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| **STEM CELL DEPARTMENT DOCTORATE PROGRAM** | | | | | |
| **FALL SEMESTER** | | | | | |
| **Course Code** | **Course Name** | **ECTS** | **T+U+L** | **T/S** | **Language** |
| **522803301** | [**MESENCHYMAL STEM CELL BIOLOGY**](#DERS522801301) | **7.5** | **3+2+0** | **COMPULSORY** | **TURKISH** |
| 522803302 | [GENOME REGULATION OF STEM CELLS](#DERS522801302) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522803303 | [STEM CELL AGING AND IMMORTALIZATION](#DERS522801303) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522803304 | [TRANSLATIONAL STEM CELL MEDICINE](#DERS522801304) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522803305 | [PLURIPOTENTIAL STEM CELLS](#DERS522801305) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522805306 | [CANCER STEM CELL BIOLOGY](#DERS522801306) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522804315 | PRINCIPLES OF STEM CELL CULTURE SYSTEM | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522805307 | [STEM CELL APPLICATIONS IN CARDIOLOGY](#DERS522801307) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805308 | [STEM CELL APPLICATIONS IN ORTHOPEDICS](#DERS522801308) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805309 | [STEM CELL IMMUNOLOGY AND DIAGNOSIS METHODS](#DERS522801309) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805310 | [STEM CELL BIOCHEMISTRY](#DERS522801310) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805311 | [BIOSAFETY IN STEM CELL RESEARCH: DIFFERENCE AND TOXICOLOGICAL APPROACH](#DERS522801311) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522803312 | [STEM CELLS IN GROWTH AND REGENERATION](#DERS522801312) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522803313 | [CELL AND TISSUE BANKING](#DERS522801313) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522803314 | [INDUCED PLURIPOTENTIAL STEM CELLS](#DERS522801314) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522805315 | [EPIGENETICS AND REPROGRAMMING](#DERS522801315) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805316 | [STEM CELL APPLICATIONS IN PEDIATRIC SURGERY](#DERS522801316) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805317 | [BONE, MUSCLE, SKELETON TISSUE ENGINEERING](#DERS522801317) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805318 | [STEM CELL MICROENVIRONMENT](#DERS522801318) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805319 | [STEM CELL PROTEOMICS](#DERS522801319) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522803320 | [STEM CELL RES. NEW GENERATION SEQUENCE AND BIOINFORMATICS](#DERS522801320) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522805321 | [TISSUE ENGINEERING IN PEDIATRIC SURGERY](#DERS522801321) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805322 | [STEM CELL APPLICATIONS IN CARDIOVASCULAR SURGERY](#DERS522801322) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805323 | [STEM CELL APPLICATIONS IN EAR NOSE THROAT SURGERY](#DERS522801323) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522805324 | [STEM CELL APPLICATIONS IN UROLOGY](#DERS522801324) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| **522804400** | **DOCTORATE SEMINAR** | **7.5** | **0+1+0** | **COMPULSORY** | **TURKISH** |
| **522801600** | **SPECIALIZED FIELD COURSE** | **5.0** | **3+0+0** | **COMPULSORY** | **TURKISH** |
| **522801300** | **DOCTORATE THESIS STUDY** | **25.0** | **0+1+0** | **COMPULSORY** | **TURKISH** |
| **520111101** | **RESEARCH METHODS AND PUBLISHING ETHICS** | **7.5** | **3+0+3** | **COMPULSORY** | **TURKISH** |

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| **STEM CELL DEPARTMENT DOCTORATE PROGRAM** | | | | | |
| **SPRING SEMESTER** | | | | | |
| **Course Code** | **Course Name** | **ECTS** | **T+U+L** | **T/S** | **Language** |
| **522804301** | [**STEM CELL DIFFERENTIATION**](#DERS522802301) | **7.5** | **3+2+0** | **COMPULSORY** | **TURKISH** |
| 522804302 | [STEM CELL LINES IN GOOD MANUFACTURING PRACTICES](#DERS522802302) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522806 303 | [STEM CELL APPLICATIONS IN GENERAL SURGERY](#DERS522802303) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806304 | [STEM CELL APPLICATIONS IN PLASTIC SURGERY](#DERS522802304) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806305 | [STEM CELLS AND DIABETES](#DERS522802305) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806306 | [CLINICAL TISSUE ENGINEERING](#DERS522802306) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806307 | [NEURAL STEM CELL](#DERS522802307) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806308 | [CURRENT APPROACHES IN TISSUE ENGINEERING](#DERS522802308) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522804309 | [HUMAN REGENERATION](#DERS522802309) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522806310 | [STEM CELL APPLICATIONS IN BRAIN SURGERY](#DERS522802310) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522806311 | [STEM CELL APPLICATIONS IN PEDIATRIC NEUROLOGY](#DERS522802311) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522804312 | [STEM CELL IN DISEASE AND PHYSIOLOGY](#DERS522802312) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522804313 | [GENE TRANSFER TECHNOLOGIES IN STEM CELLS](#DERS522802313) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522804314 | INDUCED PLURIPOTENTIAL STEM CELLS | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522806316 | [PRINCIPLES OF MECHANOTRANSDUCTION AND MECHANOBIOLOGY](#DERS522804316) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 522804317 | [CELLULAR AND MOLECULAR MECHANISMS OF AUTOIMMUNE DISEASES](#DERS522804317) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| 522804318 | [CURRENT APPROACHES IN GENE AND STEM CELL THERAPY](#DERS522804318) | 7.5 | 3+2+0 | ELECTIVE | TURKISH |
| **522804400** | **DOCTORATE SEMINAR** | **7.5** | **0+1+0** | **COMPULSORY** | **TURKISH** |
| **522801600** | **SPECIALIZED FIELD COURSE** | **5.0** | **3+0+0** | **COMPULSORY** | **TURKISH** |
| **522801300** | **DOCTORATE THESIS STUDY** | **25.0** | **0+1+0** | **COMPULSORY** | **TURKISH** |
| **520111101** | **RESEARCH METHODS AND PUBLISHING ETHICS** | **7.5** | **3+0+3** | **COMPULSORY** | **TURKISH** |

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| **COURSE CODE** | 522803301 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | MESENCHYMAL STEM CELL BIOLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st Semester) | 3 | 2 |  | 4 | | 7.5 | | Compulsory |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | The concept of mesenchymal stem cells, immunogenetic and immunophenotypic properties, interaction mechanisms | | | | | |
| **COURSE AIMS** | | | Learning the concept of mesenchymal stem cells and understanding their biological properties | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, mesenchymal stem cells and their properties will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define mesenchymal stem cells  The ability to explain the immunophenotypic and immunogenetic properties of mesenchymal stem cells  The ability to investigate the multipotent differentiation potential of mesenchymal stem cells  The ability to prepare information on the immunosuppressive properties of mesenchymal stem cells  The ability to interpret the anti-apoptotic, anti-fibrotic, and anti-inflammatory effects of mesenchymal stem cells  The ability to analyze the induction of vascularization and plasticity in mesenchymal stem cells  The ability to correlate the models used in mesenchymal stem cell research  The ability to compile information on mesenchymal stem cells and their clinical applications, as well as their role in tissue engineering  The ability to apply mesenchymal stem cell isolation methods | | | | | |
| **TEXTBOOK** | | | Adult mesenchymal stem cells Ernestina Schipani and Henry M Kronenberg.Mesenchymal Stem Cell Assays and Applications  Editors: Vemuri, Mohan C, Chase, Lucas G. , Lipnick, Scott (Eds.)2011 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | History of mesenchymal stem cells |
| **2** |  | Mesenchymal stem cell sources |
| **3** |  | Mesenchymal stem cell isolation methods |
| **4** |  | Immunophenotypic properties of mesenchymal stem cells |
| **5** |  | Immunogenetic properties of mesenchymal stem cells |
| **6** |  | Multiple differentiation studies of mesenchymal stem cells (adipogenic, osteogenic, chondrogenic, myogenic and neurogenic) |
| **7** |  | Mesenchymal stem cells and immunosuppression |
| **8** |  | MID-TERM EXAM |
| **9** |  | Mesenchymal stem cell and anti-apoptotic effect |
| **10** |  | Mesenchymal stem cell and anti-fibrotic effect |
| **11** |  | Mesenchymal stem cell and anti-inflammatory effect |
| **12** |  | Induction of mesenchymal stem cells and vascularization |
| **13** |  | Mesenchymal stem cells and plasticity |
| **14** |  | Models used in mesenchymal stem cell research |
| **15** |  | Mesenchymal stem cell and clinical application areas,mesenchymal stem cell and tissue engineering |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define mesenchymal stem cells |  |  | X |
| LO 2 | The ability to explain the immunophenotypic and immunogenetic properties of mesenchymal stem cells |  |  | X |
| LO 3 | The ability to investigate the multipotent differentiation potential of mesenchymal stem cells |  |  | X |
| LO 4 | The ability to prepare information on the immunosuppressive properties of mesenchymal stem cells |  |  | X |
| LO 5 | The ability to interpret the anti-apoptotic, anti-fibrotic, and anti-inflammatory effects of mesenchymal stem cells |  |  | X |
| LO 6 | The ability to analyze the induction of vascularization and plasticity in mesenchymal stem cells |  |  | X |
| LO 7 | The ability to correlate the models used in mesenchymal stem cell research |  |  | X |
| LO 8 | The ability to compile information on mesenchymal stem cells and their clinical applications, as well as their role in tissue engineering |  |  | X |
| LO 9 | The ability to apply mesenchymal stem cell isolation methods |  |  | X |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522803305 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | PLURIPOTENT STEM CELLS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st Semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Pluripotency mechanisms in embryonic stem cells | | | | | |
| **COURSE AIMS** | | | Learning about pluripotency and the molecular mechanisms involved in embryonic stem cells. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, pluripotency in embryonic stem cells and the molecular mechanisms involved will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define pluripotent stem cell types  The ability to explain the criteria of pluripotency  The ability to classify the characteristics of embryonic stem cells  The ability to apply in vitro and in vivo demonstration of pluripotency  The ability to discuss the in vitro differentiation potential of embryonic stem cells  The ability to interpret the clinical applications of embryonic stem cells  The ability to report the applications of embryonic stem cell therapy in genetic diseases | | | | | |
| **TEXTBOOK** | | | Pluripotent Stem Cell Biology - Advances in Mechanisms, Methods and Models.Edited by Craig S. Atwood and Sivan Vadakkadath Meethal, ISBN 978-953-51-1590-8  Embryonic Stem Cells - Differentiation and Pluripotent Alternatives.Edited by Michael S. Kallos, ISBN 978-953-307-632-4 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Zygote, blastomere and morula potency |
| **2** |  | Blastocyst and stem cell pluripotency |
| **3** |  | Types of pluripotent stem cells (embryonic stem cells, embryonic carcinoma cells, embryonic germ cells) |
| **4** |  | Origin of pluripotent cells |
| **5** |  | Criteria for pluripotency (immortality, non-differentiation, clonability, broad developmental potential) |
| **6** |  | Properties of embryonic stem cells |
| **7** |  | Demonstration of pluripotency in vitro and in vivo |
| **8** |  | MID-TERM EXAM |
| **9** |  | Pluripotency factors; maintenance of pluripotency (transcription factors and signaling molecules) |
| **10** |  | In vitro differentiation potential (cell cycle changes) of embryonic stem cells |
| **11** |  | The importance of embryonic stem cells in DNA damage repair |
| **12** |  | Clinical use of embryonic stem cells |
| **13** |  | Embryonic stem cell treatment applications in genetic diseases |
| **14** |  | Regenerative medicine |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define pluripotent stem cell types |  |  | X |
| LO 2 | The ability to explain the criteria of pluripotency |  |  | X |
| LO 3 | The ability to classify the characteristics of embryonic stem cells |  |  | X |
| LO 4 | The ability to apply in vitro and in vivo demonstration of pluripotency |  |  | X |
| LO 5 | The ability to discuss the in vitro differentiation potential of embryonic stem cells |  |  | X |
| LO 6 | The ability to interpret the clinical applications of embryonic stem cells |  |  | X |
| LO 7 | The ability to report the applications of embryonic stem cell therapy in genetic diseases |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522803303 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL AGING AND IMMORTALIZATION | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall(1st semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Cell aging and its molecular mechanisms, immortalization, generation of immortal cell lines | | | | | |
| **COURSE AIMS** | | | Learning the concept of cell aging, immortalization and mechanisms | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, cell aging, immortalization concept and mechanisms will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | |  | | | | | |
| **TEXTBOOK** | | | Cellular Senescence and the Cell Cycle J. Carl Barrett, Cynthia A. Afshari Chapter The Cell Cycle Part of the series GWUMC Department of Biochemistry Annual Spring Symposia pp 79-89 1994  Cell Immortalization Editors: Professor Dr. Alvaro Macieira-Coelho ISBN: 978-3-642-08491-1 (Print) 978-3-662-06227-2 (Online)Progress in Molecular and Subcellular Biology Volume 24 2000 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Stem Cell Aging |
| **2** |  | Molecular mechanisms of cell aging |
| **3** |  | aging and stasis |
| **4** |  | Replicative aging |
| **5** |  | Aging genes and pathways |
| **6** |  | Mechanisms of cells that escape aging |
| **7** |  | Common aging/immortalization pathways |
| **8** |  | MID-TERM EXAM |
| **9** |  | Aging /immortalization genes and pathways |
| **10** |  | Telomere biology and regulation in stromal and stem cells |
| **11** |  | Telomere-independent stages of the aging process |
| **12** |  | The link between telomeres and telomerase in aging and cancer |
| **13** |  | Cell cycle and effects of stress on the cell |
| **14** |  | Immortalization |
| **15** |  | Generation of immortal cell lines |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cell aging |  |  | X |
| LO 2 | The ability to explain the molecular mechanisms of cellular aging |  |  | X |
| LO 3 | The ability to examine replicative aging |  |  | X |
| LO 4 | The ability to analyze common aging/immortalization pathways |  |  | X |
| LO 5 | The ability to explain telomere biology and regulation in stromal and stem cells |  |  | X |
| LO 6 | The ability to interpret the connection between telomeres, telomerase, aging, and cancer |  |  | X |
| LO 7 | The ability to explain immortalization |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522803304 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | TRANSLATIONAL STEM CELL MEDICINE | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Immunomodulation, autologous and allogeneic mesenchymal stem cells, therapeutic mechanisms of mesenchymal stem cells, clinical translation of mesenchymal stem cell therapies | | | | | |
| **COURSE AIMS** | | | Learn about research on immunomodulation, autologous and allogeneic mesenchymal stem cells, and clinical translation of mesenchymal stem cell therapies | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, research on immunomodulation, autologous and allogeneic mesenchymal stem cells, and clinical translation of mesenchymal stem cell therapies will be learned | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define immunomodulation  The ability to explain autologous and allogeneic mesenchymal stem cells  The ability to interpret the therapeutic mechanisms of mesenchymal stem cells  The ability to examine the migration and homing potential of mesenchymal stem cells to the injury site after systemic infusion  The ability to develop homing strategies to enhance the efficacy and safety of mesenchymal stem cell therapies  The ability to determine the clinical translation of mesenchymal stem cell therapies  The ability to analyze the efficacy, safety, and regulatory status of mesenchymal stem cells | | | | | |
| **TEXTBOOK** | | | Translational Stem Cell Research: Issues Beyond the Debate on the Moral Status of the Human Embryo (Stem Cell Biology and Regenerative Medicine) 2011th Edition by Kristina Hug (Editor), Göran Hermerén (Editor). Translational Regenerative Medicine Edited by:Anthony Atala and Julie Allickson ISBN: 978-0-12-410396-2 2015. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Immunomodulation |
| **2** |  | Autologous and allogeneic mesenchymal stem cells |
| **3** |  | Therapeutic mechanisms of mesenchymal stem cells |
| **4** |  | Production of trophic factors |
| **5** |  | Differentiation potential and tissue engineering |
| **6** |  | Distribution of mesenchymal stem cells after systemic infusion |
| **7** |  | Migration and homing potential of mesenchymal stem cells to the wound site after systemic infusion |
| **8** |  | MID-TERM EXAM |
| **9** |  | Homing strategies to increase efficacy and safety of mesenchymal stem cell therapies |
| **10** |  | Clinical translation of mesenchymal stem cell therapies |
| **11** |  | Preclinical studies with mesenchymal stem cells |
| **12** |  | Efficacy, safety and legal status of mesenchymal stem cells |
| **13** |  | Safety issues: preclinical evaluation (consistency in manufacturing, genetic stability, dose and pharmacokinetics, biodistribution, immunogenicity and immunotoxicity, tumorigenicity) |
| **14** |  | Safety issues: clinical evaluation (stem cell therapies safety evaluations, regulation of stem cell therapeutics) |
| **15** |  | Safety issues: clinical evaluation (regulatory requirements of stem cell therapeutics) |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define immunomodulation |  |  | X |
| LO 2 | The ability to explain autologous and allogeneic mesenchymal stem cells |  |  | X |
| LO 3 | The ability to interpret the therapeutic mechanisms of mesenchymal stem cells |  |  | X |
| LO 4 | The ability to examine the migration and homing potential of mesenchymal stem cells to the injury site after systemic infusion |  |  | X |
| LO 5 | The ability to develop homing strategies to enhance the efficacy and safety of mesenchymal stem cell therapies |  |  | X |
| LO 6 | The ability to determine the clinical translation of mesenchymal stem cell therapies |  |  | X |
| LO 7 | The ability to analyze the efficacy, safety, and regulatory status of mesenchymal stem cells |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522805306 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | CANCER STEM CELL BIOLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Selda DELIORMAN KABADERE | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Cancer stem cell and its molecular mechanism | | | | | |
| **COURSE AIMS** | | | Cancer, cancer stem cell hypothesis, learning the molecular mechanisms that play a role in cancer formation. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, cancer, cancer stem cell hypothesis, and molecular mechanisms involved in cancer formation will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the cancer stem cell hypothesis in the context of stem cells and cancer  The ability to explain tumor stem cells and malignant cells  The ability to investigate the stem cell microenvironment (mesenchymal stem cells in the tumor stroma)  The ability to structure the characterization of cancer stem cells  The ability to explain cancer stem cell pathways  The ability to present plasticity in multipotent tumor stem cells  The ability to analyze cancer stem cell eradication strategies, repair mechanisms in stem cells, and cancer stem cell transformation | | | | | |
| **TEXTBOOK** | | | Advances in Cancer Stem Cell Biology.Editors: Roberto Scatena, Alvaro Mordente, Bruno Giardina.ISBN : 978-1-4614-0808-6 (Print) 978-1-4614-0809-3. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Stem cells and cancer; cancer stem cell hypothesis |
| **2** |  | Tumor stem cells and malignant cells |
| **3** |  | Stem cell microenvironment (mesenchymal stem cells in tumor stroma) |
| **4** |  | Characterization of cancer stem cells |
| **5** |  | Cancer stem cell pathways (Hedgehog/GLI, Notch signaling pathways) |
| **6** |  | TGF-β and Wnt in normal and malignant stem cells: differentiation factors and epigenetic modulation |
| **7** |  | Role of PTEN in hematopoietic and intestinal stem cells and cancer |
| **8** |  | MID-TERM EXAM |
| **9** |  | Transcription factors in cancer stem cells of hematopoietic origin |
| **10** |  | Stem cell chromatin pattern and DNA hypermethylation |
| **11** |  | Plasticity in multipotent tumor stem cells |
| **12** |  | Dormant tumor cells and metastasis |
| **13** |  | Angiogenesis and neurogenesis in tumor |
| **14** |  | The role of microRNAs in stem cells and cancer stem cells |
| **15** |  | Cancer stem cell destruction strategies, repair mechanisms in stem cells and transformation into cancer stem cells |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the cancer stem cell hypothesis in the context of stem cells and cancer |  |  | X |
| LO 2 | The ability to explain tumor stem cells and malignant cells |  |  | X |
| LO 3 | The ability to investigate the stem cell microenvironment (mesenchymal stem cells in the tumor stroma) |  |  | X |
| LO 4 | The ability to structure the characterization of cancer stem cells |  |  | X |
| LO 5 | The ability to explain cancer stem cell pathways |  |  | X |
| LO 6 | The ability to present plasticity in multipotent tumor stem cells |  |  | X |
| LO 7 | The ability to analyze cancer stem cell eradication strategies, repair mechanisms in stem cells, and cancer stem cell transformation |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Selda DELIORMAN KABADERE |  |

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| **COURSE CODE** | 522804315 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | PRINCIPLES OF STEM CELL CULTURE SYSTEM | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATAGORY** | | |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ | | Turkish | **Technical** | **Medical** | **Other (…)** |
|  | X |  |

**COURSE LEVEL**

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| **PROPAEDEUTIC** | **M.SC.** | **Ph.D.** | **COURSE OF PROVINCE** |
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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | **COURSE OF** | | | | |
| **TEORIC** | **PRACTICE** | **LABORATORY** | **CREDIT** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 3 | 2 | 0 | 4 | | 7,5 | | Elective |
|  | | | | | | | | |
| **ASSESMENT CRITERIA** | | | | | | | | |
| **MID-TERM EXAM** | | | **Activity** | | **Quantity** | | **Percentage (%)** | |
| 1st Mid-Term | | 1 | | 40 | |
| 2nd Mid-Term | |  | |  | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral Exam | |  | |  | |
| Other (………) | |  | |  | |
| **FINAL EXAM** | | | 60 | | | | | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Basic principles of somatic and stem cell culture systems | | | | | |
| **COURSE AIMS** | | | The aim of this course is to enable students to understand the basic principles of stem cell culture systems. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the basic principles of stem cell culture systems will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the isolation of somatic cells from embryonic and adult tissues  The ability to explain the preparation of primary cell cultures  The ability to plan imaging techniques in stem cell culture  The ability to perform viability assays in stem cells  The ability to investigate the basic principles of cryopreservation in stem cell culture  The ability to compile information on stem cells and their applications | | | | | |
| **TEXTBOOK(S)** | | | Adil M. Allahverdiyev “Somatik ve Kök Hücre Kültür Sistemlerinin Temel İlkeleri” Nobel Tıp Kitabevi, 2018. | | | | | |
| **OTHER REFERENCES** | | | Electronic databases and scientific books about the subject | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Isolation of somatic cells from embryonic and adult tissues |
| **2** |  | Preparation of primary cell cultures |
| **3** |  | Human fibroblastic cell culture |
| **4** |  | Human amniotic cell culture |
| **5** |  | Stem cells and application areas |
| **6** |  | Potential for use in stem cells and regenerative medicine |
| **7** |  | Stem cell applications |
| **8** |  | MID-TERM EXAM |
| **9** |  | Imaging techniques in stem cell culture I: Microscopy, time-lapse microscopy, real-time cell tracking |
| **10** |  | Imaging techniques in stem cell culture II: Flow cytometry and its use in stem cell culture |
| **11** |  | Other imaging techniques developed and applied in stem cell culture |
| **12** |  | Viability tests of stem cells I: Viability detection, cell count, cell membrane permeability |
| **13** |  | Viability tests of stem cells II: Cell function analysis |
| **14** |  | Basic principles of cryopreservation in stem cell culture I: Cryopreservation of cells, cryopretectants |
| **15** |  | Basic principles of cryopreservation in stem cell culture II: Stages of cells during cryopreservation, changes in cells during freezing |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF THE COURSE LEARNING OUTCOMES TO THE PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the isolation of somatic cells from embryonic and adult tissues |  |  | X |
| LO 2 | The ability to explain the preparation of primary cell cultures |  |  | X |
| LO 3 | The ability to plan imaging techniques in stem cell culture |  |  | X |
| LO 4 | The ability to perform viability assays in stem cells |  |  | X |
| LO 5 | The ability to investigate the basic principles of cryopreservation in stem cell culture |  |  | X |
| LO 6 | The ability to compile information on stem cells and their applications |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
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| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ | 15.11.2019 |

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| **COURSE CODE** | 522805311 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | BIOSAFETY IN STEM CELL RESEARCH: PHARMACOLOGICAL AND TOXICOLOGICAL APPROACH | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Engin YILDIRIM | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Biosafety in stem cell research | | | | | |
| **COURSE AIMS** | | | To learn biosafety studies in stem cell research from a pharmacological and toxicological perspective. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, biosafety studies in stem cell research will be learned from a pharmacological and toxicological perspective. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the general preclinical study design  The ability to explain preclinical biosafety animal studies  The ability to plan drug toxicity studies  The ability to compare pharmacokinetic and pharmacodynamic evaluations in animals  The ability to manage chemical and pharmaceutical development  The ability to compare Phase I, Phase II, Phase III, and Phase IV clinical trials | | | | | |
| **TEXTBOOK** | | | Biosafety Resource Book. Andrea SonninoFood and Agriculture Organization of the United Nations Rome, 2011. Bioethics and BiosafetyMK Sateesh IK International Pvt Ltd, 25 Aug 2008 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | 1) General preclinical study design |
| **2** |  | 2) Preclinical biosafety animal studies a) Screening tests |
| **3** |  | b) Drug toxicity studies (ED50, LD50 , therapeutic dose range) |
| **4** |  | acute toxicity studies |
| **5** |  | subacute toxicity studies |
| **6** |  | chronic toxicity studies |
| **7** |  | specific toxicity (teratogenic, carcinogenic, mutagenic, effects on fertility) |
| **8** |  | MID-TERM EXAM |
| **9** |  | c) Pharmacokinetic and pharmacodynamic studies in animals |
| **10** |  | d) Chemical and pharmaceutical development |
| **11** |  | 3) Clinical evaluation |
| **12** |  | a) First phase (phase I) trials (pharmacokinetic studies, bioavailability, drug safety) |
| **13** |  | b) Second phase (phase II) trials ( optimal dose, therapeutic dose range, degree of therapeutic effect, side effect profile) |
| **14** |  | c) Third phase (phase III) trials [bioequivalence and comparison with placebo] |
| **15** |  | d) Fourth phase (phase IV) trials (post-licensing studies) |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the general preclinical study design |  |  | X |
| LO 2 | The ability to explain preclinical biosafety animal studies |  |  | X |
| LO 3 | The ability to plan drug toxicity studies |  |  | X |
| LO 4 | The ability to compare pharmacokinetic and pharmacodynamic evaluations in animals |  |  | X |
| LO 5 | The ability to manage chemical and pharmaceutical development |  |  | X |
| LO 6 | The ability to compare Phase I, Phase II, Phase III, and Phase IV clinical trials |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Engin YILDIRIM |  |

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| **COURSE CODE** | 522805310 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL BIOCHEMISTRY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Regulatory mechanisms in stem cell proliferation, differentiation, motility and polarity, signal transduction and cellular signals in stem cells, stem cell metabolism | | | | | |
| **COURSE AIMS** | | | To examine the regulatory mechanisms, signaling mechanisms and metabolism of stem cells from a biochemical perspective. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the regulatory mechanisms, signaling mechanisms and metabolism of stem cells will be learned from a biochemical perspective. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the cell cycle and the regulation of the cell cycle in stem cells  The ability to explain the biochemistry of the cell membrane and receptors  The ability to analyze signal transduction and cellular signaling in stem cells  The ability to compile stem cell metabolism  The ability to relate the interactions between protein, lipid, and carbohydrate chains in the modulation of intra/extracellular information  The ability to report a biochemical approach to stem cell research | | | | | |
| **TEXTBOOK** | | | Biochemistry and Molecular Biology 4th Edition by William H. Elliott (Author), Daphne C. Elliott (Author) 2009. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Cell cycle, regulation of the cell cycle of stem cells |
| **2** |  | Stem Cell aging, cell death |
| **3** |  | Regulatory mechanisms in stem cell proliferation, differentiation, motility and polarity |
| **4** |  | Cell membrane and receptor biochemistry |
| **5** |  | Protein structure and function |
| **6** |  | Cell membrane structure and function |
| **7** |  | signal transduction and cellular signals in stem cells |
| **8** |  | MID-TERM EXAM |
| **9** |  | Growth factors and inhibitors in stem cell differentiation |
| **10** |  | The importance of extracellular matrix and integrins in stem cell applications |
| **11** |  | stem cell metabolism |
| **12** |  | Interaction between protein, lipid and carbohydrate chains in modulation of intra/extracellular information |
| **13** |  | Biochemical processes in genome replication and repair |
| **14** |  | Biochemical approach to stem cell research |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the cell cycle and the regulation of the cell cycle in stem cells |  |  | X |
| LO 2 | The ability to explain the biochemistry of the cell membrane and receptors |  |  | X |
| LO 3 | The ability to analyze signal transduction and cellular signaling in stem cells |  |  | X |
| LO 4 | The ability to compile stem cell metabolism |  |  | X |
| LO 5 | The ability to relate the interactions between protein, lipid, and carbohydrate chains in the modulation of intra/extracellular information |  |  | X |
| LO 6 | The ability to report a biochemical approach to stem cell research |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
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| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ |  |

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| **COURSE CODE** | 522805309 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL IMMUNOLOGY AND DIAGNOSTIC METHODS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Emel YANTIR | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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

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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Effect of mesenchymal stem cells on immune cells, immunomodulatory effect of mesenchymal stem cells in adaptive immunity, mesenchymal stem cell suppression in innate immunity, diagnostic methods | | | | | |
| **COURSE AIMS** | | | To learn the effect of mesenchymal stem cells on immune cells, the immunomodulatory effect of mesenchymal stem cells in adaptive and innate immunity, and diagnostic methods. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the effect of mesenchymal stem cells on immune cells, the immunomodulatory effect of mesenchymal stem cells in adaptive and innate immunity, and diagnostic methods will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the effects of mesenchymal stem cells on immune cells  The ability to explain the immunomodulatory effects of mesenchymal stem cells in adaptive immunity  The ability to examine mesenchymal stem cell suppression in innate immunity  The ability to investigate the HLA system (MHC system) in stem cell applications  The ability to compile antigen-antibody interactions in stem cell applications  The ability to interpret cellular immunity in stem cell applications  The ability to design autologous and allogeneic approaches and stem cell transplantation | | | | | |
| **TEXTBOOK** | | | Stem cell immunology Catherine J. Wu 2013 by the Massachusetts General Hospital. Mesenchymal Stem Cells: Immunology and Therapeutic Benefits Najib El Haddad Stem Cells in Clinic and Research", Ali Gholamrezanezhad, ISBN 978-953-307-797-0, 2011 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Effect of mesenchymal stem cells on immune cells |
| **2** |  | Immunomodulatory effect of mesenchymal stem cells in adaptive immunity |
| **3** |  | Mesenchymal stem cell suppression in innate immunity |
| **4** |  | Monocytes and dendritic cells, T regulatory cells; B regulatory cells; nonspecific defense systems (NK cells) |
| **5** |  | Cell-cell interactions in stem cell applications |
| **6** |  | HLA system (MHC system) in stem cell applications |
| **7** |  | Programmed cell death |
| **8** |  | MID-TERM EXAM |
| **9** |  | Metabolic diseases and stem cells |
| **10** |  | Tumor immunology |
| **11** |  | Antigen-antibody interactions in stem cell applications (precipitation, electrophoresis, agglutination techniques/complement binding reaction, immunofluorescence, immunohistochemistry) |
| **12** |  | Cellular immunity in stem cell applications (cell isolation techniques, T cell function testing) |
| **13** |  | Humoral immunity in stem cell applications (B cell function test) |
| **14** |  | Immunomodulation |
| **15** |  | Autogenic and allogeneic approaches and stem cell transplantation |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the effects of mesenchymal stem cells on immune cells |  |  | X |
| LO 2 | The ability to explain the immunomodulatory effects of mesenchymal stem cells in adaptive immunity |  |  | X |
| LO 3 | The ability to examine mesenchymal stem cell suppression in innate immunity |  |  | X |
| LO 4 | The ability to investigate the HLA system (MHC system) in stem cell applications |  |  | X |
| LO 5 | The ability to compile antigen-antibody interactions in stem cell applications |  |  | X |
| LO 6 | The ability to interpret cellular immunity in stem cell applications |  |  | X |
| LO 7 | The ability to design autologous and allogeneic approaches and stem cell transplantation |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
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| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Emel YANTIR |  |

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| **COURSE CODE** | 522805307 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN CARDIOLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. Selda MURAT | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Basic principles in the use of stem cells and new therapies obtained from different sources in the treatment of cardiovascular diseases | | | | | |
| **COURSE AIMS** | | | Learn about new research in the field of stem cell therapies for the treatment of cardiovascular diseases. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, information will be learned about new research in the department of treatment stem cell therapies used in care. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the fundamental principles (patient safety and risk balance) in the use of new therapies  The ability to explain key factors in the application of stem cell therapy to patients  The ability to transfer knowledge about stem cells derived from different sources for the treatment of cardiovascular diseases  The ability to analyze the role of paracrine factors secreted by stem cells in the improvement of cardiac functions  The ability to plan stem cell-based therapies for patients with acute myocardial ischemia | | | | | |
| **TEXTBOOK** | | | Stem Cell and Gene Therapy for Cardiovascular Disease Edited by:Emerson C. Perin, Leslie W. Miller, Doris A. Taylor and James T. Willerson ISBN: 978-0-12-801888-0 2015. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Basic principles for using new therapies (patient safety and balance of risk) |
| **2** |  | Important factors in administering stem cells to patients (type and nature of injury, timing of therapy) |
| **3** |  | Important factors in administering stem cells to patients (ability of cells to graft into host myocardium) |
| **4** |  | Stem cells (human embryonic stem cells) obtained from different sources in the treatment of cardiovascular diseases |
| **5** |  | Stem cells obtained from different sources in the treatment of cardiovascular diseases (cardiac stem cells) |
| **6** |  | Stem cells (myoblasts) obtained from different sources in the treatment of cardiovascular diseases |
| **7** |  | Stem cells from different sources (human adult bone marrow-derived stem cells) in the treatment of cardiovascular diseases |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cells (mesenchymal stem cells) obtained from different sources in the treatment of cardiovascular diseases |
| **10** |  | Stem cells (endothelial progenitor cells) obtained from different sources in the treatment of cardiovascular diseases |
| **11** |  | Stem cells obtained from different sources (endogenous cardiac stem cells) in the treatment of cardiovascular diseases |
| **12** |  | Stem cells obtained from different sources (umbilical cord blood stem cells) in the treatment of cardiovascular diseases |
| **13** |  | Stem cells obtained from different sources (induced pluripotent stem cells) in the treatment of cardiovascular diseases |
| **14** |  | Role of paracrine factors secreted by stem cells in improving cardiac functions. |
| **15** |  | acute myocardial ischemia |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the fundamental principles (patient safety and risk balance) in the use of new therapies |  |  | X |
| LO 2 | The ability to explain key factors in the application of stem cell therapy to patients |  |  | X |
| LO 3 | The ability to transfer knowledge about stem cells derived from different sources for the treatment of cardiovascular diseases |  |  | X |
| LO 4 | The ability to analyze the role of paracrine factors secreted by stem cells in the improvement of cardiac functions |  |  | X |
| LO 5 | The ability to plan stem cell-based therapies for patients with acute myocardial ischemia |  |  | X |
| LO 6 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. Selda MURAT |  |

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| **COURSE CODE** | 522805308 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN ORTHOPEDICS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ulukan INAN | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (1st semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell therapies in bone and cartilage diseases and traumas | | | | | |
| **COURSE AIMS** | | | Learn about new research on stem cell therapies and their effectiveness in orthopedic diseases and traumas . | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, new research on stem cell therapies and their effectiveness in orthopedic diseases and traumas will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define musculoskeletal diseases and osteoarthritis  The ability to explain cartilage degeneration in osteoarthritis  The ability to report on articular cartilage and chondrocytes, cartilage regeneration, and repair  The ability to develop stem cell application techniques in orthopedics  The ability to investigate cell-based therapies for the treatment of chondral lesions  The ability to compile information on biological scaffolds and their use in the treatment of chondral lesions  The ability to interpret data from studies conducted on animals and humans | | | | | |
| **TEXTBOOK** | | | Stem Cells and Bone Tissue Rajkumar Rajendram, Victor R. Preedy, Vinood PatelJanuary 23, 2013 by CRC Press Reference - 422 Pages - 17 Color & 70 B/W Illustrations ISBN 9781466578418 - CAT# K16834 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Musculoskeletal diseases and osteoarthritis |
| **2** |  | Cartilage degeneration in osteoarthritis |
| **3** |  | Articular cartilage and chondrocytes, cartilage regeneration and repair |
| **4** |  | In orthopedics (tendon repair, cartilage, bone) |
| **5** |  | Animal study data (cartilage repair, meniscus repair) |
| **6** |  | Animal study data (tendon repair) |
| **7** |  | Animal study data (intervertebral disc) |
| **8** |  | MID-TERM EXAM |
| **9** |  | Clinical studies in orthopedic diseases |
| **10** |  | Based therapies for the treatment of chondral lesions |
| **11** |  | Autologous chondrocyte implantation |
| **12** |  | Mesenchymal stem cell implantation |
| **13** |  | Biological scaffolds and their use in the treatment of chondral lesions |
| **14** |  | Current biomedical developments in articular cartilage repair |
| **15** |  | One step cell-free cartilage repair method |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define musculoskeletal diseases and osteoarthritis |  |  | X |
| LO 2 | The ability to explain cartilage degeneration in osteoarthritis |  |  | X |
| LO 3 | The ability to report on articular cartilage and chondrocytes, cartilage regeneration, and repair |  |  | X |
| LO 4 | The ability to develop stem cell application techniques in orthopedics |  |  | X |
| LO 5 | The ability to investigate cell-based therapies for the treatment of chondral lesions |  |  | X |
| LO 6 | The ability to compile information on biological scaffolds and their use in the treatment of chondral lesions |  |  | X |
| LO 7 | The ability to interpret data from studies conducted on animals and humans |  |  | X |
| LO 8 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ulukan INAN |  |

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| **COURSE CODE** | 522803314 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | INDUCED PLURIPOTENT STEM CELLS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (2nd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Induced pluripotent stem cells (IPSc), reprogramming and therapeutic potential | | | | | |
| **COURSE AIMS** | | | Learning about induced pluripotent stem cells (IPSc), reprogramming and therapeutic potential | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, induced pluripotent stem cells (IPSc), reprogramming and therapeutic potential mechanisms will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define reprogramming factors  The ability to explain nuclear transfer and animal cloning  The ability to convey reprogramming factors and alternative pluripotency  The ability to discuss induced pluripotent stem cells (iPSCs)  The ability to analyze the therapeutic potential of iPSCs  The ability to discuss iPSCs and cellular therapy  The ability to apply the derivation, culture, and characterization of pluripotent stem cells | | | | | |
| **TEXTBOOK** | | | Induced Pluripotent Stem (iPS) Cells: Methods and Protocols. Editors: Turksen, Kursad, Nagy, Andras (Eds.) 2016 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Obtaining, culturing and characterizing pluripotent stem cells |
| **2** |  | Reprogramming factors |
| **3** |  | Cellular reprogramming |
| **4** |  | Nuclear transfer and animal cloning |
| **5** |  | Reprogramming factors and alternative pluripotency |
| **6** |  | Induced pluripotent stem cells (ipsc) |
| **7** |  | Induced pluripotent stem cells equivalent to embryonic stem cells? |
| **8** |  | MID-TERM EXAM |
| **9** |  | Mouse ipsc |
| **10** |  | Human ipsc |
| **11** |  | Myc family genes, Nanog function in pluripotency |
| **12** |  | Oct-3/4 and Sox-2 function in pluripotency |
| **13** |  | Therapeutic potential of IPS cells |
| **14** |  | IPS cells and cellular therapy |
| **15** |  | Innovations in IPS cell research |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define reprogramming factors |  |  | X |
| LO 2 | The ability to explain nuclear transfer and animal cloning |  |  | X |
| LO 3 | The ability to convey reprogramming factors and alternative pluripotency |  |  | X |
| LO 4 | The ability to discuss induced pluripotent stem cells (iPSCs) |  |  | X |
| LO 5 | The ability to analyze the therapeutic potential of iPSCs |  |  | X |
| LO 6 | The ability to discuss iPSCs and cellular therapy |  |  | X |
| LO 7 | The ability to apply the derivation, culture, and characterization of pluripotent stem cells |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522804301 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL DIFFERENTIATION | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(2nd semester) | 3 | 2 |  | 4 | | 7.5 | | Compulsory |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Molecular mechanisms of stem cell differentiation | | | | | |
| **COURSE AIMS** | | | Learning the properties and differentiation mechanisms of stem cells at the molecular level | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the differentiation mechanisms of stem cells will be learned at the molecular level. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cells and their characteristics  The ability to explain cell-matrix interactions  The ability to relate matrix structure and organization, matrix chemistry, and mechanical properties of the matrix  The ability to categorize factors influencing stem cell differentiation  The ability to design in vitro stem cell differentiation  The ability to interpret in vitro differentiation potential  The ability to apply differentiation characterization analyses of stem cells in a laboratory setting | | | | | |
| **TEXTBOOK** | | | Essentials of Stem Cell Biology (Second Edition) Edited by:Robert Lanza, John Gearhart, Brigid Hogan, Douglas Melton, Roger Pedersen, E. Donnall Thomas, James Thomson and Sir Ian Wilmut ISBN: 978-0-12-374729-7 2009 . Stem Cells, Tissue Engineering and Regenerative Medicine Edited by: David Warburton (University of Southern California, USA) 552pp Feb 2015 ISBN: 978-981-4612-77-7 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Stem cells and their properties |
| **2** |  | Cell -matrix interactions |
| **3** |  | Matrix structure and organization, matrix chemistry, mechanical properties of the matrix |
| **4** |  | Differentiation of stem cells |
| **5** |  | Transcription factors in stem cell differentiation |
| **6** |  | Stem cell differentiation (Wnt signaling pathway, Hedgehog signaling pathway, TGF β-superfamily signaling pathway) |
| **7** |  | Stem cell differentiation (mirna in stem cell differentiation) |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cell differentiation (mechanical stimuli in stem cell differentiation) |
| **10** |  | In vitro differentiation of stem cells |
| **11** |  | In vitro differentiation potential (mesodermal lineage) |
| **12** |  | In vitro differentiation potential (ectodermal lineage) |
| **13** |  | In vitro differentiation potential (endodermal lineage) |
| **14** |  | Initiation, maintenance and termination of the differentiation process of stem cells |
| **15** |  | Selection of specific differentiation pathways of multipotent stem cells |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cells and their characteristics |  |  | X |
| LO 2 | The ability to explain cell-matrix interactions |  |  | X |
| LO 3 | The ability to relate matrix structure and organization, matrix chemistry, and mechanical properties of the matrix |  |  | X |
| LO 4 | The ability to categorize factors influencing stem cell differentiation |  |  | X |
| LO 5 | The ability to design in vitro stem cell differentiation |  |  | X |
| LO 6 | The ability to interpret in vitro differentiation potential |  |  | X |
| LO 7 | The ability to apply differentiation characterization analyses of stem cells in a laboratory setting |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522804312 | **DEPARTMENT** | **STEM CELL** | | |
| **COURSE NAME** | | STEM CELL IN DISEASE AND PHYSIOLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | **X** |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(2nd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Investigating human diseases using stem cell models, Stem cell-derived vascularity: A potential and multidimensional technology for basic research in disease modeling and tissue engineering, Nano- and microcarriers that improve stem cell behavior in neurodegenerative medicine strategies: Application to Huntington's disease, Induced neural stem cells for the treatment of Huntington's disease, Alzheimer's disease, dementia, and stem cell therapy, Current stem cell-based therapies in Parkinson's disease , Stem cell therapy for degenerative eye disease, Stem cell therapies for reversible vision loss, Stem cell therapy for kidney disease, Current approaches to the application of stem cell therapy for liver disease, Complications after stem cell therapy in inflammatory bowel disease, Fractones: an extracellular matrix niche that controls the fate and growth factor activity of stem cells in the brain in health and disease, Wnt/catenin signaling in the physiology and disease of adult stem cells, Basic principles of stem cell banking will be discussed. | | | | | |
| **COURSE AIMS** | | | To provide knowledge on examining, analyzing and developing stem cell behavior in disease treatment strategies using medical and engineering techniques. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, stem cell behavior in disease treatment strategies will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cell-derived vascularization in disease modeling and tissue engineering  The ability to explain nano- and microcarriers that enhance stem cell behavior in neurodegenerative medicine strategies  The ability to discuss neural stem cell therapies in neurodegenerative diseases  The ability to report stem cell therapies for reversible vision loss  The ability to present stem cell therapies for gastrointestinal system diseases  The ability to explain Wnt/β-catenin signaling in adult stem cell physiology and disease  The ability to define the fundamental principles of stem cell banking | | | | | |
| **TEXTBOOK** | | | Stem Cell Biology in Health and Disease, Editor: Thomas Dittmar, 2009.  Developmental and Stem Cell Biology in Health and Disease, Ahmed El-Hashash 2014.  Stem Cells and Human Diseases, Editors: Rakesh Srivastava, Sharmila Shankar, 2012. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Investigating human diseases using stem cell models |
| **2** |  | Stem cell-derived vascularity: Potential and multidimensional technology for disease modeling and tissue engineering basic research |
| **3** |  | Nano- and microcarriers to improve stem cell behavior in neurodegenerative medicine strategies: application to Huntington's disease |
| **4** |  | Induced neural stem cells for the treatment of Huntington's disease |
| **5** |  | Alzheimer's disease, dementia and stem cell therapy |
| **6** |  | Current stem cell-based therapies in Parkinson's Disease |
| **7** |  | Stem cell therapy for degenerative eye disease |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cell treatments for reversible vision loss |
| **10** |  | Stem cell therapy for kidney disease |
| **11** |  | Current approaches to the application of stem cell therapy for liver disease |
| **12** |  | Complications after stem cell therapy in inflammatory bowel disease |
| **13** |  | Fractones: an extracellular matrix niche that controls the fate and growth factor activity of stem cells in the brain in health and disease. |
| **14** |  | Wnt/ β catenin signaling in the physiology and disease of adult stem cells |
| **15** |  | Basic principles of stem cell banking |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LESARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cell-derived vascularization in disease modeling and tissue engineering |  |  | X |
| LO 2 | The ability to explain nano- and microcarriers that enhance stem cell behavior in neurodegenerative medicine strategies |  |  | X |
| LO 3 | The ability to discuss neural stem cell therapies in neurodegenerative diseases |  |  | X |
| LO 4 | The ability to report stem cell therapies for reversible vision loss |  |  | X |
| LO 5 | The ability to present stem cell therapies for gastrointestinal system diseases |  |  | X |
| LO 6 | The ability to explain Wnt/β-catenin signaling in adult stem cell physiology and disease |  |  | X |
| LO 7 | The ability to define the fundamental principles of stem cell banking |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
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| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Sibel GÜNEŞ BAĞIŞ |  |

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| **COURSE CODE** | 522806306 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | CLINICAL TISSUE ENGINEERING | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. Hüseyin AVCI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(2nd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Techniques used in tissue engineering. | | | | | |
| **COURSE AIMS** | | | To understand the latest techniques and application areas used in tissue engineering. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the latest techniques and application areas used in tissue engineering will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define biotransport, bioelectricity, and biomechanics.  The ability to explain fluid mechanics and solid mechanics.  The ability to investigate biomaterials.  The ability to apply three-dimensional (3D) bioprinting.  The ability to report the role of bioreactors in tissue engineering.  The ability to compare scaffolds used in clinical research. | | | | | |
| **TEXTBOOK** | | | Stem Cell and Tissue Engineering Edited by: Song Li, 2011. Tissue Engineering, Stem Cells, and Gene TherapiesEditors: Elçin, Y. Murat, 2003. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Introduction to tissue engineering |
| **2** |  | Biotransport |
| **3** |  | Bioelectricity |
| **4** |  | Biomechanics |
| **5** |  | Fluid mechanics |
| **6** |  | Mechanics of solid bodies |
| **7** |  | Viscoelasticity |
| **8** |  | MID-TERM EXAM |
| **9** |  | Biomaterials from living to industrial |
| **10** |  | Biomaterials from industry to life |
| **11** |  | Self-assembly |
| **12** |  | Three-dimensional (3D) bioprinting |
| **13** |  | The role of bioreactors in tissue engineering |
| **14** |  | Scaffolds used in clinical studies |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define biotransport, bioelectricity, and biomechanics. |  |  | X |
| LO 2 | The ability to explain fluid mechanics and solid mechanics. |  |  | X |
| LO 3 | The ability to investigate biomaterials. |  |  | X |
| LO 4 | The ability to apply three-dimensional (3D) bioprinting. |  |  | X |
| LO 5 | The ability to report the role of bioreactors in tissue engineering. |  |  | X |
| LO 6 | The ability to compare scaffolds used in clinical research. |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
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| LO 10 |  |  |  |  |
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| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. Hüseyin AVCI |  |

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| **COURSE CODE** | 522806316 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | PRINCIPLES OF MECHANOTRANSDUCTION AND MECHANOBIOLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. Eray ATALAY | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (2nd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Basic principles of mechanobiological mechanisms at molecular, cellular and tissue levels and their effects on tissue remodeling | | | | | |
| **COURSE AIMS** | | | Understanding of the basic principles of mechanobiology and its effects at the cellular and tissue levels. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, you will have acquired knowledge about the basic principles of mechanobiology, mechanotransduction and cell behaviors such as mechanotransduction and cell differentiation and migration related to mechanotransduction, and the areas of use of mechanobiology in regenerative medicine and tissue engineering. In addition, summary and basic information about cellular and matrix mechanical characterization methods will be given. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define mechanotransduction.  The ability to explain the mechanical relationship between cells and the extracellular matrix.  The ability to interpret mechanotransduction and fibrosis.  The ability to relate mechanotransduction to tumor formation.  The ability to comprehend the relationship between matrix mechanical properties and stem cell differentiation.  The ability to analyze the importance of mechanical stimuli in tissue development (morphogenesis).  The ability to discuss mechanobiology and biomechanics in tissue engineering.  The ability to report the fundamentals of cellular and matrix mechanical characterization. | | | | | |
| **TEXTBOOK** | | | Atala A, Lanza R, Mikos T, Nerem R. Principles of Regenerative Medicine: Elsevier Science, 2018. | | | | | |
| **OTHER REFERENCES** | | | Tee S, Bausch AR, and Janmey PA. The mechanical cell. Curr. Biol. 2009; 19(17):R745-8. [PMID: 19906576]  Ingber DE. Cellular tensegrity: defining new rules of biological design that govern the cytoskeleton. J. Cell. Sci. 1993; 104 (Pt 3):613-27. [PMID: 8314865]  Ingber DE. Tensegrity I. Cell structure and hierarchical systems biology. J. Cell. Sci. 2003; 116(Pt 7):1157-73. [PMID: 12615960]  Wirtz D. Particle-tracking microrheology of living cells: principles and applications. Annu Rev Biophys 2009; 38:301-26. [PMID: 19416071]  Gardel ML, Shin JH, MacKintosh FC, Mahadevan L, Matsudaira P, and Weitz DA. Elastic behavior of cross-linked and bundled actin networks. Science 2004; 304(5675):1301-5. [PMID: 15166374]  Storm C, Pastore JJ, MacKintosh FC, Lubensky TC, and Janmey PA. Nonlinear elasticity in biological gels. Nature 2005; 435(7039):191-4. [PMID: 15889088]  Koenderink GH, Dogic Z, Nakamura F, Bendix PM, MacKintosh FC, Hartwig JH, Stossel TP, and Weitz DA. An active biopolymer network controlled by molecular motors. Proc. Natl. Acad. Sci. USA 2009; 106(36):15192-7. [PMID: 19667200]  Zemel A, Bischofs IB, and Safran SA. Active elasticity of gels with contractile cells. Phys. Rev. Lett. 2006; 97(12):128103. [PMID: 17026002]  Zemel A, Rehfeldt F, Brown AEX, Discher DE, and Safran SA. Cell shape, spreading symmetry and the polarization of stress-fibers in cells. J Phys Condensate Matter 2010; 22(19):194110. [PMID: 20458358] | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Introduction to biomechanics and basic concepts |
| **2** |  | Introduction to mechanotransduction 1 |
| **3** |  | Introduction to mechanotransduction 2 |
| **4** |  | Article presentation |
| **5** |  | Cell-matrix mechanical relationship |
| **6** |  | Article presentation |
| **7** |  | Mechanotransduction and fibrosis |
| **8** |  | MID-TERM EXAM |
| **9** |  | Mechanotransduction and tumor formation |
| **10** |  | Relationship between matrix mechanical properties and stem cell differentiation |
| **11** |  | Article presentation |
| **12** |  | Importance of mechanical stimuli in tissue development (morphogenesis) |
| **13** |  | Mechanobiology and biomechanics in tissue engineering |
| **14** |  | Article presentation |
| **15** |  | Fundamentals of cellular and matrix mechanical characterization |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define mechanotransduction. |  |  | X |
| LO 2 | The ability to explain the mechanical relationship between cells and the extracellular matrix. |  |  | X |
| LO 3 | The ability to interpret mechanotransduction and fibrosis. |  |  | X |
| LO 4 | The ability to relate mechanotransduction to tumor formation. |  |  | X |
| LO 5 | The ability to comprehend the relationship between matrix mechanical properties and stem cell differentiation. |  |  | X |
| LO 6 | The ability to analyze the importance of mechanical stimuli in tissue development (morphogenesis). |  |  | X |
| LO 7 | The ability to discuss mechanobiology and biomechanics in tissue engineering. |  |  | X |
| LO 8 | The ability to report the fundamentals of cellular and matrix mechanical characterization. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. Eray ATALAY | 25.11.2021 |

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| **COURSE CODE** | 522804318 | **DEPARTMENT** | STEM CELL NAME | | |
| **COURSE NAME** | | CURRENT APPROACHES IN GENE AND STEM CELL THERAPY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. Tuğba SEMERCI SEVİMLİ | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (2nd semester) | 3 | 2 |  | 4 | | 7.5 | | ELECTIVE |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Genomic and cellular regulation technologies in gene and stem cell therapy | | | | | |
| **COURSE AIMS** | | | Gene and stem cell therapy .  -Development of laboratory skills. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the importance of genomic and cellular regulation technologies, which have a wide range of applications in gene and stem cell therapy, will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define gene therapy and therapeutic gene regulations.  The ability to explain ex vivo and in vivo gene regulation.  The ability to relate CRISPR and other gene regulation technologies.  The ability to investigate RNAi generation methods in stem cells and explore RNAi in stem cell therapies.  The ability to summarize knowledge about induced pluripotent stem cells and RNAi.  The ability to compare nanoparticle-based RNAi delivery systems in stem cells.  The ability to define cancer stem cells and RNAi. | | | | | |
| **TEXTBOOK** | | | A Handbook of Gene and Cell Therapy by Clévio Nóbrega, Liliana Mendonça, et al. | Jun 28, 2020  Regulatory Aspects of Gene Therapy and Cell Therapy Products: A Global Perspective (Advances in Experimental Medicine and Biology, 871) by Maria Cristina Galli and Mercedes Serabian | Sep 25, 2015 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Gene therapy , current state of the art and expectations |
| **2** |  | Therapeutic gene regulation |
| **3** |  | Ex vivo and in vivo gene regulation |
| **4** |  | CRISPR and other gene editing technologies |
| **5** |  | Cellular therapy potential and advantages |
| **6** |  | Methods for generating RNAi in stem cells and RNAi in stem cell therapies |
| **7** |  | Induced pluripotent stem cells and RNAi |
| **8** |  | MID-TERM EXAM |
| **9** |  | Nanoparticle RNAi delivery systems in stem cells |
| **10** |  | Combination of RNAi and stem cells in the treatment of CNS diseases |
| **11** |  | Combination of RNAi and stem cells in cartilage damage treatments |
| **12** |  | Combination of RNAi and stem cells in the treatment of hematological malignancies |
| **13** |  | Combination of RNAi and stem cells in the treatment of congenital diseases |
| **14** |  | Combining RNAi and stem cells in the treatment of autoimmune diseases |
| **15** |  | Cancer stem cells and RNAi |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define gene therapy and therapeutic gene regulations. |  |  | X |
| LO 2 | The ability to explain ex vivo and in vivo gene regulation. |  |  | X |
| LO 3 | The ability to relate CRISPR and other gene regulation technologies. |  |  | X |
| LO 4 | The ability to investigate RNAi generation methods in stem cells and explore RNAi in stem cell therapies. |  |  | X |
| LO 5 | The ability to summarize knowledge about induced pluripotent stem cells and RNAi. |  |  | X |
| LO 6 | The ability to compare nanoparticle-based RNAi delivery systems in stem cells. |  |  | X |
| LO 7 | The ability to define cancer stem cells and RNAi. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| LO 12 |  |  |  |  |
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| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. Tuğba SEMERCI SEVİMLİ | 27.11.2021 |

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| --- | --- | --- | --- | --- | --- |
| **COURSE CODE** | 522806308 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | CURRENT APPROACHES IN TISSUE ENGINEERING | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. S. Mine TOKER | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(2nd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Use of stem cells in tissue engineering and cell-based therapeutic approaches | | | | | |
| **COURSE AIMS** | | | Learning the use of stem cells in tissue engineering and cell-based therapeutic approaches | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the use of stem cells in tissue engineering and cell-based therapeutic approaches will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the analysis of tissue dynamics.  The ability to explain the signaling mechanisms of cellular components.  The ability to examine the use of extracellular matrix elements and similar materials in tissue engineering.  The ability to compare biocompatible materials.  The ability to compile the importance of 2D and 3D culture types in tissue engineering.  The ability to discuss the use of stem cells in tissue engineering.  The ability to report the importance of tissue engineering in the regeneration of damaged tissues.  The ability to summarize knowledge about bone, cartilage, vascular, neural, cardiac, pancreatic, skin, and nerve tissue engineering. | | | | | |
| **TEXTBOOK** | | | Stem Cell and Tissue Engineering Edited by: Song Li, 2011. Tissue Engineering, Stem Cells, and Gene TherapiesEditors: Elçin, Y. Murat, 2003. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Cell-based therapeutic approaches and ethical debates |
| **2** |  | Analysis of tissue dynamics |
| **3** |  | Tissue and cell homeostasis |
| **4** |  | Identification of signaling mechanisms of cellular components |
| **5** |  | Extracellular matrix elements and similar materials in tissue engineering |
| **6** |  | Extracellular matrix elements and biocompatible materials |
| **7** |  | Identification of cell sources |
| **8** |  | MID-TERM EXAM |
| **9** |  | Importance of 2-D and 3-D culture types in tissue engineering |
| **10** |  | Stem cells in tissue engineering |
| **11** |  | Tissue engineering architecture |
| **12** |  | Controlled release strategies |
| **13** |  | Tissue engineering in regeneration of damaged tissues |
| **14** |  | Bone, cartilage, vascular and nerve tissue engineering |
| **15** |  | Cardiac, pancreatic, skin and nerve tissue engineering |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the analysis of tissue dynamics. |  |  | X |
| LO 2 | The ability to explain the signaling mechanisms of cellular components. |  |  | X |
| LO 3 | The ability to examine the use of extracellular matrix elements and similar materials in tissue engineering. |  |  | X |
| LO 4 | The ability to compare biocompatible materials. |  |  | X |
| LO 5 | The ability to compile the importance of 2D and 3D culture types in tissue engineering. |  |  | X |
| LO 6 | The ability to discuss the use of stem cells in tissue engineering. |  |  | X |
| LO 7 | The ability to report the importance of tissue engineering in the regeneration of damaged tissues. |  |  | X |
| LO 8 | The ability to summarize knowledge about bone, cartilage, vascular, neural, cardiac, pancreatic, skin, and nerve tissue engineering. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. S. Mine TOKER |  |

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| **COURSE CODE** | 522806307 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | NEURAL STEM CELL | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(2nd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Neural stem cell biology, isolation and culture of neural stem cells, neural stem cell sources for therapeutic use | | | | | |
| **COURSE AIMS** | | | neural stem cell biology, isolation and culture of neural stem cells, sources of neural stem cells for therapeutic use | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, neural stem cell biology, isolation and culture of neural stem cells, and neural stem cell sources for therapeutic use will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define neural stem cell biology.  The ability to explain the adult neural stem cell niche.  The ability to investigate the in vivo function of neural stem cells.  The ability to compile the neural induction and differentiation of pluripotent stem cells.  The ability to apply the isolation and culture of neural stem cells.  The ability to discuss neural stem cell sources for therapeutic use.  The ability to report on preclinical and clinical research of neural stem cells. | | | | | |
| **TEXTBOOK** | | | Neural Stem Cells Methods and Protocols Editors: Leslie P. Weiner ISBN: 978-1-58829-846-1 2008. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Neural stem cell biology |
| **2** |  | Adult neural stem cell niche |
| **3** |  | Neural stem cells in the developing brain |
| **4** |  | In vivo function of neural stem cells |
| **5** |  | Neural induction of pluripotent stem cells |
| **6** |  | Neural differentiation of pluripotent stem cells |
| **7** |  | Isolation of neural stem cells |
| **8** |  | MID-TERM EXAM |
| **9** |  | Culture of neural stem cells |
| **10** |  | Neural stem cell sources for therapeutic use |
| **11** |  | Mobilization of endogenous neural stem cells |
| **12** |  | Neural stem cells in cell replacement approaches |
| **13** |  | Cell replacement approaches: requirements and suitable in vitro systems |
| **14** |  | Neural stem cell preclinical and clinical studies |
| **15** |  | Neural stem cell transplantation in central nervous system diseases |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define neural stem cell biology. |  |  | X |
| LO 2 | The ability to explain the adult neural stem cell niche. |  |  | X |
| LO 3 | The ability to investigate the in vivo function of neural stem cells. |  |  | X |
| LO 4 | The ability to compile the neural induction and differentiation of pluripotent stem cells. |  |  | X |
| LO 5 | The ability to apply the isolation and culture of neural stem cells. |  |  | X |
| LO 6 | The ability to discuss neural stem cell sources for therapeutic use. |  |  | X |
| LO 7 | The ability to report on preclinical and clinical research of neural stem cells. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522803313 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | CELL AND TISSUE BANKING | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | The purpose of cell and tissue banking is, areas of use, cryopreservation of cells and tissues and standards | | | | | |
| **COURSE AIMS** | | | To learn the purpose of cell and tissue banking, areas of use, cryopreservation of cells and tissues, and standards. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the purpose of cell and tissue banking, its areas of use, cryopreservation of cells and tissues and their standards will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define cell and tissue banking.  The ability to identify human biological materials.  The ability to examine human biological materials that cannot be banked/archived.  The ability to distinguish the application areas of banked tissues.  The ability to explain the standards and processes applied for safe tissue transplantation.  The ability to select donor screening and virus detection techniques.  The ability to discuss bone, skin, and heart valve collection procedures.  The ability to apply cryopreservation techniques for storing cells and tissues. | | | | | |
| **TEXTBOOK** | | | Essentials of Tissue Banking Editors: Galea, George (Ed.) 2010 Springer ISBN 978-90-481-9142-0. Regulatory Issues in the Therapeutic Use of Stem Cells in Regenerative Medicine and Tissue Engineering", book edited by Jose A. Andrades, ISBN 978-953-51-1108-5, Published: May 22, 2013 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Purpose of cell and tissue banking |
| **2** |  | Guide documents |
| **3** |  | Human biological materials: bone, cornea, heart valves |
| **4** |  | Human biological materials: tendon, skin |
| **5** |  | Human biological materials: , hematopoietic tissues, bone marrow and cord blood |
| **6** |  | Human biological materials: , dura mater |
| **7** |  | Human biological materials: ear bones and cartilage |
| **8** |  | MID-TERM EXAM |
| **9** |  | Non-bankable /non-archivable human biological materials |
| **10** |  | Usage areas of tissues stored in banks |
| **11** |  | Standards : processes applied for safe tissue transplantation |
| **12** |  | Donor selection and virus detection techniques |
| **13** |  | Bone , skin and heart valve harvesting procedures |
| **14** |  | Infection control |
| **15** |  | Cryopreservation of cells and tissues |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define cell and tissue banking. |  |  | X |
| LO 2 | The ability to identify human biological materials. |  |  | X |
| LO 3 | The ability to examine human biological materials that cannot be banked/archived. |  |  | X |
| LO 4 | The ability to distinguish the application areas of banked tissues. |  |  | X |
| LO 5 | The ability to explain the standards and processes applied for safe tissue transplantation. |  |  | X |
| LO 6 | The ability to select donor screening and virus detection techniques. |  |  | X |
| LO 7 | The ability to discuss bone, skin, and heart valve collection procedures. |  |  | X |
| LO 8 | The ability to apply cryopreservation techniques for storing cells and tissues. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522805318 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL MICROENVIRONMENT | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell niche, structure, stem cell niche in regenerative medicine | | | | | |
| **COURSE AIMS** | | | Learning new information about the stem cell niche, its structure and the stem cell niche in regenerative medicine | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, new information about the stem cell niche, its structure and the stem cell niche in regenerative medicine will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define soluble factors in the microenvironment.  The ability to explain niche mechanisms and the stem cell niche.  The ability to examine the effects of secretory factors in mesenchymal stem cells.  The ability to discuss paracrine factors and niche structure.  The ability to discuss the interaction between the extracellular matrix and mesenchymal stem cells.  The ability to compare classes of adhesion molecules in stem cell-niche interactions.  The ability to relate the regulation of stem cell renewal through signaling.  The ability to report the importance of the stem cell niche in regenerative medicine. | | | | | |
| **TEXTBOOK** | | | Biology in Stem Cell Niche Editors: Turksen, Kursad (Ed.) 2015. Stem Cell Niche Methods and Protocols Editors: Kursad Turksen ISBN: 978-1-62703-507-1 2013. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Mesenchymal stem cells |
| **2** |  | Soluble factors in the microenvironment |
| **3** |  | Niche mechanisms (primary maintenance signals, additional signals, asymmetric division) |
| **4** |  | Stem cell niche |
| **5** |  | Effect of secretory factors on mesenchymal stem cells |
| **6** |  | Paracrine factors and niche structure |
| **7** |  | Extracellular matrix proteins as reservoirs of growth factors |
| **8** |  | MID-TERM EXAM |
| **9** |  | Extracellular matrix and mesenchymal stem cell interaction |
| **10** |  | Extracellular matrix as a functional component of the stem cell niche |
| **11** |  | Adhesion in the stem cell niche: biological role and regulation |
| **12** |  | Adhesion molecule classes (cadherin and integrin family) in stem cell-niche interaction |
| **13** |  | Stem cell regulation (niche attachment and homing) |
| **14** |  | Control of stem cell renewal via signals |
| **15** |  | Stem cell niche in regenerative medicine |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define soluble factors in the microenvironment. |  |  | X |
| LO 2 | The ability to explain niche mechanisms and the stem cell niche. |  |  | X |
| LO 3 | The ability to examine the effects of secretory factors in mesenchymal stem cells. |  |  | X |
| LO 4 | The ability to discuss paracrine factors and niche structure. |  |  | X |
| LO 5 | The ability to discuss the interaction between the extracellular matrix and mesenchymal stem cells. |  |  | X |
| LO 6 | The ability to compare classes of adhesion molecules in stem cell-niche interactions. |  |  | X |
| LO 7 | The ability to relate the regulation of stem cell renewal through signaling. |  |  | X |
| LO 8 | The ability to report the importance of the stem cell niche in regenerative medicine. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522803312 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELLS IN GROWTH AND REGENERATION | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist.. Prof. Dr. Sibel GÜNEŞ BAĞIŞ | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell biology and molecular mechanisms in mammalian organ development and regeneration | | | | | |
| **COURSE AIMS** | | | To learn stem cell biology and molecular mechanisms in mammalian organ development and regeneration | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, stem cell biology and molecular mechanisms in mammalian organ development and regeneration will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the role of stem cells in mammalian organ development and regeneration.  The ability to explain the concept of pluripotency and pluripotent stem cells.  The ability to examine the regulation of pluripotent stem cell renewal.  The ability to analyze asymmetric cell division and stem cells.  The ability to compile the extrinsic regulation of stem cell renewal.  The ability to compare stem cell differentiation mechanisms.  The ability to understand the molecular mechanisms of organ development and regeneration.  The ability to report the protective and guiding effects of stem cells in differentiation and renewal mechanisms. | | | | | |
| **TEXTBOOK** | | | Stem Cells and Tissue Engineering Mirjana Pavlovic, Bela Balint Springer-Verlag New York 2013. Stem Cells: From Mechanisms to Technologies Michal K. Stachowiak World Scientific, 2012 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | The role of stem cells in mammalian organ development and regeneration |
| **2** |  | The concept of pluripotency and pluripotent stem cells |
| **3** |  | Pluripotent stem cell regeneration |
| **4** |  | Regulation of pluripotent stem cell renewal |
| **5** |  | Asymmetric cell division and stem cells |
| **6** |  | Extrinsic regulation of stem cell renewal |
| **7** |  | Stem cell differentiation mechanisms |
| **8** |  | MID-TERM EXAM |
| **9** |  | Molecular mechanisms in the development and regeneration of organs |
| **10** |  | Protective and guiding effects of stem cells on stem cell differentiation and renewal mechanisms |
| **11** |  | Growth pathways |
| **12** |  | Growth pathway disorders |
| **13** |  | The role of stem cells in cancer development |
| **14** |  | Stem cell regeneration |
| **15** |  | Role of tumor suppressors in aging |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the role of stem cells in mammalian organ development and regeneration. |  |  | X |
| LO 2 | The ability to explain the concept of pluripotency and pluripotent stem cells. |  |  | X |
| LO 3 | The ability to examine the regulation of pluripotent stem cell renewal. |  |  | X |
| LO 4 | The ability to analyze asymmetric cell division and stem cells. |  |  | X |
| LO 5 | The ability to compile the extrinsic regulation of stem cell renewal. |  |  | X |
| LO 6 | The ability to compare stem cell differentiation mechanisms. |  |  | X |
| LO 7 | The ability to understand the molecular mechanisms of organ development and regeneration. |  |  | X |
| LO 8 | The ability to report the protective and guiding effects of stem cells in differentiation and renewal mechanisms. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assist.. Prof. Dr. Sibel GÜNEŞ BAĞIŞ |  |

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| **COURSE CODE** | 522803302 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | GENOME REGULATION OF STEM CELLS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Genomic regulation and control of gene expression, genome regulation in stem cell differentiation and cellular identity | | | | | |
| **COURSE AIMS** | | | Learning about genomic regulation and control of gene expression, genome regulation in stem cell differentiation and cellular identity | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, genomic regulation and control of gene expression, genome regulation in stem cell differentiation and cellular identity will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the genomic regulation of stemness in stem cells.  The ability to explain the cellular and molecular events in stem cell differentiation.  The ability to examine programming and functions in differentiated cell types.  The ability to analyze the stages of gene expression.  The ability to compile post-transcriptional modification and RNA transport.  The ability to interpret translation and mRNA degradation.  The ability to report DNA modifications.  The ability to investigate the regulation of transcription in stem cells. | | | | | |
| **TEXTBOOK** | | | Tam, W.-L. and Lim, B. , Genome-wide transcription factor localization and function in stem cells (September 15, 2008), StemBook, ed. The Stem Cell Research Community, StemBook, doi/10.3824/stembook.1.19.1. Stem Cells & Regenerative Medicine Ed Kursad Turksen 2011. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Regulation of stemness of stem cells |
| **2** |  | Cellular and molecular events in stem cell differentiation |
| **3** |  | Developmental potential of stem cells |
| **4** |  | Programming and function in differentiated cell types |
| **5** |  | Control of labile differentiation stages |
| **6** |  | Control of stable differentiation stages |
| **7** |  | Steps of gene expression (chromatin structure, transcription) |
| **8** |  | MID-TERM EXAM |
| **9** |  | Post-transcriptional modification, RNA transport |
| **10** |  | Translation, mRNA degradation |
| **11** |  | Modification of DNA (structural and chemical) |
| **12** |  | Regulation of Transcription in the Stem Cell |
| **13** |  | Regulation of transcription in cancer |
| **14** |  | Regulation of translation (RNA splicing and diseases) |
| **15** |  | Control of the cell cycle and cancer |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the genomic regulation of stemness in stem cells. |  |  | X |
| LO 2 | The ability to explain the cellular and molecular events in stem cell differentiation. |  |  | X |
| LO 3 | The ability to examine programming and functions in differentiated cell types. |  |  | X |
| LO 4 | The ability to analyze the stages of gene expression. |  |  | X |
| LO 5 | The ability to compile post-transcriptional modification and RNA transport. |  |  | X |
| LO 6 | The ability to interpret translation and mRNA degradation. |  |  | X |
| LO 7 | The ability to report DNA modifications. |  |  | X |
| LO 8 | The ability to investigate the regulation of transcription in stem cells. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522803320 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | NEXT GENERATION SEQUENCING AND BIOINFORMATICS IN STEM CELL RESEARCH | | | |
| **INSTRUCTOR GIVING NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Next generation sequencing technologies and their use in stem cell research | | | | | |
| **COURSE AIMS** | | | Learning the use of next-generation sequencing technologies in stem cell research | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the use of next generation sequencing technologies in stem cell research will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define DNA methylation data and new epigenome techniques.  The ability to explain sequencing technologies.  The ability to examine bioinformatics analyses for pluripotency.  The ability to apply differentiation analyses.  The ability to utilize immunophenotypic characterization.  The ability to interpret functional analyses.  The ability to analyze transcription factor binding sites (TFBS) in expressed genes.  The ability to report gene expression profiling.  The ability to discuss NGS data analyses. | | | | | |
| **TEXTBOOK** | | | Next Generation Sequencing - Advances, Applications and Challenges", book edited by Jerzy K Kulski, ISBN 978-953-51-2240-1, Published: January 14, 2016. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | DNA methylation data and new epigenome techniques |
| **2** |  | Sequencing technologies |
| **3** |  | Bioinformatics analyses for pluripotency |
| **4** |  | Differentiation analyses |
| **5** |  | Immunophenotypic characterization |
| **6** |  | RNA-Seq data generation and processing |
| **7** |  | Functional analysis |
| **8** |  | MID-TERM EXAM |
| **9** |  | Transcription factor binding sites (TFBS) analyses in expressed genes |
| **10** |  | Gene expression profiling |
| **11** |  | Epigenetic profiles |
| **12** |  | NGS data analysis |
| **13** |  | NGS clinical applications |
| **14** |  | Therapeutics and NGS |
| **15** |  | Applications in stem cell research |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define DNA methylation data and new epigenome techniques. |  |  | X |
| LO 2 | The ability to explain sequencing technologies. |  |  | X |
| LO 3 | The ability to examine bioinformatics analyses for pluripotency. |  |  | X |
| LO 4 | The ability to apply differentiation analyses. |  |  | X |
| LO 5 | The ability to utilize immunophenotypic characterization. |  |  | X |
| LO 6 | The ability to interpret functional analyses. |  |  | X |
| LO 7 | The ability to analyze transcription factor binding sites (TFBS) in expressed genes. |  |  | X |
| LO 8 | The ability to report gene expression profiling. |  |  | X |
| LO 9 | The ability to discuss NGS data analyses. |  |  | X |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522805315 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | EPIGENETICS AND REPROGRAMMING | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Nilufer ERKASAP | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | The concept of epigenetics and its importance in stem cell differentiation | | | | | |
| **COURSE AIMS** | | | To learn the concept of epigenetics, its importance in stem cell differentiation, reprogramming and mechanisms of pluripotency | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the concept of epigenetics, its importance in stem cell differentiation, reprogramming and mechanisms of pluritensis will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define pluripotent stem cells and epigenetics.  The ability to explain the factors that regulate gene expression.  The ability to interpret the significance of epigenetic concepts in stem cell differentiation.  The ability to classify epigenetic reprogramming mechanisms.  The ability to examine the intermediate stages of reprogramming.  The ability to discuss possible mechanisms leading to DNA demethylation.  The ability to integrate epigenetics into the reprogramming of differentiated somatic cells and induced pluripotent stem cells. | | | | | |
| **TEXTBOOK** | | | Epigenetic Mechanisms in Cellular Reprogramming Eds: Alexander Meissner, Jörn Walter ISBN: 978-3-642-31973-0 in Epigenetics and Human Health 2015. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Pluripotent stem cells and epigenetics |
| **2** |  | Factors controlling gene expression |
| **3** |  | Molecular structures that constitute gene expression |
| **4** |  | Functions of molecular structures that constitute gene expression |
| **5** |  | The concept of epigenetics |
| **6** |  | The importance of epigenetics in stem cell differentiation |
| **7** |  | Epigenetic reprogramming |
| **8** |  | MID-TERM EXAM |
| **9** |  | Epigenetic reprogramming mechanisms |
| **10** |  | Mechanisms of epigenetic reprogramming and pluripotency |
| **11** |  | Intermediate stages of reprogramming |
| **12** |  | Possible mechanisms leading to DNA demethylation |
| **13** |  | Progenitor cells and rearrangement of epigenetic information |
| **14** |  | Epigenetics in reprogramming differentiated somatic cells and induced pluripotent stem cells |
| **15** |  | Stem cell metabolic reprogramming |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define pluripotent stem cells and epigenetics. |  |  | X |
| LO 2 | The ability to explain the factors that regulate gene expression. |  |  | X |
| LO 3 | The ability to interpret the significance of epigenetic concepts in stem cell differentiation. |  |  | X |
| LO 4 | The ability to classify epigenetic reprogramming mechanisms. |  |  | X |
| LO 5 | The ability to examine the intermediate stages of reprogramming. |  |  | X |
| LO 6 | The ability to discuss possible mechanisms leading to DNA demethylation. |  |  | X |
| LO 7 | The ability to integrate epigenetics into the reprogramming of differentiated somatic cells and induced pluripotent stem cells. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| LO 12 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Nilufer ERKASAP |  |

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| **COURSE CODE** | 522805319 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL PROTEOMICS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Derya ÜSTÜNER | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | The concept of proteomics, methods used in stem cell analysis and application areas | | | | | |
| **COURSE AIMS** | | | To learn the concept of proteomics, methods used in stem cell analysis and application areas. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the concept of proteomics, methods used in stem cell analysis and application areas will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the concept of proteomics and stem cells.  The ability to understand two-dimensional electrophoresis.  The ability to examine mass spectrometry, protein profiling, and quantitative analysis using mass spectrometry.  The ability to investigate membrane proteomics.  The ability to compile post-translational modifications.  The ability to discuss the application of protein arrays in stem cell proteomics.  The ability to interpret the role of proteomics in transplantation.  The ability to report proteomic research in stem cells. | | | | | |
| **TEXTBOOK** | | | Wang, J. , Trowbridge, JJ, Rao, S. and Orkin, SH, Proteomic of stem cells (July studies 14, 2008), StemBook, ed. The Stem Cell Research Community, StemBook, doi/10.3824/stembook.1.4.1 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | The concept of proteomics and stem cells |
| **2** |  | Sample preparation and protein extraction |
| **3** |  | Two- dimensional electrophoresis |
| **4** |  | Mass spectrophotometry, protein profiling and quantitative analysis by mass spectrophotometry |
| **5** |  | Profiling and differential expression analyses |
| **6** |  | Membrane proteomics |
| **7** |  | Post -translational modification |
| **8** |  | MID-TERM EXAM |
| **9** |  | Proteome heterogeneity |
| **10** |  | Protein array application to stem cell proteomics |
| **11** |  | Secretomics |
| **12** |  | Transplantation of proteomics |
| **13** |  | Stem cell protein network and signaling pathways for pluripotency |
| **14** |  | Proteomics studies in stem cells |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the concept of proteomics and stem cells. |  |  | X |
| LO 2 | The ability to understand two-dimensional electrophoresis. |  |  | X |
| LO 3 | The ability to examine mass spectrometry, protein profiling, and quantitative analysis using mass spectrometry. |  |  | X |
| LO 4 | The ability to investigate membrane proteomics. |  |  | X |
| LO 5 | The ability to compile post-translational modifications. |  |  | X |
| LO 6 | The ability to discuss the application of protein arrays in stem cell proteomics. |  |  | X |
| LO 7 | The ability to interpret the role of proteomics in transplantation. |  |  | X |
| LO 8 | The ability to report proteomic research in stem cells. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Derya ÜSTÜNER |  |

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| **COURSE CODE** | 522805317 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | BONE AND MUSCULOSKELETAL SYSTEM TISSUE ENGINEERING | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Nusret KÖSE | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Bioengineering of the musculoskeletal system, selection of biomaterials used, scaffolds. | | | | | |
| **COURSE AIMS** | | | Learning about muscle-bone structure, biomaterial selection, scaffolds and their use. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, muscle-bone structure, biomaterial selection, scaffolds and their use will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the structure and function of bone, tendon, and cartilage tissues.  The ability to explain bone healing.  The ability to discuss biomaterials, metals, ceramics, and polymers.  The ability to comprehend scaffolds that can be used as an extracellular matrix.  The ability to report the ideal properties of scaffolds.  The ability to explain scaffold strength, composite scaffolds, and artificial scaffolds.  The ability to discuss scaffold applications in bone and cartilage tissue engineering. | | | | | |
| **TEXTBOOK** | | | Stem Cell and Tissue Engineering Edited by: Song Li, 2011. Tissue Engineering, Stem Cells, and Gene TherapiesEditors: Elçin, Y. Murat, 2003. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Bone tissue structure and function |
| **2** |  | Tendon tissue structure and function |
| **3** |  | Cartilage tissue structure and function |
| **4** |  | Bone healing |
| **5** |  | Biomaterials |
| **6** |  | Metals |
| **7** |  | Ceramics |
| **8** |  | MID-TERM EXAM |
| **9** |  | Polymers |
| **10** |  | Scaffolds that can be used as extracellular matrix |
| **11** |  | Ideal properties of scaffolding |
| **12** |  | Strength of scaffolding |
| **13** |  | Composite scaffolding |
| **14** |  | Artificial scaffolding |
| **15** |  | Bone and cartilage tissue engineering applications of scaffolds |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the structure and function of bone, tendon, and cartilage tissues. |  |  | X |
| LO 2 | The ability to explain bone healing. |  |  | X |
| LO 3 | The ability to discuss biomaterials, metals, ceramics, and polymers. |  |  | X |
| LO 4 | The ability to comprehend scaffolds that can be used as an extracellular matrix. |  |  | X |
| LO 5 | The ability to report the ideal properties of scaffolds. |  |  | X |
| LO 6 | The ability to explain scaffold strength, composite scaffolds, and artificial scaffolds. |  |  | X |
| LO 7 | The ability to discuss scaffold applications in bone and cartilage tissue engineering. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Nusret KÖSE |  |

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| **COURSE CODE** | 522805316 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN PEDIATRIC SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Huseyin ILHAN | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell applications in pediatric surgery | | | | | |
| **COURSE AIMS** | | | Learning about the potential use of mesenchymal stem cells in pediatric surgery and recent developments | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the potential use of mesenchymal stem cells in pediatric surgery and recent developments will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the application routes of mesenchymal stem cells in pediatric surgery.  The ability to explain the use of mesenchymal stem cells in the treatment of Graft-Versus-Host Disease (GVHD).  The ability to examine stem cell therapy in autoimmune, pulmonary, and cardiovascular diseases.  The ability to investigate cardiac stem cell therapy in congenital heart disease.  The ability to report clinical applications in pediatric osteoarticular diseases.  The ability to discuss mesenchymal stem cell therapy in Duchenne Muscular Dystrophy (DMD). | | | | | |
| **TEXTBOOK** | | | Pediatric Surgery: Diagnosis and Management. Devendra Gupta, Shilpa Sharma, Richard G. Azizkhan.ISBN -13: 978-0071719872  Stem Cells in Clinic and Research. Edited by Ali Gholamrezanezhad, ISBN 978-953-307-797-0 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Application routes of mesenchymal stem cells in pediatric surgery (intravascular infusion, local percutaneous injection, local intraarticular injection) |
| **2** |  | Mesenchymal stem cells in the treatment of graft-versus-host diseases (GVHD) |
| **3** |  | Autoimmune diseases |
| **4** |  | Lung diseases |
| **5** |  | Cardiovascular diseases |
| **6** |  | Cell types in myocardial regeneration |
| **7** |  | Cardiac stem cell therapy in myocardial infarction |
| **8** |  | MID-TERM EXAM |
| **9** |  | Cardiac stem cell therapy in congenital heart disease , liver diseases |
| **10** |  | Mesenchymal stem cell therapy in inflammatory bowel disease, Crohn's disease |
| **11** |  | Osteoarticular diseases, mesenchymal stem cells in pediatric osteoarticular diseases, |
| **12** |  | Clinical applications in pediatric osteoarticular diseases (osteogenesis imperfecta, juvenile idiopathic arthritis, simple bone cyst, femoral head osteonecrosis), |
| **13** |  | Duchenne Muscular Dystrophy (DMD), Mesenchymal Stem Cell Therapy in Duchenne Muscular Dystrophy (DMD) |
| **14** |  | Unresolved issues (cell retention and engraftment, mechanism of stem cell therapy in heart failure , route of administration, cell type-autologous or allogeneic) |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the application routes of mesenchymal stem cells in pediatric surgery. |  |  | X |
| LO 2 | The ability to explain the use of mesenchymal stem cells in the treatment of Graft-Versus-Host Disease (GVHD). |  |  | X |
| LO 3 | The ability to examine stem cell therapy in autoimmune, pulmonary, and cardiovascular diseases. |  |  | X |
| LO 4 | The ability to investigate cardiac stem cell therapy in congenital heart disease. |  |  | X |
| LO 5 | The ability to report clinical applications in pediatric osteoarticular diseases. |  |  | X |
| LO 6 | The ability to discuss mesenchymal stem cell therapy in Duchenne Muscular Dystrophy (DMD). |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Huseyin ILHAN |  |

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| **COURSE CODE** | 522805321 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | TISSUE ENGINEERING IN PEDIATRIC SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Baran TOKAR | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Tissue engineering in pediatric surgery | | | | | |
| **COURSE AIMS** | | | Learning tissue engineering applications in pediatric surgery | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, tissue engineering applications in pediatric surgery will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define tissue engineering and biotechnology.  The ability to describe cell sources (embryonic and adult stem cells).  The ability to examine scaffolds and polymers.  The ability to evaluate the characteristics of an ideal scaffold.  The ability to relate tissue engineering to pediatric surgery.  The ability to interpret the future of tissue engineering in pediatric surgery. | | | | | |
| **TEXTBOOK** | | | Principles of Tissue Engineering Robert Lanza, Robert Langer, Joseph P. Vacanti Academic Press, 2000 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Tissue engineering and biotechnology |
| **2** |  | Cell sources (embryonic and adult stem cells) |
| **3** |  | Scaffolds and polymers |
| **4** |  | Characteristics of an ideal scaffold |
| **5** |  | Types of scaffolding |
| **6** |  | Bioreactors |
| **7** |  | Tissue engineering and pediatric surgery |
| **8** |  | MID-TERM EXAM |
| **9** |  | Tissue engineering of muscle, cartilage and bone |
| **10** |  | Cardiovascular tissue engineering |
| **11** |  | Pancreas, esophagus and intestinal tissue engineering |
| **12** |  | Liver replacement and tissue engineering |
| **13** |  | Kidney and bladder tissue engineering |
| **14** |  | Lung tissue engineering |
| **15** |  | The future of tissue engineering in pediatric surgery |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define tissue engineering and biotechnology. |  |  | X |
| LO 2 | The ability to describe cell sources (embryonic and adult stem cells). |  |  | X |
| LO 3 | The ability to examine scaffolds and polymers. |  |  | X |
| LO 4 | The ability to evaluate the characteristics of an ideal scaffold. |  |  | X |
| LO 5 | The ability to relate tissue engineering to pediatric surgery. |  |  | X |
| LO 6 | The ability to interpret the future of tissue engineering in pediatric surgery. |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Baran TOKAR |  |

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| **COURSE CODE** | 522805322 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN CARDIOVASCULAR SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Behcet SEVİN | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell therapies in heart diseases , stem cell therapies in coronary artery diseases | | | | | |
| **COURSE AIMS** | | | therapies in heart diseases , stem cell therapies in coronary artery diseases, ischemic mitral insufficiency stem cell therapies, trans-coronary treatment stem cell therapies. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, stem cell therapies in heart diseases , stem cell therapies in coronary artery diseases, ischemic mitral insufficiency stem cell therapies, trans-coronary treatment stem cell therapies will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cell delivery routes.  The ability to explain the potential therapeutic mechanisms of stem cells.  The ability to examine stem cell therapies in heart diseases.  The ability to evaluate stem cell therapies in coronary artery diseases.  The ability to discuss stem cell therapies in congestive heart failure.  The ability to analyze coronary artery bypass grafting and stem cell applications. | | | | | |
| **TEXTBOOK** | | | Regenerative Medicine Using Pregnancy-Specific Biological Substances  editor: Niranjan Bhattacharya,Phillip Stubblefield  Stem Cell and Gene Therapy for Cardiovascular Disease, 1st Edition.Editor(s): Perin, Miller, Taylor, Willerson 2015Imprint:Academic PressPrint Book ISBN :9780128018880 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Spectrum of stem cells examined (mesenchymal stem cells, adipose tissue-derived mesenchymal stem cells, cardiac stem cells, c-kit+ cardiac stem cells) |
| **2** |  | Spectrum of stem cells examined (cardiosphere-derived cells, embryonic stem cells, induced pluripotent stem cells) |
| **3** |  | Stem cell transfer routes (transvascular approach, intracoronary transfer, intravenous infusion, direct injection into the ventricular wall ) |
| **4** |  | Stem cell transfer routes (transepicardial injection , transendocardial injection, transcoronary vein injection) |
| **5** |  | Potential therapeutic mechanisms of stem cells (differentiation of transplanted stem cells into cardiac cells, formation of new blood vessels from transplanted stem cells, paracrine effect, cell fusion) |
| **6** |  | Stem cell therapies in heart diseases |
| **7** |  | Stem cell therapies in coronary artery diseases |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cell therapies in congestive heart failure |
| **10** |  | Coronary artery bypass grafting and stem cell applications |
| **11** |  | Left ventricular restoration, ischemic mitral insufficiency stem cell therapies |
| **12** |  | Trans-coronary treatment stem cell therapies |
| **13** |  | Stem cell therapies for peripheral arterial diseases |
| **14** |  | Stem cell therapies for chronic obstructive pulmonary disease |
| **15** |  | Stem cell therapies in pleural diseases |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cell delivery routes. |  |  | X |
| LO 2 | The ability to explain the potential therapeutic mechanisms of stem cells. |  |  | X |
| LO 3 | The ability to examine stem cell therapies in heart diseases. |  |  | X |
| LO 4 | The ability to evaluate stem cell therapies in coronary artery diseases. |  |  | X |
| LO 5 | The ability to discuss stem cell therapies in congestive heart failure. |  |  | X |
| LO 6 | The ability to analyze coronary artery bypass grafting and stem cell applications. |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Behcet SEVİN |  |

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| **COURSE CODE** | 522805323 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN EAR NOSE THROAT DISEASES | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Armagan İNCESULU | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Mesenchymal stem cell therapies in ear, nose, and throat surgery | | | | | |
| **COURSE AIMS** | | | Mesenchymal stem cell therapies in ear, nose and throat surgery , animal models and stem cell applications in hearing loss regeneration studies, and their future applications. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course mesenchymal stem cell therapies in ear, nose and throat surgery, animal models in hearing loss regeneration studies, stem cell applications and future applications will be learned | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define mesenchymal stem cell therapies in otorhinolaryngology-head and neck surgery.  The ability to explain vocal fold mucosa regeneration.  The ability to examine mesenchymal stem cell therapies in cochlear hair regeneration.  The ability to analyze animal models in hearing loss regeneration studies.  The ability to interpret hearing loss treatment with mesenchymal stem cells.  The ability to report the use of mesenchymal stem cells in human inner ear treatments.  The ability to present the application of pluripotent stem cells in hearing loss treatment. | | | | | |
| **TEXTBOOK** | | | Stem Cells in Clinic and Research. Edited by Ali Gholamrezanezhad, ISBN 978-953-307-797-0  Ear, Nose, and Throat Diseases. Behrbohm. I SBN :9783136712030 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Mesenchymal stem cell therapies in otorhinolaryngology-head and neck surgery |
| **2** |  | Vocal fold mucosa regeneration (cell therapy , growth factor therapy, mesenchymal stem cell applications) |
| **3** |  | Cochlear damage repair |
| **4** |  | Animal models in hearing loss regeneration studies |
| **5** |  | Hearing loss treatment with mesenchymal stem cells |
| **6** |  | Mesenchymal stem cells in human inner ear therapies |
| **7** |  | Mesenchymal stem cell therapies in cochlear hair regeneration (embryonic stem cells, adult stem cells, mesenchymal stem cells) |
| **8** |  | MID-TERM EXAM |
| **9** |  | Pluripotent stem cells and their use in hearing loss |
| **10** |  | Stem cells in squamous head and neck cancers |
| **11** |  | therapy in subglottis stenosis |
| **12** |  | Mesenchymal stem cells in tissue replacement therapies (bone, cartilage, fat, dermal matrix replacement, vocal fold, hair cells replacement therapies) |
| **13** |  | Inner ear stem cell transplantation |
| **14** |  | Clinical studies |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define mesenchymal stem cell therapies in otorhinolaryngology-head and neck surgery. |  |  | X |
| LO 2 | The ability to explain vocal fold mucosa regeneration. |  |  | X |
| LO 3 | The ability to examine mesenchymal stem cell therapies in cochlear hair regeneration. |  |  | X |
| LO 4 | The ability to analyze animal models in hearing loss regeneration studies. |  |  | X |
| LO 5 | The ability to interpret hearing loss treatment with mesenchymal stem cells. |  |  | X |
| LO 6 | The ability to report the use of mesenchymal stem cells in human inner ear treatments. |  |  | X |
| LO 7 | The ability to present the application of pluripotent stem cells in hearing loss treatment. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Armagan İNCESULU |  |

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| **COURSE CODE** | 522805324 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN UROLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. İyimser ÜRE | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Fall (3rd semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Urogenital tract-derived stem/progenitor cells and stem cell therapies in urological diseases | | | | | |
| **COURSE AIMS** | | | To learn about urogenital tract-derived stem/progenitor cells and stem cell therapies in urological diseases | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, urogenital tract-derived stem/progenitor cells and stem cell therapies in urological diseases will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define uro-genital tract-derived stem/progenitor cells.  The ability to explain mesenchymal stem cells in urinary tract tissue regeneration.  The ability to examine stem cell therapy in bladder dysfunction.  The ability to relate bladder cell transplantation to regenerative medicine.  The ability to investigate cellular therapy in stress urinary incontinence.  The ability to explain penile endogenous stem cells.  The ability to report stem cell therapy in erectile dysfunction.  The ability to analyze stem cell applications in prostate and kidney diseases. | | | | | |
| **TEXTBOOK** | | | Mesenchymal Stem Cells for Cell Therapy and Tissue Regeneration in Urology in Regenerative Medicine and Tissue Engineering - Cells and Biomaterials", ed: Daniel Eberli, ISBN 978-953-307-663-8, 2011. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Urogenital tract-derived stem/progenitor cells (bladder, kidney, testis, urine) |
| **2** |  | Application of mesenchymal stem cells (urothelial cells) in urinary tract tissue regeneration |
| **3** |  | Application of mesenchymal stem cells in urinary tract tissue regeneration (urothelial differentiation of mesenchymal stem cells) |
| **4** |  | Stem cell therapy for bladder dysfunction |
| **5** |  | Bladder cell transplantation and regenerative medicine |
| **6** |  | Therapy for stress urinary incontinence |
| **7** |  | Penile endogenous stem cells |
| **8** |  | MID-TERM EXAM |
| **9** |  | Erectile dysfunction (mechanism and causes) |
| **10** |  | Erectile dysfunction (stem cell therapy for erectile dysfunction ) |
| **11** |  | Peyronie's disease (mechanism) |
| **12** |  | Peyronie's disease (stem cell therapy in Peyronie's disease ) |
| **13** |  | Stem cells in infertility treatment |
| **14** |  | Applications of adipose tissue-derived stem cells in prostate diseases |
| **15** |  | Applications of adipose tissue-derived stem cells in kidney diseases |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define uro-genital tract-derived stem/progenitor cells. |  |  | X |
| LO 2 | The ability to explain mesenchymal stem cells in urinary tract tissue regeneration. |  |  | X |
| LO 3 | The ability to examine stem cell therapy in bladder dysfunction. |  |  | X |
| LO 4 | The ability to relate bladder cell transplantation to regenerative medicine. |  |  | X |
| LO 5 | The ability to investigate cellular therapy in stress urinary incontinence. |  |  | X |
| LO 6 | The ability to explain penile endogenous stem cells. |  |  | X |
| LO 7 | The ability to report stem cell therapy in erectile dysfunction. |  |  | X |
| LO 8 | The ability to analyze stem cell applications in prostate and kidney diseases. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. İyimser ÜRE |  |

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| **COURSE CODE** | 522804309 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | HUMAN REGENERATION | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Regeneration of adult human and animal cells and tissues, cellular molecular basis of regeneration | | | | | |
| **COURSE AIMS** | | | To learn the regeneration of adult human and animal cells and tissues, the cellular molecular basis of regeneration, tissue engineering and its applications in regenerative medicine. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the regeneration of adult human and animal cells and tissues, the cellular molecular basis of regeneration, tissue engineering and its applications in regenerative medicine will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define pluripotent stem cells from early embryos.  The ability to explain tissue engineering and regeneration as a therapeutic alternative to transplantation.  The ability to examine the regeneration of adult human and animal cells and tissues.  The ability to investigate the cellular and molecular basis of regeneration.  The ability to compile information on tissue and organ regeneration.  The ability to report model organisms and animals used in regeneration research.  The ability to interpret the regeneration of fingers, ribs, liver, kidney, and heart.  The ability to summarize stem cells, tissue engineering, and their applications in regenerative medicine. | | | | | |
| **TEXTBOOK** | | | Stem Cell Repair and Regeneration Volume 3 Edited by: Nataša Levičar 2008. Regeneration: Stem Cells and Beyond Eds: Heber-Katz, Ellen (Ed.) 2004. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Biology of mesenchymal stem cells |
| **2** |  | Mesenchymal stem cells: from culture to clinic |
| **3** |  | Stem cell signaling and therapeutics |
| **4** |  | Pluripotent stem cells from early embryo |
| **5** |  | Tissue engineering and regeneration as a therapeutic alternative to transplantation |
| **6** |  | Adult human and animal cells and tissues |
| **7** |  | Cellular molecular basis of regeneration |
| **8** |  | MID-TERM EXAM |
| **9** |  | Tissue and organ regeneration |
| **10** |  | Model organisms and animals in regeneration (planarians and vertebrates: amphibians, mouse, rat) |
| **11** |  | Regeneration of fingers |
| **12** |  | Of ribs , liver regeneration |
| **13** |  | Kidney regeneration, heart regeneration |
| **14** |  | Stem cells in regenerative medicine |
| **15** |  | Tissue engineering and applications in regenerative medicine |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define pluripotent stem cells from early embryos. |  |  | X |
| LO 2 | The ability to explain tissue engineering and regeneration as a therapeutic alternative to transplantation. |  |  | X |
| LO 3 | The ability to examine the regeneration of adult human and animal cells and tissues. |  |  | X |
| LO 4 | The ability to investigate the cellular and molecular basis of regeneration. |  |  | X |
| LO 5 | The ability to compile information on tissue and organ regeneration. |  |  | X |
| LO 6 | The ability to report model organisms and animals used in regeneration research. |  |  | X |
| LO 7 | The ability to interpret the regeneration of fingers, ribs, liver, kidney, and heart. |  |  | X |
| LO 8 | The ability to summarize stem cells, tissue engineering, and their applications in regenerative medicine. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI |  |

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| **COURSE CODE** | 522804302 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL LINES IN GOOD MANUFACTURING PRACTICES | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assist. Prof. Dr. Onur UYSAL | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (4th semester) | 3 | 2 |  | 4 | | 7.5 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Optimization and standardization of stem cell culture protocols in clinical applications according to Good Manufacturing Practices | | | | | |
| **COURSE AIMS** | | | The optimization and standardization of stem cell culture protocols in clinical applications according to Good Manufacturing Practices | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course optimization and standardization of stem cell culture protocols in clinical applications according to Good Manufacturing Practices will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define GMP in cell therapies using stem cells.  The ability to explain GMP and culture conditions.  The ability to examine the optimization and standardization of stem cell culture protocols for clinical use.  The ability to report GMP-compliant stem cells.  The ability to organize the validation of GMP materials and protocols (SOP).  The ability to compile information on sourcing, culturing, storage, quality control, and biosafety in GMP facilities.  The ability to compile the production of mesenchymal stem cells for clinical use.  The ability to report the production of mesenchymal stem cells in good manufacturing practices. | | | | | |
| **TEXTBOOK** | | | Stem Cells and Good Manufacturing Practices, Methods, Protocols, and Regulations. Turksen, Kursad (Ed.) 2015 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | GMP in cell therapies using stem cells |
| **2** |  | GMP and culture conditions |
| **3** |  | Optimization and standardization of stem cell culture protocols for clinical use |
| **4** |  | GMP-compliant stem cells |
| **5** |  | Validation of GMP materials and protocols (SOP) |
| **6** |  | Source, culture and storage in GMP facilities |
| **7** |  | Quality control |
| **8** |  | MID-TERM EXAM |
| **9** |  | GMP biosafety |
| **10** |  | Validation of functionality by applications |
| **11** |  | Optimization and standardization of stem cell differentiation protocols |
| **12** |  | GMP-compatible stem cell-derived cell lines |
| **13** |  | Production of mesenchymal stem cells for clinical use |
| **14** |  | Production of mesenchymal stem cells using good manufacturing practices |
| **15** |  | Clinical studies |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define GMP in cell therapies using stem cells. |  |  | X |
| LO 2 | The ability to explain GMP and culture conditions. |  |  | X |
| LO 3 | The ability to examine the optimization and standardization of stem cell culture protocols for clinical use. |  |  | X |
| LO 4 | The ability to report GMP-compliant stem cells. |  |  | X |
| LO 5 | The ability to organize the validation of GMP materials and protocols (SOP). |  |  | X |
| LO 6 | The ability to compile information on sourcing, culturing, storage, quality control, and biosafety in GMP facilities. |  |  | X |
| LO 7 | The ability to compile the production of mesenchymal stem cells for clinical use. |  |  | X |
| LO 8 | The ability to report the production of mesenchymal stem cells in good manufacturing practices. |  |  | X |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assist. Prof. Dr. Onur UYSAL |  |

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| **COURSE CODE** | 522804317 | **DEPARTMENT** | STEM CELL NAME | | |
| **COURSE NAME** | | CELLULAR AND MOLECULAR MECHANISMS OF AUTOIMMUNE DISEASES | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Assoc. Prof. Dr. Tuğba SEMERCI SEVİMLİ | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (4th semester) | 3 | 2 |  | 4 | | 7.5 | | ELECTIVE |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Examining the molecular basis of autoimmune diseases and examining current therapy approaches by considering stem cell properties. | | | | | |
| **COURSE AIMS** | | | -Orientation towards research on stem cell therapy approaches, considering the molecular basis of autoimmune diseases and stem cell properties.  -Development of laboratory skills in in vitro disease models. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the molecular basis of autoimmune diseases and how stem cell applications are used in their treatment will be learned | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the prevalence and molecular basis of autoimmune diseases.  The ability to explain immunosuppression, immunoregulation, and stem cells.  The ability to examine stem cell therapy approaches in autoimmune diseases.  The ability to report genetically modified stem cell therapy in autoimmune diseases.  The ability to analyze interferon-gamma modified stem cell therapy in autoimmune diseases.  The ability to comprehend the production and transplantation of stem cells for regenerative purposes. | | | | | |
| **TEXTBOOK** | | | “Stem Cell Transplantation for Autoimmune Diseases and Inflammation”  Springer Nature Switzerland AG 2019, Print ISBN 978-3-030-23420-1  “Autoimmune Diseases Contributing Factors, Specific Cases of Autoimmune Diseases, and Stem Cell and Other Therapies”  Published: July 25th 2012, DOI: 10.5772/2896, ISBN: 978-953-51-0693-7 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Prevalence and molecular basis of autoimmune disease |
| **2** |  | Immunosuppression and stem cells |
| **3** |  | Immunoregulation and stem cells |
| **4** |  | therapy approaches in autoimmune diseases |
| **5** |  | Production and transplantation of stem cells for regenerative purposes |
| **6** |  | Hematopoietic stem cell transplantation and its importance in autoimmune diseases |
| **7** |  | Adipose tissue-derived mesenchymal stem cell transplantation and its importance in autoimmune diseases |
| **8** |  | MID-TERM EXAM |
| **9** |  | Genetically modified stem cell therapy in autoimmune diseases |
| **10** |  | Interferon-gamma modified stem cell therapy in autoimmune diseases |
| **11** |  | Stem cell therapy approaches in Inflammatory Bowel Diseases (IBD) |
| **12** |  | Stem cell therapy approaches in Graves' Disease |
| **13** |  | Stem cell therapy approaches in urticaria |
| **14** |  | Therapy approaches in Systemic Lupus Erythematosus (SLE) |
| **15** |  | Stem cell therapy approaches in myasthenia gravis |
| **16** |  | Therapy approaches in familial Mediterranean fever (FMF) |
| **14** |  | Stem cell therapy approaches in Addison's Disease |
| **15** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the prevalence and molecular basis of autoimmune diseases. |  |  | X |
| LO 2 | The ability to explain immunosuppression, immunoregulation, and stem cells. |  |  | X |
| LO 3 | The ability to examine stem cell therapy approaches in autoimmune diseases. |  |  | X |
| LO 4 | The ability to report genetically modified stem cell therapy in autoimmune diseases. |  |  | X |
| LO 5 | The ability to analyze interferon-gamma modified stem cell therapy in autoimmune diseases. |  |  | X |
| LO 6 | The ability to comprehend the production and transplantation of stem cells for regenerative purposes. |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Assoc. Prof. Dr. Tuğba SEMERCI SEVİMLİ |  |

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| **COURSE CODE** | 522804313 | **DEPARTMENT** | **STEM CELL NAME** | | |
| **COURSE NAME** | | GENE TRANSFER TECHNOLOGIES IN STEM CELLS | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Ayla EKER SARIBOYACI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring (4th semester) | 3 | 2 |  | 4 | | 7.5 | | ELECTIVE |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | The basis of gene transfer approaches to stem cells, Gene transfer vectors and elements, Gene transfer techniques: biological methods, Gene transfer techniques: chemical methods, Gene transfer techniques: physical/mechanical methods, Inhibition of gene expression (silencing or inactivation), Gene insertion and gene deletion techniques, Controlled gene expression, Gene therapy approaches in stem cells will be explained. | | | | | |
| **COURSE AIMS** | | | -Providing knowledge and skills on the molecular structure and intended use of current gene transfer methods, taking into account stem cell characteristics.  -Improving laboratory skills in gene transfer to stem cells. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, you will have learned which criteria should be taken into consideration for gene transfer to stem cells and how it is done. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the fundamentals of gene transfer approaches in stem cells.  The ability to explain gene transfer vectors and their elements.  The ability to examine gene transfer techniques: biological, chemical, and physical/mechanical methods.  The ability to investigate gene expression inhibition (silencing or suppression).  The ability to analyze gene insertion and gene deletion techniques.  The ability to interpret controlled gene expression.  The ability to discuss gene therapy approaches in stem cells. | | | | | |
| **TEXTBOOK** | | | “Primary and Stem Cells: Gene Transfer Technologies and Applications”  1st ed. 2012 Edition  “Gene Delivery Approaches for Mesenchymal Stem Cell Therapy: Strategies to Increase Efficiency and Specificity.” [Stem Cell Rev.](https://www.ncbi.nlm.nih.gov/pubmed/28815481) 2017 “Gene Biotechnology” 1st ed. 2016 Edition | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Basis for gene transfer approaches to stem cells |
| **2** |  | Gene transfer vectors and elements |
| **3** |  | Gene transfer techniques: biological methods |
| **4** |  | Gene transfer techniques: chemical methods |
| **5** |  | Gene transfer techniques: physical/mechanical methods |
| **6** |  | Inhibition of gene expression (silencing or inactivation) |
| **7** |  | Literature study |
| **8** |  | MID-TERM EXAM |
| **9** |  | Gene insertion and gene deletion techniques |
| **10** |  | Literature study |
| **11** |  | Controlled gene expression |
| **12** |  | Literature study |
| **13** |  | Gene therapy approaches in stem cells |
| **14** |  | Literature study |
| **15** |  | Literature study |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the fundamentals of gene transfer approaches in stem cells. |  |  | X |
| LO 2 | The ability to explain gene transfer vectors and their elements. |  |  | X |
| LO 3 | The ability to examine gene transfer techniques: biological, chemical, and physical/mechanical methods. |  |  | X |
| LO 4 | The ability to investigate gene expression inhibition (silencing or suppression). |  |  | X |
| LO 5 | The ability to analyze gene insertion and gene deletion techniques. |  |  | X |
| LO 6 | The ability to interpret controlled gene expression. |  |  | X |
| LO 7 | The ability to discuss gene therapy approaches in stem cells. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Ayla EKER SARIBOYACI | 13.12.2018 |

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| **COURSE CODE** | 522806305 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELLS AND DIABETES | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. M. Nur KEBAPCI | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell applications in diabetes treatment. | | | | | |
| **COURSE AIMS** | | | Learning about studies on obtaining beta cells from stem cells in the treatment of type 1 and type 2 diabetes, the problems encountered, and other applications. | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, studies on obtaining beta cells from stem cells in the treatment of type 1 and type 2 diabetes, the problems encountered and other applications will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define diabetes and its pathogenesis.  The ability to describe Type 1 diabetes treatment and the challenges encountered.  The ability to describe Type 2 diabetes treatment and the challenges encountered.  The ability to examine stem cell sources in diabetes treatment.  The ability to report stem cell approaches in Type 1 diabetes treatment.  The ability to report stem cell approaches in Type 2 diabetes treatment.  The ability to discuss beta cell production from pluripotent stem cells and transplantation.  The ability to interpret the immune system mechanism after transplantation.  The ability to report the advantages and challenges of stem cell applications. | | | | | |
| **TEXTBOOK** | | | Stem Cell Therapy for Diabetes (Stem Cell Biology and Regenerative Medicine) by Shimon Efrat. ISBN-13: 978-1607613657.  Progress in Stem Cell Transplantation, Edited by Taner Demirer, ISBN 978-953-51-2227-2. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Pancreas structure and function |
| **2** |  | Definition and pathogenesis of diabetes |
| **3** |  | Type 1 diabetes treatment and problems encountered |
| **4** |  | Type 2 diabetes treatment and problems encountered |
| **5** |  | Stem cell sources in diabetes treatment (embryonic stem cells, pancreatic islet-derived stem cells, pancreatic duct stem cells, pancreatic stromal cells, hematopoietic stem cells, inducible stem cells, mesenchymal stem cells) |
| **6** |  | Stem cell approaches in the treatment of type 1 diabetes |
| **7** |  | Stem cell approaches in the treatment of type 2 diabetes |
| **8** |  | MID-TERM EXAM |
| **9** |  | Beta cell production and transplantation from pluripotent stem cells |
| **10** |  | Post-transplantation immune system mechanism |
| **11** |  | Studies on reducing high blood sugar with stem cells |
| **12** |  | Stem cell applications in diabetic wounds |
| **13** |  | Advantages and problems encountered in stem cell application |
| **14** |  | Regenerative medicine |
| **15** |  | Future applications |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define diabetes and its pathogenesis. |  |  | X |
| LO 2 | The ability to describe Type 1 diabetes treatment and the challenges encountered. |  |  | X |
| LO 3 | The ability to describe Type 2 diabetes treatment and the challenges encountered. |  |  | X |
| LO 4 | The ability to examine stem cell sources in diabetes treatment. |  |  | X |
| LO 5 | The ability to report stem cell approaches in Type 1 diabetes treatment. |  |  | X |
| LO 6 | The ability to report stem cell approaches in Type 2 diabetes treatment. |  |  | X |
| LO 7 | The ability to discuss beta cell production from pluripotent stem cells and transplantation. |  |  | X |
| LO 8 | The ability to interpret the immune system mechanism after transplantation. |  |  | X |
| LO 9 | The ability to report the advantages and challenges of stem cell applications. |  |  | X |
| LO 10 |  |  |  |  |
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| LO 13 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. M. Nur KEBAPCI |  |

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| **COURSE CODE** | 522806304 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN PLASTIC SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. A. Aydan KÖSE | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell therapies in plastic surgery applications , treatment approaches in wound and burn healing, clinical stem cell research | | | | | |
| **COURSE AIMS** | | | To learn the effectiveness of stem cell therapies in plastic surgery and burn cases | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the effectiveness of stem cell therapies in plastic surgery and burn cases will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cells and bone regeneration.  The ability to explain stem cells, cartilage tissue, and breast tissue engineering.  The ability to classify wound healing, the pathophysiology of normal wound healing, and the phases of normal wound healing.  The ability to examine chronic non-healing wounds and traditional approaches to wound healing.  The ability to discuss stem cells and skin regeneration, as well as stem cell populations in cutaneous repair.  The ability to categorize skin tissue engineering, scaffolds, wound healing, and skin grafts.  The ability to report stem cell therapies in experimental burn models and the role of stem cells in burn wound healing. | | | | | |
| **TEXTBOOK** | | | Qingfeng Li and Mei Yang (2012). Stem Cell Research: A New Era for Reconstructive Surgery, Selected Topics in Plastic Reconstructive Surgery, Dr Stefan Danilla (Ed.)Innovations in Plastic and Aesthetic Surgery Editors: Eisenmann-Klein, Marita, Neuhann-Lorenz 2008. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Stem cell therapy |
| **2** |  | Stem cells and bone regeneration |
| **3** |  | Cartilage tissue engineering |
| **4** |  | Stem cells and vascularization |
| **5** |  | Stem cell and breast tissue engineering |
| **6** |  | Wound healing, pathophysiology of normal wound healing, phases of normal wound healing (inflammatory phase, proliferative phase, remodeling phase) |
| **7** |  | Non-healing wounds, traditional approaches to wound healing |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cells and skin regeneration |
| **10** |  | Stem cell populations in cutaneous repair (mesenchymal stem cells, bone marrow-derived mesenchymal stem cells, adipose tissue-derived mesenchymal stem cells, umbilical cord blood and extra-fetal tissue, skin stem cells, embryonic and induced pluripotent stem cells) |
| **11** |  | Skin tissue engineering, scaffolds and wound healing |
| **12** |  | Skin grafts (allogeneic skin grafts, autogeneic skin grafts, uncultured skin autografts, cultured skin grafts, epithelial autografts produced in in vitro cell culture) |
| **13** |  | Burn wound healing |
| **14** |  | Experimental burn models, stem cells and burn wound healing |
| **15** |  | Clinical studies in cell- based therapies |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cells and bone regeneration. |  |  | X |
| LO 2 | The ability to explain stem cells, cartilage tissue, and breast tissue engineering. |  |  | X |
| LO 3 | The ability to classify wound healing, the pathophysiology of normal wound healing, and the phases of normal wound healing. |  |  | X |
| LO 4 | The ability to examine chronic non-healing wounds and traditional approaches to wound healing. |  |  | X |
| LO 5 | The ability to discuss stem cells and skin regeneration, as well as stem cell populations in cutaneous repair. |  |  | X |
| LO 6 | The ability to categorize skin tissue engineering, scaffolds, wound healing, and skin grafts. |  |  | X |
| LO 7 | The ability to report stem cell therapies in experimental burn models and the role of stem cells in burn wound healing. |  |  | X |
| LO 8 |  |  |  |  |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. A. Aydan KÖSE |  |

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| **COURSE CODE** | 522806303 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN GENERAL SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. N. Fatih YAŞAR | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell applications in general surgical diseases. | | | | | |
| **COURSE AIMS** | | | Learning about stem cell therapies in general surgical diseases and especially cancer treatment | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, general surgical diseases and especially stem cell therapies in cancer treatment will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define the risks and benefits of mesenchymal stem cells in liver transplantation.  The ability to explain the cytokines secreted by mesenchymal stem cells in liver injury.  The ability to examine mesenchymal stem cell therapy in acute and chronic kidney ischemia.  The ability to investigate mesenchymal stem cell therapy in kidney transplantation.  The ability to interpret the potential role of mesenchymal stem cells in pancreatic islet transplantation.  The ability to discuss the clinical outcomes of pancreatic islet transplantation.  The ability to examine unresolved issues in human islet transplantation.  The ability to research inflammatory bowel disease and mesenchymal stem cells. | | | | | |
| **TEXTBOOK** | | | Progress in Stem Cell Transplantation, Edited by Taner Demirer, ISBN 978-953-51-2227-2.  Pluripotent Stem Cell Biology - Advances in Mechanisms, Methods and Models, Edited by Craig S. Atwood and Sivan Vadakkadath Meethal, ISBN 978-953-51-1590-8. | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Plasticity of mesenchymal stem cells |
| **2** |  | Immune system and immunomodulation |
| **3** |  | Potential risks of mesenchymal stem cell therapies |
| **4** |  | Repair properties of mesenchymal stem cells (liver repair, kidney repair, colon repair, fibroblastic differentiation) |
| **5** |  | Mesenchymal stem cells in liver transplantation: risks and benefits |
| **6** |  | Cytokines secreted by mesenchymal stem cells in liver injury |
| **7** |  | Clinical studies on mesenchymal stem cells in the treatment of liver diseases |
| **8** |  | MID-TERM EXAM |
| **9** |  | Mesenchymal stem cell therapy in acute and chronic renal ischemia |
| **10** |  | Mesenchymal stem cell therapy in kidney transplantation |
| **11** |  | Potential role of mesenchymal stem cells in pancreatic islet transplantation. |
| **12** |  | Clinical outcomes of pancreatic islet transplantation |
| **13** |  | Unsolved problems in human islet transplantation |
| **14** |  | Inflammatory bowel disease and mesenchymal stem cells |
| **15** |  | Effect of mesenchymal stem cells on tumor mechanism, mesenchymal stem cells and regenerative therapy after cancer |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define the risks and benefits of mesenchymal stem cells in liver transplantation. |  |  | X |
| LO 2 | The ability to explain the cytokines secreted by mesenchymal stem cells in liver injury. |  |  | X |
| LO 3 | The ability to examine mesenchymal stem cell therapy in acute and chronic kidney ischemia. |  |  | X |
| LO 4 | The ability to investigate mesenchymal stem cell therapy in kidney transplantation. |  |  | X |
| LO 5 | The ability to interpret the potential role of mesenchymal stem cells in pancreatic islet transplantation. |  |  | X |
| LO 6 | The ability to discuss the clinical outcomes of pancreatic islet transplantation. |  |  | X |
| LO 7 | The ability to examine unresolved issues in human islet transplantation. |  |  | X |
| LO 8 | The ability to research inflammatory bowel disease and mesenchymal stem cells. |  |  | X |
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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. N. Fatih YAŞAR |  |

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| **COURSE CODE** | 522806310 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN BRAIN SURGERY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Erhan COSAN | | Turkish | **Technical** | **Medical** | **Other( …… )** |
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**COURSE LEVEL**

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| **SCIENTIFIC PREPARATION** | **DEGREE** | **DOCTORATE** | **SPECIALIZED FIELD COURSE** |
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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
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| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Stem cell therapies in neurosurgery cases | | | | | |
| **COURSE AIMS** | | | To learn new approaches about stem cell therapies in brain surgery cases and traumas | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, new approaches to stem cell therapies in brain surgery cases and traumas will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cells in central nervous system (CNS) regeneration and plasticity.  The ability to explain neuronal stem cells.  The ability to examine the extracellular matrix and the neuronal stem cell microenvironment.  The ability to report stem cell therapy in ischemic stroke.  The ability to discuss animal models and stem cell therapy in traumatic brain injury.  The ability to investigate stem cell therapy in spinal cord injury.  The ability to analyze stem cell therapy in degenerative disc disease. | | | | | |
| **TEXTBOOK** | | | Stem Cell Therapy in Neurological Disorders 2014 by NeuroGen Brain and Spine Institute Pvt. Ltd. ISBN 81-86876-06-5Ms. Akshata Shetty | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Sources and properties of mesenchymal stem cells |
| **2** |  | Phenotype of mesenchymal stem cells |
| **3** |  | profile of mesenchymal stem cells |
| **4** |  | Stem cells in CNS regeneration and plasticity |
| **5** |  | Neuronal stem cells |
| **6** |  | Extracellular matrix: The neuronal stem cell microenvironment |
| **7** |  | Stem cell therapy in ischemic stroke |
| **8** |  | MID-TERM EXAM |
| **9** |  | Animal models of traumatic brain injury |
| **10** |  | Stem cell therapy in traumatic brain injury |
| **11** |  | Stem cell therapy for spinal cord injury |
| **12** |  | Stem cell therapy in brain tumors |
| **13** |  | Stem cell therapy in temporal lobe epilepsy |
| **14** |  | Stem cell therapy in degenerative disc diseases |
| **15** |  | Clinical studies |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cells in central nervous system (CNS) regeneration and plasticity. |  |  | X |
| LO 2 | The ability to explain neuronal stem cells. |  |  | X |
| LO 3 | The ability to examine the extracellular matrix and the neuronal stem cell microenvironment. |  |  | X |
| LO 4 | The ability to report stem cell therapy in ischemic stroke. |  |  | X |
| LO 5 | The ability to discuss animal models and stem cell therapy in traumatic brain injury. |  |  | X |
| LO 6 | The ability to investigate stem cell therapy in spinal cord injury. |  |  | X |
| LO 7 | The ability to analyze stem cell therapy in degenerative disc disease. |  |  | X |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Erhan COSAN |  |

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| **COURSE CODE** | 522806311 | **DEPARTMENT** | Stem Cell | | |
| **COURSE NAME** | | STEM CELL APPLICATIONS IN PEDIATRIC NEUROLOGY | | | |
| **INSTRUCTOR NAME** | | **COURSE LANGUAGE** | **COURSE CATEGORY** | | |
| Prof. Dr. Kürşat Bora ÇARMAN | | Turkish | **Technical** | **Medical** | **Other( …… )** |
|  | X |  |

**COURSE LEVEL**

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

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| **SEMESTER** | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | | | |
| **THEORETICAL** | **APPLICATION** | **LAB** | **LOAN** | | **ECTS** | | **TYPE** |
| Spring(4th semester) | 2 | 0 |  | 2 | | 5.0 | | Elective |
|  | | | | | | | | |
| **EVALUATION CRITERIA** | | | | | | | | |
| **SEMESTER ACTIVITIES** | | | **Type of activity** | | **Number** | | **Percentage (%)** | |
| Midterm Exam | | **1** | | 40 | |
| Quiz | |  | |  | |
| Homework | |  | |  | |
| Project | |  | |  | |
| Oral examination | |  | |  | |
| Other ( ……… ) | |  | |  | |
| **Final Exam** | | | | 60 | |
| **PREREQUISITE(S)** | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | Use of stem cells in neurological diseases such as motor neuron diseases | | | | | |
| **COURSE AIMS** | | | Use of stem cells in neurological diseases such as motor neuron diseases, autism and cerebral palsy | | | | | |
| **COURSE CONTRBUTION TO THE PROFESSIONAL EDUCATION OBJECTIVES** | | | At the end of this course, the use of stem cells in neurological diseases such as motor neuron diseases, autism and cerebral palsy will be learned. | | | | | |
| **LEARNING OUTCOMES OF THE COURSE** | | | The ability to define stem cell therapies in motor neuron diseases  The ability to explain stem cell therapies in cerebral palsy  The ability to examine stem cell therapies in autism  The ability to report stem cell therapies in traumatic brain injury  The ability to analyze stem cell therapies in spinal cord injury  The ability to investigate stem cell therapies in muscular dystrophy | | | | | |
| **TEXTBOOK** | | | Neural Stem Cell Assays,e ditor(s): Navjot Kaur, Mohan C. Vemuri.Online ISBN: 9781118308295 | | | | | |
| **OTHER REFERENCES** | | | Electronic search engines and scientific books on the subject | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | |  | | | | | |

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| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **DATE** | **TOPICS TO BE COVERED** |
| **1** |  | Stem cell therapies in motor neuron diseases |
| **2** |  | Stem cell therapies in cerebral palsy |
| **3** |  | Stem cell therapies in autism |
| **4** |  | Stem cell therapies in traumatic brain injury |
| **5** |  | Stem cell therapies in spinal cord injury |
| **6** |  | Stem cell therapies in subacute sclerosing panencephalitis |
| **7** |  | therapies in pediatric myelin diseases |
| **8** |  | MID-TERM EXAM |
| **9** |  | Stem cell therapies in osteogenesis imperfecta |
| **10** |  | Stem cell therapies in muscular dystrophy |
| **11** |  | Stem cell therapies in bronchopulmonary dysplasia |
| **12** |  | therapies in cardiac valvular diseases |
| **13** |  | Stem cell therapies in diabetes mellitus |
| **14** |  | Stem cell therapies in lysosomal storage disease |
| **15** |  | Stem cell therapies in leukodystrophies , clinical studies |
| **16** |  | FINAL EXAM |

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| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **CONTRIBUTION LEVEL** | | |
| **NO** | **LEARNING OUTCOMES** | **1**  **Low** | **2**  **Med** | **3**  **Hıgh** |
| LO 1 | The ability to define stem cell therapies in motor neuron diseases |  |  | X |
| LO 2 | The ability to explain stem cell therapies in cerebral palsy |  |  | X |
| LO 3 | The ability to examine stem cell therapies in autism |  |  | X |
| LO 4 | The ability to report stem cell therapies in traumatic brain injury |  |  | X |
| LO 5 | The ability to analyze stem cell therapies in spinal cord injury |  |  | X |
| LO 6 | The ability to investigate stem cell therapies in muscular dystrophy |  |  | X |
| LO 7 |  |  |  |  |
| LO 8 |  |  |  |  |
| LO 9 |  |  |  |  |
| LO 10 |  |  |  |  |
| LO 11 |  |  |  |  |
| LO 12 |  |  |  |  |
| LO 13 |  |  |  |  |
| LO 14 |  |  |  |  |

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| **INSTRUCTOR NAME** | **DATE** |
| Prof. Dr. Kürşat Bora ÇARMAN |  |