|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Doctorate** | | | | | |
| Code | Course Name | ECTS | T+U+L | T/S | Language |
| Fall Semester | | | | | |
| 521903305 | [TRANSMISSION ELECTRON MICROSCOPE AND ITS WORKING PRINCIPLES](#DERS521901305) | 7.5 | 2+2+0 | COMPULSORY | TURKISH |
| 521903308 | [HISTOCHEMISTRY AND IMMUNOHISTOCHEMISTRY](#DERS521901308) | 7.5 | 2+2+0 | COMPULSORY | TURKISH |
| 521903301 | [RESEARCH METHODS AND ULTRA-STRUCTURE IN THE DIGESTIVE SYSTEM](#DERS521901301) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 521905302 | [DEVELOPMENT AND HISTOLOGY OF LYMPHATIC TISSUES AND ORGANS](#DERS521901302) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 521905304 | [DEVELOPMENT OF THE HEAD AND NECK REGION](#DERS521901304) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 521903305 | [TRANSMISSION ELECTRON MICROSCOPE AND ITS WORKING PRINCIPLES](#DERS521901305) | 7.5 | 2+2+0 | ELECTIVE | TURKISH |
| 521903306 | [CONGENITAL MALFORMATIONS IN EMBRYOLOGY](#DERS521901306) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 521905307 | [MICROMANIPULATION](#DERS521901307) | 5.0 | 2+1+0 | ELECTIVE | TURKISH |
| 521903308 | [HISTOCHEMISTRY AND IMMUNOHISTOCHEMISTRY](#DERS521901308) | 7.5 | 2+2+0 | ELECTIVE | TURKISH |
| 521905309 | [EMBRYO STEM CELLS AND CLONING](#DERS521901309) | 5.0 | 1+2+0 | ELECTIVE | TURKISH |
| 521905310 | [CELL INJURY, ADAPTATION AND DEATH](#DERS521901310) | 5.0 | 1+2+0 | ELECTIVE | TURKISH |
| 521905311 | [INFLAMMATION AND TISSUE REPAIR](#DERS521901311) | 5.0 | 1+2+0 | ELECTIVE | TURKISH |
| 521901600 | SPECIALIZED FIELD COURSE | 5 | 3+0+0 | COMPULSORY | TURKISH |
|  | |  |  |  |  |
| Spring Term | | | | | |
| 521904301 | [ORGANOGENESIS](#DERS521902301) | 7.5 | 3+0+0 | COMPULSORY | TURKISH |
| 521906302 | [DEVELOPMENT AND HISTOLOGY OF THE CARDIOVASCULAR SYSTEM](#DERS521902302) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 521904303 | [DEVELOPMENT AND HISTOLOGY OF NERVOUS SYSTEM ORGANS](#DERS521902303) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 521904304 | [UROGENITAL SYSTEM IN LIGHT AND ELECTRON MICROSCOPE](#DERS521902304) | 7.5 | 3+0+0 | ELECTIVE | TURKISH |
| 521906306 | [ENDOCRINE SYSTEM DEVELOPMENT AND HISTOLOGY](#DERS521902306) | 5.0 | 2+0+0 | ELECTIVE | TURKISH |
| 521904307 | [SCANNING ELECTRON MICROSCOPE AND ITS WORKING PRINCIPLES](#DERS521902307) | 7.5 | 2+2+0 | ELECTIVE | TURKISH |
| 521901600 | SPECIALIZED FIELD COURSE | 5 | 3+0+0 | COMPULSORY | TURKISH |
|  | |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521903301** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | RESEARCH METHODS AND ULTRA-STRUCTURE IN THE DIGESTIVE SYSTEM | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 3 | 0 | 0 | 3 | 7.5 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Development and histology of digestive system organs | | |
| **COURSE AIMS** | Teaching the development and histology of digestive system organs | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Understand and explain the development and histology of digestive system organs. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Be able to interpret basic concepts related to histological structure and functions and development of oral cavity, tongue, teeth, supporting tissues and salivary glands.  Be able to define basic concepts related to normal development, structure and functions of esophagus, stomach, small and large intestines.  Be able to learn embryonic development and basic histological information and concepts related to liver, gall bladder and pancreas and evaluate and interpret the entire digestive system as a whole.  Be able to understand developmental anomalies and basic functional disorders of digestive system and be able to comment on their cause-effect relationships. | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to the digestive system |
| 2 |  | Development of the foregut |
| 3 |  | Midgut development |
| 4 |  | Hindgut development |
| 5 |  | Oral cavity and related structures |
| 6 |  | Esophagus |
| 7 |  | **Midterm Exam** |
| 8 |  | Stomach |
| 9 |  | Small intestine |
| 10 |  | Large intestine and rectum |
| 11 |  | Liver and gallbladder |
| 12 |  | Pancreas |
| 13 |  | Methods of examining the digestive system |
| 14 |  | Selected literatures |
| 15 |  | Microscopic examination |
| 16 |  | **End of term exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  |  | **X** |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  | **X** |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905302** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | DEVELOPMENT AND HISTOLOGY OF LYMPHATIC TISSUES AND ORGANS | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 2 | 0 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Development and histology of lymphatic tissues and organs | | |
| **COURSE AIMS** | Teaching the developmental stages and histology of lymphatic tissues and organs. | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | immune system cells, tissues and organs. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Knows and can interpret the development of lymphatic tissues and organs and the anomalies that occur during this process.  Knows the histological features of lymphatic tissues and organs and the relationship of these features with the functions of the organs.  Can interpret images of lymphatic tissues under the microscope.  Knows the relationship of lymphatic tissues and organs with immune system cells.  Can define the properties and functions of immune system cells at the molecular level.  Can establish the connection between lymphatic tissues and cells and diseases. | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to the lymphatic system |
| 2 |  | Immune system cells - neutrophil , basophil, eosinophil , monocyte , lymphocyte |
| 3 |  | Immune system cells - plasmocyte , reticulum cell, dendritic cell, mononuclear phagocytic system |
| 4 |  | Development of bone marrow |
| 5 |  | Histology of bone marrow |
| 6 |  | Lymphatic tissues |
| 7 |  | **Midterm Exam** |
| 8 |  | Development and histology of lymph nodes |
| 9 |  | Development and histology of tonsils |
| 10 |  | Development of the thymus |
| 11 |  | Histology of the thymus |
| 12 |  | Development and histology of the spleen |
| 13 |  | Functions of lymphatic organs |
| 14 |  | Immune system in tissue and organ transplantation |
| 15 |  | Some problems in the immune system with unknown answers |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  | **X** |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  |  | **X** |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905304** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | DEVELOPMENT OF THE HEAD AND NECK REGION | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 2 | 0 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | The role of the pharyngeal systems in the development of the head and neck regions | | |
| **COURSE AIMS** | the pharyngeal pouches, pharyngeal arches, pharyngeal slits and pharyngeal membranes that form the pharyngeal system . | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | The information learned will be used in the analysis of problems to be encountered in the clinic. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Explain the structure of pharyngeal arches  Explain the formation of the face and its anomalies  Explain the formation of the tongue and its anomalies  Explain the formation of the palate and its anomalies | | |
| **TEXTBOOK** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **OTHER REFERENCES** | embryology and birth defects , Before we are born . Moore KL, Persaud TVN Translation edit .; Müftüoğlu, S., Atilla, P., Kaymaz, F., Güneş Medical Bookstores, 7th Edition, 2009. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to head and neck development |
| 2 |  | What is the pharyngeal system? |
| 3 |  | Pharyngeal arches |
| 4 |  | Pharyngeal pouches |
| 5 |  | Seminar 1 |
| 6 |  | Pharyngeal clefts |
| 7 |  | **Midterm Exam** |
| 8 |  | Pharyngeal membranes |
| 9 |  | Pharyngeal anomalies |
| 10 |  | Seminar 2 |
| 11 |  | Development of the thyroid and parathyroid glands |
| 12 |  | Development of the thymus |
| 13 |  | Development of language |
| 14 |  | Development of the face |
| 15 |  | Clinical information |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods | **X** |  |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning | **X** |  |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521903305** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | TRANSMISSION ELECTRON MICROSCOPE AND ITS WORKING PRINCIPLES | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  | **X** |  |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 2 |  | 2 | 3 | 7.5 | Required: **X** |
| Elective: |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | The place and importance of transmission electron microscopy in histology | | |
| **COURSE AIMS** | Introduce the transmission electron microscope | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Explain the application areas of transmission electron microscope. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Ability to follow up tissues by electron microscopy.  Ability to take semi-thin and thin sections  Ability to prepare a knife for sectioning  Ability to perform electron microscopic examinations of sections and necessary evaluations  Ability to interpret errors encountered in electron microscopy | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Electron Microscopy Course Book, Istanbul Cerrahpaşa Medical Faculty, 1997. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Working principle of transmission electron microscope |
| 2 |  | Electron microscope laboratory equipment |
| 3 |  | Features of TEM device |
| 4 |  | Texture detection methods for TEM |
| 5 |  | Tissue tracking for TEM |
| 6 |  | Obtaining tissue blocks for TEM |
| 7 |  | **Midterm Exam** |
| 8 |  | Glass knife making |
| 9 |  | Ultramicrotome |
| 10 |  | Semi-thin sectioning |
| 11 |  | Staining with toluidine blue |
| 12 |  | Ultra-thin sectioning |
| 13 |  | Grid painting |
| 14 |  | Ultramicrograph evaluation principles |
| 15 |  | Ultramicrograph interpretation |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  |  |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  |  | **X** |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  |  | **X** |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521903306** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | CONGENITAL MALFORMATIONS IN EMBRYOLOGY | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 3 | 0 | 0 | 3 | 7.5 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Congenital malformations | | |
| **COURSE AIMS** | Congenital Teaching the causes and consequences of malformations | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Congenital Understanding the causes and consequences of malformations | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the concept of teratology and relating it to the embryogenesis process  Understanding the causes of congenital anomalies  Recognizing developmental anomalies occurring in various systems and understanding their consequences. | | |
| **TEXTBOOK** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **OTHER REFERENCES** | embryology and birth defects , Translation editor: Sevda Müftüoğlu, translation from the 7th edition, Güneş Bookstore, 2009. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Congenital Introduction to malformations |
| 2 |  | Teratology |
| 3 |  | Embryogenesis |
| 4 |  | Nervous system malformations |
| 5 |  | Cardiovascular system malformations |
| 6 |  | Digestive system malformations |
| 7 |  | **Midterm Exam** |
| 8 |  | Musculoskeletal malformations |
| 9 |  | Female reproductive system malformations |
| 10 |  | Malformations of the male reproductive system |
| 11 |  | Urinary system malformations |
| 12 |  | Chromosome disorders |
| 13 |  | Skin malformations |
| 14 |  | Respiratory system malformations |
| 15 |  | Other malformations |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  |  | **X** |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  | **X** |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications | **X** |  |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  |  | **X** |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  |  | **X** |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905307** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | MICROMANUPLATION | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  | **X** |  |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 2 | 1 | 0 | 2.5 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Micromanipulation techniques and information on oocytes, sperm and embryos | | |
| **COURSE AIMS** | Learning how to apply micromanipulation | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | micromanipulation technique | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the biological mechanisms in the gametogenesis process  Being able to recognize and use basic tools and devices in the IVF laboratory  Understanding the concept of micromanufacturing, learning the techniques and tools used in this process  Defining and preparing the culture medium required for micromanufacturing | | |
| **TEXTBOOK** | Hikmet Hassa (Editor), Clinical Approach to Infertile Cases and IVF Laboratory Applications, Osmangazi University Publications, Eskişehir, 2003. | | |
| **OTHER REFERENCES** | Lale Delilbaşı , In Vitro Fertilization Laboratory from A to Z, Veri Medical Publishing, Istanbul, 2008. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Entrance |
| 2 |  | oogenesis and spermatogenesis ? |
| 3 |  | Equipment used in the IVF laboratory |
| 4 |  | micromanipulation ? |
| 5 |  | micropenuplation technique? |
| 6 |  | Preparation of culture medium used in micromanipulation |
| 7 |  | **Midterm Exam** |
| 8 |  | Seminar |
| 9 |  | Cumulus oocyte complex manipulation , oocyte and oocyte​ denudation |
| 10 |  | Attaching microinjection needle and holder pipette to micromanipulator |
| 11 |  | Tail breaking, spermatozoon capture and collection |
| 12 |  | Intracytoplasmic sperm injection (ICSI) |
| 13 |  | Zygote control and scoring |
| 14 |  | Micromanipulation application 1 |
| 15 |  | Micromanipulation application 2 |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods | **X** |  |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results | **X** |  |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning | **X** |  |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  |  | **X** |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  Prof. Dr. Dilek BURUKOĞLU DÖNMEZ  **Signature** | **Date**  **06.03.2018** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521903308** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | HISTOCHEMISTRY AND IMMUNOHISTOCHEMISTRY | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Varol SAHINTURK | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 2 | 2 | 0 | 3 | 7.5 | Required: **X** |
| Elective: |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Basic histochemical and immunohistochemical techniques | | |
| **COURSE AIMS** | basic histochemical and immunohistochemical techniques | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | basic histochemical and immunohistochemical techniques | | |
| **LEARNING OUTCOMES OF THE COURSE** | To have knowledge about morphological and biochemical properties of antigen and antibody  To have knowledge about immunohistochemical techniques and to be able to apply them  To learn and apply the stages of immunohistochemical staining technique  To have knowledge about the problems encountered in immunohistochemical staining and their causes  To have knowledge about the use of immunohistochemical staining in the diagnosis of diseases | | |
| **TEXTBOOK** | Applied Immunohistochemistry Techniques Course Book, 1997, Ankara, Alp Can. | | |
| **OTHER REFERENCES** |  | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to histochemistry |
| 2 |  | Biochemistry of cells, intercellular substances and cell secretions |
| 3 |  | Basic mechanisms of the staining reaction |
| 4 |  | Methods for determining various tissue components |
| 5 |  | Histochemical applications on paraffin and cryo sections |
| 6 |  | Fluorescence microscopy |
| 7 |  | **Midterm Exam** |
| 8 |  | Basic principles of immunohistochemical methods |
| 9 |  | Demonstration of lipids in tissue sections |
| 10 |  | Demonstration of mucins in tissue sections |
| 11 |  | Demonstration of nucleic acids in tissue sections |
| 12 |  | Demonstration of glycosaminoglycans in tissue sections |
| 13 |  | Biogenic in tissue sections showing amines |
| 14 |  | Acridine orange method |
| 15 |  | Basic approaches in choosing techniques |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  |  | **X** |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Varol SAHINTURK**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905309** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | EMBRYO STEM CELLS AND CLONING | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  | **X** |  |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 1 | 2 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Embryo stem cells and cloning technique | | |
| **COURSE AIMS** | Teaching the general principles of embryo stem cells and cloning | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | the properties of embryo stem cells and cloning techniques | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understand and explain the events of the first three weeks of embryonic development  Understand the concept of embryonic stem cells, their properties, definition, culture and potential uses  Understand the concept of cloning  Interpret cloning technologies, their applications and potential uses. | | |
| **TEXTBOOK** | Alp Can, Stem Cell, Academician Medical Bookstore, Ankara, 2014. | | |
| **OTHER REFERENCES** | Erdal Karaöz and Ercüment Ovalı, Stem Cells, ATİ Technology, Trabzon, 2004. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | The first 3 weeks of embryo development |
| 2 |  | What are stem cells? Why are stem cells important? |
| 3 |  | specific properties of stem cells ? |
| 4 |  | embryonic stem cells? |
| 5 |  | How to culture embryo stem cells? |
| 6 |  | embryonic stem cells |
| 7 |  | **Midterm Exam** |
| 8 |  | What is cloning? |
| 9 |  | Development of cloning technology |
| 10 |  | The beginning of the cloning era - Dolly |
| 11 |  | Embryo cloning |
| 12 |  | Areas of use of cloning technology |
| 13 |  | Health of cloned organisms |
| 14 |  | Embryonic stem cell studies and ethical problems |
| 15 |  | Current article search |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods | **X** |  |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results | **X** |  |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning | **X** |  |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  |  | **X** |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905310** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | CELL INJURY, ADAPTATION AND DEATH | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Mustafa Fuat AÇIKALİN | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 1 | 2 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **40** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **60** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Cell injury, adaptation and death | | |
| **COURSE AIMS** | Obtaining information about cell injury, adaptation and death | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Learning the factors that cause cell injury, cell injury mechanisms, cellular adaptations to injury and types of cell death | | |
| **LEARNING OUTCOMES OF THE COURSE** | Identify factors that cause cell injury  Understand mechanisms of cell injury and cellular adaptations to injury  Understand types of cell death and their morphological and molecular markers | | |
| **TEXTBOOK** | Robbins Essential Pathology 8th Edition, Nobel Medical Bookstore, 2008. | | |
| **OTHER REFERENCES** |  | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Overview of cell injury, causes of cell injury |
| 2 |  | Cell injury mechanisms-General biochemical mechanisms |
| 3 |  | Mechanisms of cell injury - Ischemic and hypoxic injury |
| 4 |  | Cell injury mechanisms-Free radical-induced cell injury |
| 5 |  | Cell injury mechanisms-Chemical injury |
| 6 |  | Cellular adaptation to injury – Atrophy and hypertrophy |
| 7 |  | **Midterm Exam** |
| 8 |  | Cellular adaptation to injury – Hyperplasia and metaplasia |
| 9 |  | Intracellular accumulations |
| 10 |  | Pathological calcification |
| 11 |  | Reversible and irreversible cell injury-Mechanisms |
| 12 |  | Reversible and irreversible cell injury-Morphology |
| 13 |  | Programmed cell death ( apoptosis ) |
| 14 |  | Cellular aging |
| 15 |  | Microscopic examination |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  | **X** |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Mustafa Fuat AÇIKALİN**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521905311** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | INFLAMMATION AND TISSUE REPAIR | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Deniz ARIK | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
| **X** |  | 1 | 2 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **40** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **60** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Inflammation and tissue repair | | |
| **COURSE AIMS** | Learning about inflammation and tissue repair | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | inflammation , their benefits and harms to the tissue and the stages of tissue repair | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the types of inflammation  Identifying the cells and mechanisms involved in the inflammation process  Understanding the benefits and harms of inflammation to the tissue and the stages of tissue repair and being able to interpret various clinical scenarios with this information. | | |
| **TEXTBOOK** | Robbins Essential Pathology 8th Edition, Nobel Medical Bookstore, 2008. | | |
| **OTHER REFERENCES** |  | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | General information about inflammation |
| 2 |  | Acute inflammation-1 |
| 3 |  | Acute inflammation-2 |
| 4 |  | Chronic inflammation-1 |
| 5 |  | Chronic inflammation-2 |
| 6 |  | Chemical mediators and regulators of inflammation |
| 7 |  | **Midterm Exam** |
| 8 |  | Systemic effects of inflammation |
| 9 |  | Overview of tissue repair |
| 10 |  | Cell and tissue regeneration-1 |
| 11 |  | Cell and tissue regeneration-2 |
| 12 |  | Scar formation |
| 13 |  | Factors affecting tissue repair |
| 14 |  | Tissue sampling |
| 15 |  | Tissue tracking and sectioning |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  | **X** |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Deniz ARIK**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521904301** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | ORGANOGENESIS | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 3 | 0 | 0 | 3 | 7.5 | Required: **X** |
| Elective: |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Formation of major organ systems between the 4th and 8th weeks of development | | |
| **COURSE AIMS** | Learning about the basic developmental events and changes in external appearance in the embryo between the 4th and 8th weeks | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Teratogens during organogenesis congenital They may cause anomalies . The information learned in this course will be applied in the clinic. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the concept of organogenesis and the developmental stages of the embryo  Interpreting embryo folding  Understanding the concept of germ layer and the molecular mechanisms in their formation  Understanding the structures that develop from germ layers and explaining the mechanisms that are effective in this process  Interpreting the concepts of organogenesis and teratology together and explaining them with clinical examples | | |
| **TEXTBOOK** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **OTHER REFERENCES** | embryology and birth defects , Before we are born . Moore KL, Persaud TVN Translation edit .; Müftüoğlu, S., Atilla, P., Kaymaz, F., Güneş Medical Bookstores, 7th Edition, 2009. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | organogenesis ? |
| 2 |  | Developmental stages of the embryo |
| 3 |  | Folding of the embryo |
| 4 |  | Structures that develop from germ layers |
| 5 |  | embryonic development |
| 6 |  | Seminar 1 |
| 7 |  | **Midterm Exam** |
| 8 |  | Key events of week four |
| 9 |  | Key events in week five |
| 10 |  | Key events in week six |
| 11 |  | Key events in week seven |
| 12 |  | Seminar 2 |
| 13 |  | Key events in week eight |
| 14 |  | Summary of weeks 4-8 |
| 15 |  | Clinical information |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods | **X** |  |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning | **X** |  |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521906302** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | DEVELOPMENT AND HISTOLOGY OF THE CARDIOVASCULAR SYSTEM | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Ass. Prof. Dr. Murat SEVİMLİ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 2 | 0 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Development and histology of the heart and vessels | | |
| **COURSE AIMS** | Teaching the development and histology of the heart and blood vessels | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Understanding abnormal development and structures by learning the normal development and structure of the heart and blood vessels | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the development of the heart and blood vessels in humans and interpreting the mechanisms and consequences of developmental disorders that occur during this process  Explaining fetal circulation  Understanding the histological structure of the organs that make up the circulatory system, explaining the structure-function relationship  Gaining the necessary knowledge and experience to identify all circulatory system components under the microscope | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Development of the heart - trunk arteriosus |
| 2 |  | Development of the heart - atria |
| 3 |  | Development of the heart - ventricles |
| 4 |  | Development of the heart - bulbus cordis and sinus venosus |
| 5 |  | Histology of the heart |
| 6 |  | Development of blood vessels |
| 7 |  | **Midterm Exam** |
| 8 |  | Seminar 1 |
| 9 |  | Histology of blood vessels-arteries |
| 10 |  | Histology of blood vessels - veins |
| 11 |  | Development of blood cells |
| 12 |  | Microscopic structure of blood cells |
| 13 |  | Seminar 2 |
| 14 |  | Microscopic examination-heart and vessels |
| 15 |  | Microscopic examination-blood cells |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  Ass. Prof. Dr. Murat SEVİMLİ  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521904303** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | DEVELOPMENT AND HISTOLOGY OF NERVOUS SYSTEM ORGANS | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Ass. Prof. Dr. Murat SEVİMLİ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 3 | 0 | 0 | 3 | 7.5 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Development and histology of nervous system organs | | |
| **COURSE AIMS** | Teaching the development and histology of nervous system organs | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Understanding abnormal development and structures by learning the normal development and structure of nervous system organs | | |
| **LEARNING OUTCOMES OF THE COURSE** | Sinir sisteminin yapısal ve işlevsel,mikroskobik ve moleküler özelliklerini tanımlayabilme  Sinir sistemi gelişimi esnasında köken aldığı embriyolojik yapıları, olayları ve etkili molekülleri adlandırabilme  Sinir sistemi gelişimi esnasında oluşan hataların sonuçlarını, ortaya çıkan anomalileri ve/veya hastalıkları tanımlayabilme | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to the nervous system |
| 2 |  | Cells of the nervous system-neurons |
| 3 |  | Cells of the nervous system - neuroglia cells |
| 4 |  | General characteristics of the nervous system |
| 5 |  | Early development of the nervous system |
| 6 |  | Brain development |
| 7 |  | **Midterm Exam** |
| 8 |  | Brain histology |
| 9 |  | Spinal cord development |
| 10 |  | Spinal cord histology |
| 11 |  | Cerebellum development |
| 12 |  | Histology of the cerebellum |
| 13 |  | Ganglion development and histology |
| 14 |  | Peripheral nerve development and histology |
| 15 |  | Histology of encapsulated nerve endings |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  | **X** |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis | **X** |  |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  |  | **X** |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  |  | **X** |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  Ass. Prof. Dr. Murat SEVİMLİ  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521904304** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | UROGENITAL SYSTEM IN LIGHT AND ELECTRON MICROSCOPE | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Ass. Prof. Dr. Murat SEVİMLİ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 3 | 0 | 0 | 3 | 7.5 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Overview of the urogenital system | | |
| **COURSE AIMS** | Teaching the development and histology of the urogenital system organs | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | To learn the development and histology of the urogenital system organs and to explain the relationship between structure and function. | | |
| **LEARNING OUTCOMES OF THE COURSE** | To be able to describe the development and differentiation of sex cells in females and males, molecules affecting them, migration to the gonads, differentiation of gonads into testes and ovaries, genetic factors affecting them, development of genital excretory tracts and external genital organs, development of kidneys and urinary excretory tracts and establish clinical connections with malformations  To be able to describe various molecules expressed during development  To be able to describe the histological structures of testis, ovary, genital excretory tracts, kidneys and urinary excretory tracts - establish connections with clinical problems related to the structure | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | Langman's Medical Embryology , T.W. Sadler , Thirteenth Edition, Wolters Kluwer , USA, 2015. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Development of the urinary system |
| 2 |  | Histology of the kidney |
| 3 |  | Histology of the ureter , bladder and urethra |
| 4 |  | Microscopic examination |
| 5 |  | Seminar |
| 6 |  | Male genital system development |
| 7 |  | **Midterm Exam** |
| 8 |  | Testicular histology and spermatogenesis |
| 9 |  | Epididymis , duct Histology of the deferens and other canal systems |
| 10 |  | Prostate, bulbourethral gland, vesicle seminalis and penis histology |
| 11 |  | Female genital system development |
| 12 |  | Ovarian histology and ovarian Cycle |
| 13 |  | Uterine histology and uterine Cycle |
| 14 |  | Histology of vagina and fallopian tube |
| 15 |  | Microscopic examination |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  |  | **X** |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  |  | **X** |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  |  | **X** |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  |  | **X** |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  |  | **X** |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  |  | **X** |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  Ass. Prof. Dr. Murat SEVİMLİ  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521906306** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | ENDOCRINE SYSTEM DEVELOPMENT AND HISTOLOGY | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Ass. Prof. Dr. Murat SEVİMLİ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  |  | **X** |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 2 | 0 | 0 | 2 | 5.0 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | Development and histological structure of endocrine system organs | | |
| **COURSE AIMS** | of the pituitary gland, hypothalamus , pineal gland, thyroid gland, parathyroid gland and adrenal gland. | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | The development and histological structure of endocrine organs will be understood and used in analyzing clinical situations. | | |
| **LEARNING OUTCOMES OF THE COURSE** | Understanding the microscopic structures of the organs that make up the endocrine system, their hormone synthesis and secretion patterns, and their hypo- and hyperfunctions on a functional and morphological basis. Understanding the embryological development of the structures that make up the endocrine system and the molecular mechanisms that control these processes. | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** | embryology and birth defects , Before we are born . Moore KL, Persaud TVN Translation editor; Müftüoğlu, S ., Atilla, P., Kaymaz, F., Güneş Medical Bookstores, 7th Edition, 2009. | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Introduction to the development of the endocrine system |
| 2 |  | Organs that make up the endocrine system |
| 3 |  | Functions of organs that make up the endocrine system |
| 4 |  | Seminar 1 |
| 5 |  | Pituitary gland |
| 6 |  | Hypothalamus |
| 7 |  | **Midterm Exam** |
| 8 |  | Pineal gland |
| 9 |  | Thyroid gland |
| 10 |  | Parathyroid gland |
| 11 |  | Seminar 2 |
| 12 |  | Adrenal gland |
| 13 |  | Diffuse neuroendocrine system |
| 14 |  | Other endocrine structures |
| 15 |  | Clinical information |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  | **X** |  |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  | **X** |  |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods | **X** |  |  |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  | **X** |  |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  | **X** |  |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning | **X** |  |  |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  | **X** |  |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  | **X** |  |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  |  | **X** |

|  |  |
| --- | --- |
| **Instructor of the Course**  Ass. Prof. Dr. Murat SEVİMLİ  **Signature** | **Date**  **26.03.2025** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COURSE CODE:** | **521904307** | **DEPARTMENT:** | | HISTOLOGY AND EMBRYOLOGY | | |
| **COURSE NAME:** | SCANNING ELECTRON MICROSCOPE AND ITS WORKING PRINCIPLES | | | | | |
| **INSTRUCTOR GIVING THE COURSE** | | **COURSE LANGUAGE** | | **COURSE CATEGORY** | | |
| Prof. Dr. Dilek BURUKOĞLU DÖNMEZ | | **Turkish** | **English** | **Technical** | **Medical** | **Other (…)** |
| **X** |  | **X** |  |  |

**COURSE LEVEL**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY CLASS HOURS** | | | **YOUR COURSE** | | |
| **Autumn** | **Spring** | **Theoretical** | **APPLICATION** | **Lab** | **Credit** | **ECTS** | **TYPE** |
|  | **X** | 2 |  | 2 | 3 | 7.5 | Compulsory: |
| Optional: **X** |

|  |  |  |  |
| --- | --- | --- | --- |
| **EVALUATION CRITERIA** | | | |
| **SEMESTER ACTIVITIES** | **Type of activity** | **Number** | **Percentage (%)** |
| Midterm Exam | **1** | **50** |
| Quiz |  |  |
| Homework |  |  |
| Project |  |  |
| Oral examination |  |  |
| Other ( ……… ) |  |  |
| **Final Exam** | | **50** |
| **PREREQUISITE(S)** | No | | |
| **SHORT COURSE CONTENT** | The place and importance of scanning electron microscopy in histology | | |
| **COURSE AIMS** | Teaching the scanning electron microscope and its areas of use | | |
| **COURSE CONTRBUTION TO THE PROFESSIOAL EDUCATION OBJECTIVES** | Explain the principles of conducting research with a scanning electron microscope and interpreting images. | | |
| **LEARNING OUTCOMES OF THE COURSE** | To be able to follow the electron microscopic examination of tissues for SEM.  To understand the working principle, features and laboratory equipment used in SEM.  To be able to understand and interpret the analyses performed with SEM. | | |
| **TEXTBOOK** | Histology -A Text and Atlas, M. H. Ross and W. Pawlina , Seventh Edition, Wolters Kluwer , USA, 2016. | | |
| **OTHER REFERENCES** |  | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | No | | |

|  |  |  |
| --- | --- | --- |
| **WEEKLY PLAN OF THE COURSE** | | |
| **WEEK** | **HISTORY** | **TOPICS COVERED** |
| 1 |  | Working principle of scanning electron microscope |
| 2 |  | Electron microscope laboratory equipment |
| 3 |  | Features of the SEM device |
| 4 |  | Considerations for tissue preparation for SEM |
| 5 |  | Tissue preparation methods for SEM |
| 6 |  | Seminar 1 |
| 7 |  | **Midterm Exam** |
| 8 |  | Principles of working with SEM |
| 9 |  | SEM-TEM comparison |
| 10 |  | Seminar 2 |
| 11 |  | Other analyses performed with SEM |
| 12 |  | Selected literatures |
| 13 |  | Principles of image acquisition |
| 14 |  | Image interpretation |
| 15 |  | Use of SEM in the clinic |
| 16 |  | **End of Term Exam** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAM LEARNING OUTCOMES** | | **Contribution Level** | | |
| **NO** | **LESSON OUTCOMES** | **1**  **Little** | **2**  **Middle** | **3**  **High** |
| LO 1 | Ability to establish structure-function relationships by understanding the microscopic structures and molecular mechanisms of the organization of cells, tissues and organs |  | **X** |  |
| LO 2 | Ability to evaluate developmental disorders by understanding human embryological development and the molecular mechanisms that regulate it |  |  | **X** |
| LO 3 | Ability to interpret and apply methods such as histochemistry, immunohistochemistry, electron microscopy, cell culture with basic laboratory skills |  |  | **X** |
| LO 4 | Ability to analyze microscope and imaging techniques by applying current auxiliary examination methods |  |  | **X** |
| LO 5 | Ability to conduct laboratory studies in cooperation with the clinic, such as assisted reproductive techniques, stem cell and cell culture applications |  |  | **X** |
| LO 6 | Ability to turn original hypotheses created independently into projects and to manage these projects by designing basic research methods and to evaluate the results |  |  | **X** |
| LO 7 | Ability to know the methods of accessing information to improve oneself and to adopt the importance of lifelong learning |  |  | **X** |
| LO 8 | Ability to Use Computers Effectively in Research and Data Analysis |  |  | **X** |
| LO 9 | Ability to Understand the Contribution of Experimental Studies to National and International Science |  |  | **X** |
| LO 10 | Ability to participate in scientific environments at national and international levels, to discuss and to make effective presentations |  | **X** |  |
| LO 11 | Ability to internalize research ethical values, Ability to be informed and comment on ethical discussions of clinical applications such as scientific and publication ethics, assisted reproductive techniques or stem cell technologies |  | **X** |  |
| LO 12 | Ability to have knowledge, skills and attitudes that will contribute to education |  | **X** |  |
| LO 13 | Ability to Recognize Basic Concepts in Medical Education |  | **X** |  |
| LO 14 | Ability to analyze projects supported by various organizations and articles published in international/national journals for evaluation purposes |  | **X** |  |

|  |  |
| --- | --- |
| **Instructor of the Course**  **Prof. Dr. Dilek BURUKOĞLU DÖNMEZ**  **Signature** | **Date**  **26.03.2025** |