM |
| 7 |  | THE IMPACT OF GEOLOGICAL EVOLUTION ON BRAIN EVOLUTION |
| 8 |  | BRAIN AND EVOLUTION ECONOMY |
| 9 |  | HOMO SAPIENS FROM EARLY HOMINIDS |
| 10 |  | WHAT IS CONSCIOUSNESS AND ITS EVOLUTION |
| 11 |  | PRESENT AND FUTURE OF BRAIN EVOLUTION |
| 12 |  | EVO-DEVO STUDIES (1) (Molecular, genetic, structural. MGY) |
| 13 |  | EVO-DEVO STUDIES (2) (MGY) |
| 14 |  | CONSCIOUSNESS and CELL (1) (Like mirror neurons) |
| 15 |  | CONSCIOUSNESS and CELL (2) (Intracellular structures, such as Microtubular quantum) |
| 16 |  | FINAL EXAM |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | Gains a different perspective on evolution from a neuroscientific perspective |  |  | **X** |
| **LO 2** | Learns the science of evolution |  |  | **X** |
| **LO 3** | Gains a different perspective on consciousness from a neuroscientific perspective |  |  | **X** |
| **LO 4** |  |  |  |  |
| **LO 5** |  |  |  |  |
| **LO 6** |  |  |  |  |
| **LO 7** |  |  |  |  |
| **LO 8** |  |  |  |  |
| **LO 9** |  |  |  |  |
| **LO 10** |  |  |  |  |
| **LO 11** |  |  |  |  |
| **LO 12** |  |  |  |  |
| **LO 13** |  |  |  |  |
| **LO 14** |  |  |  |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  **Prof. Dr. Tevfik Erhan COŞAN** | **DATE**  **30.04.2025** |



**ESOGU INSTITUTE OF HEALTH SCIENCES**

**DEPARTMENT OF INTERDISCIPLINARY NEUROSCIENCES**

**COURSE INFORMATION FORM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **522604304** | | **DEPARTMENT: INTERDISCIPLINARY NEUROSCIENCES** | | | |
| **COURSE NAME: GENETIC APPROACH TO NEUROPSYCHIATRIC DISORDERS** | | | | | | |
| **TEACHING THE COURSE**  **STAFF**  Prof. Dr. Sevilhan ARTAN  Dr. Lecturer. Ebru ERZURUMLUOĞLU GÖKALP | | **COURSE LANGUAGE**  **Turkish: X**  **English:** | | **Category of the Course** | | |
| Technical | Medical | Other(……) |
|  | |  | |  | **X** |  |

**COURSE LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
|  |  | **X** | **** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | |
| **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** | |
| Spring **X**  Autumn **** | 3 |  |  | 3 | 7.5 | MANDATORY ELECTIVE  ** X** | |
|  | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | | **Number** | **Percentage (%)** |
| Midterm Exam | | | **1** | **50** |
| Quiz | | |  |  |
| Homework | | |  |  |
| Project | | |  |  |
| Oral examination | | |  |  |
| Other (………) | | |  |  |
| **Final Exam** | | | | **50** |
| **PREREQUISITE(S)** | | |  | | | | |
| **SHORT COURSE CONTENT** | | | Basic molecular genetic concepts, mutation types, epigenetics, analysis methods, evaluation of molecular pathogenesis in neuropsychiatric diseases | | | | |
| **COURSE AIMS** | | | Learning the basic concepts of medical genetics and evaluating genetic and epigenetic mechanisms in neuropsychiatric diseases. | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | To learn the molecular basis and genetic risk factors of neuropsychiatric diseases | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | |  | | | | |
| **TEXTBOOK** | | | Yasui, D., Peedicayil, J., & Grayson, D. R. (Eds.). (2016). Neuropsychiatric Disorders and Epigenetics. Academic Press. | | | | |
| **OTHER REFERENCES** | | | Geschwind, D.H., Paulson, H.L., & Klein, C. (2018). *Neurogenetics* (Vol. 148). elsevier | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | Source booksRelated websites | | | | |

|  |  |  |
| --- | --- | --- |
|  | **WEEKLY PLAN OF THE COURSE** | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Basic molecular genetic concepts |
| 2 |  | Pedigree analyses and inheritance patterns |
| 3 |  | Copy number variants and mutations |
| 4 |  | Epigenetic Mechanisms: DNA Methylation, Histone modifications |
| 5 |  | Epigenetic Mechanisms: Noncoding RNAs |
| 6 |  | Methods Used in Genetic Diagnosis |
| 7 |  | New generation genetic technologies |
| 8 |  | Genetics in Major Depressive Disorder |
| 10 |  | Midterm Exam |
| 11 |  | Genetics in autism spectrum disorders |
| 12 |  | Genetics of Schizophrenia |
| 13 |  | Progressive dementias with behavioral disorders and genetic factors |
| 14 |  | Data analysis in molecular cytogenetics and molecular testing |
| 15 |  | Overview and evaluation |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | Learn basic molecular genetic concepts |  |  | **X** |
| **LO 2** | Learn Epigenetic Mechanisms |  |  | **X** |
| **LO 3** | Learn new generation genetic technologies |  |  | **X** |
| **LO 4** | Learn genetic mechanisms of neuropsychiatric diseases |  |  | **X** |
| **LO 5** |  |  |  |  |
| **LO 6** |  |  |  |  |
| **LO 7** |  |  |  |  |
| **LO 8** |  |  |  |  |
| **LO 9** |  |  |  |  |
| **LO 10** |  |  |  |  |
| **LO 11** |  |  |  |  |
| **LO 12** |  |  |  |  |
| **LO 13** |  |  |  |  |
| **LO 14** |  |  |  |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Signature**  Prof. Dr. Sevilhan ARTAN  Dr. Lecturer. Ebru ERZURUMLUOĞLU GÖKALP | **DATE**  30.04.2025 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **COURSE CODE** | **522604305** | **DEPARTMENT** | Interdisciplinary Neurosciences | | |
| **COURSE NAME** | | **QUANTUM PHYSICS AND CONSCIOUSNESS** | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. T. Erhan COSAN | | Turkish | **Technical** | **Medical** | **Other (……)** |
| X | X |  |

**COURSE LEVEL**

|  |  |  |
| --- | --- | --- |
| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** |
|  |  | **x** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | **ECTS** | **TYPE** |
| Spring | 2 | 2 | - | 3 | 7.5 | Elective |
|  | | | | | | |
| **EVALUATION CRITERIA** | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | **Number** | **Percentage (%)** | |
| Midterm Exam | **1** | **50** | |
| Quiz |  |  | |
| Homework |  |  | |
| Project |  |  | |
| Oral examination |  |  | |
| Other (………) |  |  | |
| **Final Exam** | | **50** | |
| **PREREQUISITE(S)** | | |  | | | |
| **SHORT COURSE CONTENT** | | | Fundamentals of Quantum Physics, explanation of consciousness through quantum mechanics, | | | |
| **COURSE AIMS** | | | Basic information about Quantum Physics, Consciousness and quantum computing. | | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | | | To learn about consciousness | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | |  | | | |
| **TEXTBOOK** | | | Prof. Dr. T. Erhan COSANProf. Dr. Abdullah ALGIN “CONSCIOUSNESS AND REALITY” | | | |
| **OTHER REFERENCES** | | |  | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | Source books  Related websites | | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS TO BE COVERED** |
| **1** |  | Information Hidden in Quantum Dynamics |
| **2** |  | Fundamental Concepts of Quantum Dynamics |
| **3** |  | Quantum's Hidden Variables Turn Into Information |
| **4** |  | Time |
| **5** |  | Quantum Dynamics and Biological Systems |
| **6** |  | **MIDTERM EXAM** |
| **7** |  | Quantum Dynamics and Biological Systems |
| **8** |  | Is Artificial Intelligence Consciousness? |
| **9** |  | Will Quantum Computers Become Conscious? |
| **10** |  | Consciousness |
| **11** |  | From Neural Networks to Consciousness |
| **12** |  | Remote Control of the Brain |
| **13** |  | Universe Consciousness |
| **14** |  | Noosphere |
| **15,16** |  | **END OF SEMESTER EXAM** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE ELECTRICAL ELECTRONICS ENGINEERING MSc PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES (Phd)** | **1**  **Low** | **2**  **Mid** | **3**  **High** |
| **LO 1** | The subject of consciousness is examined in terms of quantum physics |  |  | **X** |
| **LO 2** | Acquiring information about quantum physics |  |  | **X** |
| **LO 3** | A different perspective on the subject of consciousness is gained from a neuroscientific perspective |  |  | **X** |
| **LO 4** |  |  |  |  |
| **LO 5** |  |  |  |  |
| **LO 6** |  |  |  |  |
| **LO 7** |  |  |  |  |
| **LO 8** |  |  |  |  |
| **LO 9** |  |  |  |  |
| **LO 10** |  |  |  |  |
| **LO 11** |  |  |  |  |
| **LO 12** |  |  |  |  |
| **LO 13** |  |  |  |  |
| **LO 14** |  |  |  |  |

|  |  |
| --- | --- |
| **INSTRUCTOR GIVING THE COURSE** | **DATE** |
| Prof. Dr. T. Erhan COSAN | 30.04.2025 |