



## CELL BIOLOGY & INTRODUCTION TO HUMAN EMBRYOLOGY

### COURSE INTRODUCTION

|                           |  |
|---------------------------|--|
| <b>COURSE PERIOD</b>      | : Year 1 – Semester 1  |
| <b>COURSE CODE</b>        | : MED105   |
| <b>COURSE DURATION</b>    | : 8 weeks  |
| <b>NATIONAL CREDIT</b>    | : 8  |
| <b>ECTS CREDIT</b>        | : 12   |
| <b>COURSE COORDINATOR</b> | : Professor Alp CAN  |
| <b>COURSE SECRETARY</b>   | :  |
| <b>COURSE DATES</b>       | : 19.11.2018 – 11.01.2019  |
| <b>TRAINING LOCATIONS</b> | : Pink Hall, Yellow Hall, Rıdvan Ege Laboratory, Occupational Skills Laboratory, Communication Skills Laboratory |

### COORDINATOR DEPARTMENTS

Biochemistry  
Biophysics  
Histology & Embryology  
Medical Biology  
Medical Genetics

### CONTRIBUTING DEPARTMENTS

Hematology  
Medical Education and Informatics  
Plastic, Reconstructive and Aesthetic Surgery

### TEACHING STAFFS

Prof. Dr. Önder ARSLAN  
Prof. Dr. Aslihan AVCI  
Prof. Dr. Alp CAN  
Prof. Dr. Özgür ÇINAR  
Prof. Dr. Erdinç DEVRİM  
Prof. Dr. İlker DURAK  
Prof. Dr. Hatice ILGIN RUHİ  
Prof. Dr. Hasan Serdar ÖZTÜRK  
Prof. Dr. Asuman SUNGUROĞLU

Prof. Dr. Ayşe Fulya TEKŞEN  
Prof. Dr. Mehmet UĞUR  
Prof. Dr. Özgür ÇINAR  
Doç. Dr. Oya Sena AYDOS  
Doç. Dr. Burak KAYA  
Doç. Dr. İ. Sinan ÖZKAVUKÇU  
Dr. Öğr. Üyesi Halil Gürhan KARABULUT  
Dr. Öğr. Üyesi Timur TUNCALI  
Dr. Öğr. Üyesi Nüket YÜRÜR KUTLAY

## AIM OF THE COURSE

To gain knowledge about the structure, function and mechanisms of human biology at the molecular and cellular level and the basic human embryology. Also, to gain skills for basic communication and medical practices.

## LEARNING OBJECTIVES OF THE COURSE

Explains the origin of life and the universal properties of cells.

Lists the macromolecules of the livings, and relates the three-dimensional structure functionally.

Explains the functions of the macromolecules involved in metabolism.

Interprets the macromolecular mechanisms in the cell.

Describes the structure of genome, and explains the diversity in the genome.

Understands that all livings are a common origin and that divide to three groups as archea, eubacteria and eukaryote.

Explains the formation of livings with eukaryotic cells and the change until today.

Explains the structure and function of the cell membrane.

Defines the structure of the cytoplasm, lists the organelles in the cytoplasm, and explains their functions.

Explains the structure and function of the cell nucleus.

Explains the mechanism of transport of molecules between the cytoplasm and the nucleus, and understands its relation to cellular processes.

Lists the components of the cytoskeleton, and explains their differences.

Understands the signaling mechanisms within the cell.

Knows and applies the basic methods of cell analysis.

Distinguishes various types of cells on microscopic level.

Explains the structure and function of DNA, and interprets the relation between these.

Explains the mechanism of packaging of DNA to chromosomes and the molecules that play a role in this process.

Explains the mutation, its varieties, mechanisms of occurrence and detection methods.

Explains the DNA repair mechanisms.

Describes the recombination mechanisms, and explains the consequences and effects on the evolution process of this mechanism.

|   |
|---|
| From the formation of primitive livings to today, explains the RNA types, their synthesis and functions.                          |
| Explains protein synthesis, defines genetic code and associates it with protein synthesis.  |
| Describes epithelial tissue and covering epithelium, and explains their functions.  |
| Describes the secretory epithelium, and explains its types and functions.   |
| Defines gene structure, and explains the transcription with all steps.  |
| Explains all phases of gene expression control and the mechanisms used in control.  |
| Sorts the methods used in gene expression, gene sequences and identifying changes of their functions, and interprets the results. |
| Explains the cell division and its control.   |
| Explains the cell proliferation and its control.  |
| Explains the cell aging process.  |
| Defines the types of cell death, and explains their mechanisms.   |
| Explains the general principles and mechanisms of evolution, and understands its importance in the health sciences.               |
| Understands the importance of discovery of DNA molecules in the development of health sciences.                                   |
| Describes the differences of intraspecies and interspecies in genetic information.  |
| Uses correctly the frequently used terms in cell biology, and associates them.  |
| Defines the stem cells, and sorts clinical use areas.   |
| Uses the laboratory equipment required for basic experiments.   |
| Describes the formation of human embryo and their molecular interactions.   |
| Knows and applies basic communication skills.   |
| Performs basic medical skills (basic life support).   |

## PROGRAM LEARNING OUTCOMES RELATED WITH COURSE LEARNING OBJECTIVES

| COURSE LEARNING OBJECTIVES  | PROGRAM LEARNING OUTCOMES |
|---|---------------------------|
| Explains the origin of life and the universal properties of cells.  | LO-1                      |
| Lists the macromolecules of the livings, and relates the three-dimensional structure functionally.  | LO-1                      |
| Explains the functions of the macromolecules involved in metabolism.  | LO-1                      |
| Interprets the macromolecular mechanisms in the cell.   | LO-1                      |
| Describes the structure of genome, and explain the diversity in the genome.   | LO-1                      |
| Understands that all livings are a common origin and that divide to three groups as archea, eubacteria and eukaryote.                       | LO-1                      |
| Explains the formation of livings with eukaryotic cells and the change until today.   | LO-1                      |
| Explains the structure and function of the cell membrane.   | LO-1                      |
| Defines the structure of the cytoplasm, lists the organelles in the cytoplasm, and explains their functions.                                | LO-1                      |
| Explains the structure and function of the cell nucleus.  | LO-1                      |
| Explains the mechanism of transport of molecules between the cytoplasm and the nucleus, and understands its relation to cellular processes. | LO-1                      |
| Lists the components of the cytoskeleton, and explains their differences.   | LO-1                      |
| Understands the signaling mechanisms within the cell.   | LO-1                      |
| Knows and applies the basic methods of cell analysis.   | LO-1                      |
| Distinguishes various types of cells on microscopic level.  | LO-1                      |
| Explains the structure and function of DNA, and interprets the relation between these.  | LO-1                      |
| Explains the mechanism of packaging of DNA to chromosomes and the molecules that play a role in this process.                               | LO-1                      |
| Explains the mutation, its varieties, mechanisms of occurrence and detection methods.   | LO-1                      |
| Explains the DNA repair mechanisms.   | LO-1                      |
| Describes the recombination mechanisms, and explains the consequences and effects on the evolution process of this mechanism.               | LO-1                      |

|   |            |
|---|------------|
| From the formation of primitive livings to today, explains the RNA types, their synthesis and functions.                              | LO-1       |
| Explains protein synthesis, defines genetic code and associates it with protein synthesis.  | LO-1       |
| Describes epithelial tissue and covering epithelium, and explains their functions.  | LO-1       |
| Describes the secretory epithelium, and explains its types and functions.   | LO-1       |
| Describes the biochemical properties of the extracellular matrix, and sorts the biochemical stages of collagen and elastin synthesis. | LO-1       |
| Defines gene structure, and explains the transcription with all steps.  | LO-1       |
| Explains all phases of gene expression control and the mechanisms used in control.  | LO-1       |
| Sorts the methods used in gene expression, gene sequences and identifying changes of their functions, and interprets the results.     | LO-1       |
| Explains the cell division and its control.   | LO-1       |
| Explains the cell proliferation and its control.  | LO-1       |
| Explains the cell aging process.  | LO-1       |
| Defines the types of cell death, and explains their mechanisms.   | LO-1       |
| Explains the general principles and mechanisms of evolution, and understands its importance in the health sciences.                   | LO-1       |
| Understands the importance of discovery of DNA molecules in the development of health sciences.                                       | LO-1       |
| Describes the differences of intraspecies and interspecies in genetic information.  | LO-1       |
| Uses correctly the frequently used terms in cell biology, and associates them.  | LO-1       |
| Defines the stem cells, and sorts clinical use areas.   | LO-1       |
| Uses the laboratory equipment required for basic experiments.   | LO-1       |
| Describes the formation of human embryo and their molecular interactions.   | LO-1       |
| Knows and applies basic communication skills.   | LO-1, LO-6 |
| Performs basic medical skills (basic life support).   | LO-1, LO-3 |

## ASSESSMENT AND EVALUATION

### ASSESSMENT SYSTEM

|  |  |
|--|--|
| <b>MIDTERM EXAM</b>                        | Written exam consisting of multiple-choice questions   |
| <b>PRACTICAL EXAM AT THE END OF COURSE</b> | Objectively structured practical and clinical exam   |
| <b>WRITTEN EXAM AT THE END OF COURSE</b>   | Written exam consisting of multiple-choice questions   |
| <b>CALCULATION OF COURSE FINAL SCORE</b>   | Midterm exam : 20%<br>Practical exam at the end of course : 30%<br>Written exam at the end of course : 50% |

### PROGRAM EVALUATION

Evaluation at the end of the course, is done both orally and electronically using structured evaluation forms.

## SUMMARY OF THE COURSE

|                                       | Lecture   | Panel    | Lab Practice | Clinical Skills | Total      |
|---------------------------------------|-----------|----------|--------------|-----------------|------------|
| Biochemistry                          | 6         | 2        | 3            |                 | 11         |
| Biophysics                            | 3         | 2        |              |                 | 5          |
| Histology & Embryology                | 13        | 2        | 6            |                 | 21         |
| Medical Biology                       | 22        | 2        | 14           |                 | 38         |
| Medical Genetics                      | 20        | 4        |              |                 | 24         |
| Hematology                            |           | 2        |              |                 | 2          |
| Plastic Surgery                       |           | 2        |              |                 |            |
| Medical Skills                        |           |          |              | 32              | 32         |
| Communication Skills                  |           |          |              | 16              | 16         |
| Individual - Professional Development |           |          |              | 36              | 36         |
| <b>TOTAL</b>                          | <b>64</b> | <b>6</b> | <b>23</b>    | <b>84</b>       | <b>177</b> |

## COURSE PROGRAM

### WEEK-1

#### MONDAY (19.11.2018)

|             |   |                         |
|-------------|---|-------------------------|
| 08.30-09:15 | Introduction of the course                  | Dr. Alp CAN             |
| 09:30-10:15 |   |                         |
| 10:30-11:15 | Water and pH                                | Dr. Erdiñç DEVRİM       |
| 11:30-12:15 | Origin of life, universal features of cells | Dr. Timur TUNCALI       |
| 12:15-13:30 | Lunch Break                                 |                         |
| 13:30-14:15 | Macromolecules in medicine: Carbohydrates   | Dr. Hasan Serdar ÖZTÜRK |
| 14:30-15:15 | Macromolecules in medicine: Lipids          | Dr. Hasan Serdar ÖZTÜRK |
| 15:30-16:15 | Turkish Language                            |                         |
| 16:30-17:15 | Turkish Language                            |                         |

#### TUESDAY (20.11.2018)

|             |  |                   |
|-------------|--|-------------------|
| 08.30-09:15 | Independent Learning Session                   |                   |
| 09:30-10:15 | Macromolecules in medicine: Amino acids        | Dr. Aslıhan AVCI  |
| 10:30-11:15 | Nucleic acids                                  | Dr. Aslıhan AVCI  |
| 11:30-12:15 | Enzymes  | Dr. Erdiñç DEVRİM |
| 12:15-13:30 | Lunch Break                                    |                   |
| 13:30-14:15 | Ataturk's Principles and History of Revolution |                   |
| 14:30-15:15 | Ataturk's Principles and History of Revolution |                   |
| 15:30-16:15 | Independent Learning Session                   |                   |
| 16:30-17:15 |  |                   |

#### WEDNESDAY (21.11.2018)

|             |   |  |
|-------------|---|--|
| 08.30-09:15 | Basic Medical Skills (Airway opening, airway placement) |  |
| 09:30-10:15 |   |  |
| 10:30-11:15 |   |  |
| 11:30-12:15 |   |  |
| 12:15-13:30 | Lunch Break   |  |
| 13:30-14:15 | Basic Communications Skills                             |  |
| 14:30-15:15 |   |  |
| 15:30-16:15 | Information and Communication Technologies              |  |
| 16:30-17:15 | Information and Communication Technologies              |  |



| <b>THURSDAY (22.11.2018)</b> |   |                       |
|------------------------------|---|-----------------------|
| 08.30-09:15                  | Independent Learning Session                              |                       |
| 09:30-10:15                  | Physicochemical properties of macromolecular interactions | Dr. Mehmet UĞUR       |
| 10:30-11:15                  | Physicochemical properties of macromolecular bonds        | Dr. Mehmet UĞUR       |
| 11:30-12:15                  | Reactions in binding of macromolecules to small molecules | Dr. Mehmet UĞUR       |
| 12:15-13:30                  | Lunch Break   |                       |
| 13:30-14:15                  | Individual and Professional Development                   |                       |
| 14:30-15:15                  |   |                       |
| 15:30-16:15                  |   |                       |
| 16:30-17:15                  |   |                       |
| <b>FRIDAY (23.11.2018)</b>   |   |                       |
| 08.30-09:15                  | Independent Learning Session                              |                       |
| 09:30-10:15                  | Diversity of genomes and genomic structure                | Dr. Timur TUNCALI     |
| 10:30-11:15                  | Archea, eubacteria and eukaryotic cells                   | Dr. Ayşe Fulya TEKŞEN |
| 11:30-12:15                  | Archea, eubacteria and eukaryotic cells                   | Dr. Ayşe Fulya TEKŞEN |
| 12:15-13:30                  | Lunch Break   |                       |
| 13:30-14:15                  | What have we learned this week?                           |                       |
| 14:30-15:15                  |   |                       |
| 15:30-16:15                  |   |                       |
| 16:30-17:15                  |   |                       |

| <b>WEEK-2</b>               |   |                       |
|-----------------------------|---|-----------------------|
| <b>MONDAY (26.11.2018)</b>  |   |                       |
| 08.30-09:15                 | Lab Practice: Laboratory safety   | Dr. Erdiñç DEVRİM     |
| 09:30-10:15                 | Structure of the cell membrane  | Dr. Asuman SUNGUROĞLU |
| 10:30-11:15                 | Structure of the cell membrane  | Dr. Asuman SUNGUROĞLU |
| 11:30-12:15                 | Independent Learning Session  |                       |
| 12:15-13:30                 | Lunch Break   |                       |
| 13:30-14:15                 | Lab Practice: Introduction to microscopy and cell imaging techniques (examples of cells/tissue preparations); Tissue preparation techniques | Dr. Özgür ÇINAR       |
| 14:30-15:15                 |   |                       |
| 15:30-16:15                 | Turkish Language  |                       |
| 16:30-17:15                 | Turkish Language  |                       |
| <b>TUESDAY (27.11.2018)</b> |   |                       |
| 08.30-09:15                 | Cytoplasmic compartments and organelles   | Dr. Özgür ÇINAR       |

|                               |   |                            |
|-------------------------------|---|----------------------------|
| 09:30-10:15                   | Cytoplasmic compartments and organelles                             | Dr. Özgür ÇINAR            |
| 10:30-11:15                   | Lab Practice: How do I estimate cell size using a microscope?       | Dr. Asuman SUNGUROĞLU      |
| 11:30-12:15                   |   |                            |
| 12:15-13:30                   | Lunch Break   |                            |
| 13:30-14:15                   | Ataturk's Principles and History of Revolution                      |                            |
| 14:30-15:15                   | Ataturk's Principles and History of Revolution                      |                            |
| 15:30-16:15                   | Independent Learning Session  |                            |
| 16:30-17:15                   |   |                            |
| <b>WEDNESDAY (28.11.2018)</b> |   |                            |
| 08.30-09:15                   | Basic Medical Skills (Airway opening, airway placement)             |                            |
| 09:30-10:15                   |   |                            |
| 10:30-11:15                   |   |                            |
| 11:30-12:15                   |   |                            |
| 12:15-13:30                   | Lunch Break   |                            |
| 13:30-14:15                   | Basic Communication Skills  |                            |
| 14:30-15:15                   |   |                            |
| 15:30-16:15                   | Information and Communication Technologies                          |                            |
| 16:30-17:15                   | Information and Communication Technologies                          |                            |
| <b>THURSDAY (29.11.2018)</b>  |   |                            |
| 08.30-09:15                   | Individual and Professional Development                             |                            |
| 09:30-10:15                   |   |                            |
| 10:30-11:15                   |   |                            |
| 11:30-12:15                   |   |                            |
| 12:15-13:30                   | Lunch Break   |                            |
| 13:30-14:15                   | Individual and Professional Development                             |                            |
| 14:30-15:15                   |   |                            |
| 15:30-16:15                   |   |                            |
| 16:30-17:15                   |   |                            |
| <b>FRIDAY (30.11.2018)</b>    |   |                            |
| 08.30-09:15                   | Independent Learning Session  |                            |
| 09:30-10:15                   | Nuclear transport   | Dr. Ayşe Fulya TEKŞEN      |
| 10:30-11:15                   | The structure and function of DNA                                   | Dr. Halil Gürhan KARABULUT |
| 11:30-12:15                   | Chromosomal DNA and its packaging, chromatin structure and function | Dr. Hatice ILGIN RUHİ      |

|             |                                 |  |
|-------------|---------------------------------|--|
| 12:15-13:30 | Lunch Break                     |  |
| 13:30-14:15 | What have we learned this week? |  |
| 14:30-15:15 |                                 |  |
| 15:30-16:15 |                                 |  |
| 16:30-17:15 |                                 |  |

### WEEK-3

#### MONDAY (03.12.2018)

|             |  |                        |
|-------------|--|------------------------|
| 08.30-09:15 | Lab Practice: DNA isolation                          | Dr. Asuman SUNGUROĞLU  |
| 09:30-10:15 |  |                        |
| 10:30-11:15 | The maintenance of DNA sequences and DNA replication | Dr. Timur TUNCALI      |
| 11:30-12:15 | The maintenance of DNA sequences and DNA replication | Dr. Timur TUNCALI      |
| 12:15-13:30 | Lunch Break  |                        |
| 13:30-14:15 | Mutation   | Dr. Nüket YÜRÜR KUTLAY |
| 14:30-15:15 | DNA repair systems                                   | Dr. Nüket YÜRÜR KUTLAY |
| 15:30-16:15 | Turkish Language                                     |                        |
| 16:30-17:15 | Turkish Language                                     |                        |

#### TUESDAY (04.12.2018)

|             |  |                            |
|-------------|--|----------------------------|
| 08.30-09:15 | Homologous and site-specific recombination     | Dr. Nüket YÜRÜR KUTLAY     |
| 09:30-10:15 | From DNA to RNA and RNA world                  | Dr. Halil Gürhan KARABULUT |
| 10:30-11:15 | From RNA to proteins                           | Dr. Halil Gürhan KARABULUT |
| 11:30-12:15 | Protein synthesis                              | Dr. Oya Sena AYDOS         |
| 12:15-13:30 | Lunch Break                                    |                            |
| 13:30-14:15 | Ataturk's Principles and History of Revolution |                            |
| 14:30-15:15 | Ataturk's Principles and History of Revolution |                            |
| 15:30-16:15 | Independent Learning Session                   |                            |
| 16:30-17:15 |  |                            |

#### WEDNESDAY (05.12.2018)

|             |  |  |
|-------------|--|--|
| 08.30-09:15 | Basic Medical Skills (Heimlich maneuvering practice in adult and infant) |  |
| 09:30-10:15 |  |  |
| 10:30-11:15 |  |  |
| 11:30-12:15 |  |  |
| 12:15-13:30 | Lunch Break  |  |

|                              |  |                       |
|------------------------------|--|-----------------------|
| 13:30-14:15                  | Basic Communication Skills                 |                       |
| 14:30-15:15                  |  |                       |
| 15:30-16:15                  | Information and Communication Technologies |                       |
| 16:30-17:15                  | Information and Communication Technologies |                       |
| <b>THURSDAY (06.12.2018)</b> |  |                       |
| 08.30-09:15                  | Independent Learning Session               |                       |
| 09:30-10:15                  | Cell secretion (vesicular trafficking)     | Dr. Özgür ÇINAR       |
| 10:30-11:15                  | Cytoskeleton and cell motility             | Dr. Alp CAN           |
| 11:30-12:15                  | Cytoskeleton and cell motility             | Dr. Alp CAN           |
| 12:15-13:30                  | Lunch Break                                |                       |
| 13:30-14:15                  | Individual and Professional Development    |                       |
| 14:30-15:15                  |  |                       |
| 15:30-16:15                  |  |                       |
| 16:30-17:15                  |  |                       |
| <b>FRIDAY (07.12.2018)</b>   |  |                       |
| 08.30-09:15                  | Independent Learning Session               |                       |
| 09:30-10:15                  |  |                       |
| 10:30-11:15                  | Cell signaling                             | Dr. Asuman SUNGUROĞLU |
| 11:30-12:15                  | Cell signaling                             | Dr. Asuman SUNGUROĞLU |
| 12:15-13:30                  | Lunch Break                                |                       |
| 13:30-14:15                  | What have we learned this week?            |                       |
| 14:30-15:15                  |  |                       |
| 15:30-16:15                  |  |                       |
| 16:30-17:15                  |  |                       |

#### WEEK-4

|                            |   |                     |
|----------------------------|---|---------------------|
| <b>MONDAY (10.12.2018)</b> |   |                     |
| 08.30-09:15                | MIDTERM EXAM  |                     |
| 09:30-10:15                |   |                     |
| 10:30-11:15                |   |                     |
| 11:30-12:15                |   |                     |
| 12:15-13:30                | Lunch Break   |                     |
| 13:30-14:15                | Introduction to tissue biology and epithelial tissues | Prof.Dr.Özgür ÇINAR |
| 14:30-15:15                | Introduction to tissue biology and epithelial tissues | Prof.Dr.Özgür ÇINAR |

|                               |  |                            |
|-------------------------------|--|----------------------------|
| 15:30-16:15                   | Turkish Language   |                            |
| 16:30-17:15                   | Turkish Language   |                            |
| <b>TUESDAY (11.12.2018)</b>   |  |                            |
| 08.30-09:15                   | Independent Learning Session   |                            |
| 09:30-10:15                   | Introduction to tissue biology and epithelial tissues                    | Prof.Dr.Özgür ÇINAR        |
| 10:30-11:15                   | Lab Practice: Epithelium   | Prof.Dr.Özgür ÇINAR        |
| 11:30-12:15                   |  |                            |
| 12:15-13:30                   | Lunch Break  |                            |
| 13:30-14:15                   | Ataturk's Principles and History of Revolution                           |                            |
| 14:30-15:15                   | Ataturk's Principles and History of Revolution                           |                            |
| 15:30-16:15                   | Independent Learning Session   |                            |
| 16:30-17:15                   |  |                            |
| <b>WEDNESDAY (12.12.2018)</b> |  |                            |
| 08.30-09:15                   | Basic Medical Skills (Heimlich maneuvering practice in adult and infant) |                            |
| 09:30-10:15                   |  |                            |
| 10:30-11:15                   |  |                            |
| 11:30-12:15                   |  |                            |
| 12:15-13:30                   | Lunch Break  |                            |
| 13:30-14:15                   | Basic Communication Skills   |                            |
| 14:30-15:15                   |  |                            |
| 15:30-16:15                   | Information and Communication Technologies                               |                            |
| 16:30-17:15                   | Information and Communication Technologies                               |                            |
| <b>THURSDAY (13.12.2018)</b>  |  |                            |
| 08.30-09:15                   | An overview of gene control  | Dr. Halil Gürhan KARABULUT |
| 09:30-10:15                   | Transcriptional regulation   | Dr. Halil Gürhan KARABULUT |
| 10:30-11:15                   | Post transcriptional control   | Dr. Halil Gürhan KARABULUT |
| 11:30-12:15                   | Noncoding RNAs and regulation of gene expression                         | Dr. Timur TUNCALI          |
| 12:15-13:30                   | Lunch Break  |                            |
| 13:30-14:15                   | Individual and Professional Development                                  |                            |
| 14:30-15:15                   |  |                            |
| 15:30-16:15                   |  |                            |
| 16:30-17:15                   |  |                            |
| <b>FRIDAY (14.12.2018)</b>    |  |                            |
| 08.30-09:15                   | Independent Learning Session   |                            |

|             |   |                       |
|-------------|---|-----------------------|
| 09:30-10:15 | Epigenetics                                   | Dr. Asuman SUNGUROĞLU |
| 10:30-11:15 | Lab Practice: Epigenetics - X chromatin assay | Dr. Asuman SUNGUROĞLU |
| 11:30-12:15 |   |                       |
| 12:15-13:30 | Lunch Break                                   |                       |
| 13:30-14:15 | What have we learned this week?               |                       |
| 14:30-15:15 |   |                       |
| 15:30-16:15 |   |                       |
| 16:30-17:15 |   |                       |

### WEEK-5

#### MONDAY (17.12.2018)

|             |   |                    |
|-------------|---|--------------------|
| 08.30-09:15 | Cell cycle and cell division: Mitosis and meiosis           | Dr. Oya Sena AYDOS |
| 09:30-10:15 | Cell cycle and cell division: Mitosis and meiosis           | Dr. Oya Sena AYDOS |
| 10:30-11:15 | Cell cycle and cell division: Mitosis and meiosis           | Dr. Oya Sena AYDOS |
| 11:30-12:15 | Cell cycle and cell division: Mitosis and meiosis           | Dr. Oya Sena AYDOS |
| 12:15-13:30 | Lunch Break   |                    |
| 13:30-14:15 | Lab Practice: Simple cell viability and proliferation assay | Dr. Oya Sena AYDOS |
| 14:30-15:15 |   |                    |
| 15:30-16:15 | Turkish Language  |                    |
| 16:30-17:15 | Turkish Language  |                    |

#### TUESDAY (18.12.2018)

|             |  |                       |
|-------------|--|-----------------------|
| 08.30-09:15 | Lab Practice: Cell division (mitosis)          | Dr. Oya Sena AYDOS    |
| 09:30-10:15 |  |                       |
| 10:30-11:15 | Cell proliferation and control mechanisms      | Dr. Asuman SUNGUROĞLU |
| 11:30-12:15 | Cell proliferation and control mechanisms      | Dr. Asuman SUNGUROĞLU |
| 12:15-13:30 | Lunch Break                                    |                       |
| 13:30-14:15 | Ataturk's Principles and History of Revolution |                       |
| 14:30-15:15 | Ataturk's Principles and History of Revolution |                       |
| 15:30-16:15 | Independent Learning Session                   |                       |
| 16:30-17:15 |  |                       |

#### WEDNESDAY (19.12.2018)

|             |   |  |
|-------------|---|--|
| 08.30-09:15 | Basic Medical Skills (Artificial respiration in adult and infant) |  |
| 09:30-10:15 |   |  |

|                              |   |                       |
|------------------------------|---|-----------------------|
| 10:30-11:15                  |   |                       |
| 11:30-12:15                  |   |                       |
| 12:15-13:30                  | Lunch Break   |                       |
| 13:30-14:15                  | Basic Communication Skills  |                       |
| 14:30-15:15                  |   |                       |
| 15:30-16:15                  | Information and Communication Technologies                              |                       |
| 16:30-17:15                  | Information and Communication Technologies                              |                       |
| <b>THURSDAY (20.12.2018)</b> |   |                       |
| 08.30-09:15                  | Cell death: Types and mechanisms  | Dr. Asuman SUNGUROĞLU |
| 09:30-10:15                  | Cell death: Types and mechanisms  | Dr. Asuman SUNGUROĞLU |
| 10:30-11:15                  | Lab Practice: Programmed cell death - Apoptosis assay                   | Dr. Asuman SUNGUROĞLU |
| 11:30-12:15                  |   |                       |
| 12:15-13:30                  | Lunch Break   |                       |
| 13:30-14:15                  | Individual and Professional Development                                 |                       |
| 14:30-15:15                  |   |                       |
| 15:30-16:15                  |   |                       |
| 16:30-17:15                  |   |                       |
| <b>FRIDAY (21.12.2018)</b>   |   |                       |
| 08.30-09:15                  | Independent Learning Session  |                       |
| 09:30-10:15                  | Cellular senescence and aging   | Dr. Ayşe Fulya TEKŞEN |
| 10:30-11:15                  | Genetic diversity and polymorphism                                      | Dr. Timur TUNCALI     |
| 11:30-12:15                  | Evolutionary mechanisms: Microevolution and neutral theory of evolution | Dr. Timur TUNCALI     |
| 12:15-13:30                  | Lunch Break   |                       |
| 13:30-14:15                  | What have we learned this week?   |                       |
| 14:30-15:15                  |   |                       |
| 15:30-16:15                  |   |                       |
| 16:30-17:15                  |   |                       |

## WEEK-6

|                            |  |                       |
|----------------------------|--|-----------------------|
| <b>MONDAY (24.12.2018)</b> |  |                       |
| 08.30-09:15                | Population genetics                                | Dr. Timur TUNCALI     |
| 09:30-10:15                | Lab Practice: Hypo-osmotic solutions and hemolysis | Dr. Asuman SUNGUROĞLU |
| 10:30-11:15                |  |                       |

|                               |   |  |
|-------------------------------|---|--|
| 11:30-12:15                   | Independent Learning Session                                      |  |
| 12:15-13:30                   | Lunch Break   |  |
| 13:30-14:15                   | Evolutionary mechanisms: Macroevolution                           | Dr. Timur TUNCALI  |
| 14:30-15:15                   | Evolutionary processes and its impact on health sciences          | Dr. Timur TUNCALI  |
| 15:30-16:15                   | Turkish Language  |  |
| 16:30-17:15                   | Turkish Language  |  |
| <b>TUESDAY (25.12.2018)</b>   |   |  |
| 08.30-09:15                   | Panel: Online genome and variation databases                      | Dr. Timur TUNCALI  |
| 09:30-10:15                   |   |  |
| 10:30-11:15                   | Mechanisms of developmental biology                               | Dr. Ayşe Fulya TEKŞEN  |
| 11:30-12:15                   | Mechanisms of developmental biology                               | Dr. Ayşe Fulya TEKŞEN  |
| 12:15-13:30                   | Lunch Break   |  |
| 13:30-14:15                   | Ataturk's Principles and History of Revolution                    |  |
| 14:30-15:15                   | Ataturk's Principles and History of Revolution                    |  |
| 15:30-16:15                   | Independent Learning Session                                      |  |
| 16:30-17:15                   |   |  |
| <b>WEDNESDAY (26.12.2018)</b> |   |  |
| 08.30-09:15                   | Basic Medical Skills (Artificial respiration in adult and infant) |  |
| 09:30-10:15                   |   |  |
| 10:30-11:15                   |   |  |
| 11:30-12:15                   |   |  |
| 12:15-13:30                   | Lunch Break   |  |
| 13:30-14:15                   | Basic Communication Skills  |  |
| 14:30-15:15                   |   |  |
| 15:30-16:15                   | Information and Communication Technologies                        |  |
| 16:30-17:15                   | Information and Communication Technologies                        |  |
| <b>THURSDAY (27.12.2018)</b>  |   |  |
| 08.30-09:15                   | Stem cell biology   | Dr. Asuman SUNGUROĞLU  |
| 09:30-10:15                   | Stem cell biology   | Dr. Asuman SUNGUROĞLU  |
| 10:30-11:15                   | Panel: Stem cells and regenerative medicine                       | Dr. Asuman SUNGUROĞLU<br>Dr. Alp CAN<br>Dr. Önder ARSLAN<br>Dr. Burak KAYA |
| 11:30-12:15                   |   |  |
| 12:15-13:30                   | Lunch Break   |  |



|                            |   |             |
|----------------------------|---|-------------|
| 13:30-14:15                | Individual and Professional Development |             |
| 14:30-15:15                |   |             |
| 15:30-16:15                |   |             |
| 16:30-17:15                |   |             |
| <b>FRIDAY (28.12.2018)</b> |   |             |
| 08.30-09:15                | Independent Learning Session            |             |
| 09:30-10:15                | Human embryology                        | Dr. Alp CAN |
| 10:30-11:15                | Human embryology                        | Dr. Alp CAN |
| 11:30-12:15                | Human embryology                        | Dr. Alp CAN |
| 12:15-13:30                | Lunch Break                             |             |
| 13:30-14:15                | What have we learned this week?         |             |
| 14:30-15:15                |   |             |
| 15:30-16:15                |   |             |
| 16:30-17:15                |   |             |

### WEEK-7

|                             |   |                 |
|-----------------------------|---|-----------------|
| <b>MONDAY (31.12.2018)</b>  |   |                 |
| 08.30-09:15                 | Lab Practice: Effects of substrate concentration of enzyme activation | Dr. İlker DURAK |
| 09:30-10:15                 |   |                 |
| 10:30-11:15                 | Human embryology  | Dr. Alp CAN     |
| 11:30-12:15                 | Human embryology  | Dr. Alp CAN     |
| 12:15-13:30                 | Lunch Break   |                 |
| 13:30-14:15                 | Lab Practice: Human embryology  | Dr. Alp CAN     |
| 14:30-15:15                 |   |                 |
| 15:30-16:15                 | Turkish Language  |                 |
| 16:30-17:15                 | Turkish Language  |                 |
| <b>TUESDAY (01.01.2019)</b> |   |                 |
| 08.30-09:15                 | NEW YEAR'S DAY  |                 |
| 09:30-10:15                 |   |                 |
| 10:30-11:15                 |   |                 |
| 11:30-12:15                 |   |                 |
| 12:15-13:30                 |   |                 |
| 13:30-14:15                 |   |                 |

|                               |  |                                |
|-------------------------------|--|--------------------------------|
| 14:30-15:15                   |  |                                |
| 15:30-16:15                   |  |                                |
| 16:30-17:15                   |  |                                |
| <b>WEDNESDAY (02.01.2019)</b> |  |                                |
| 08.30-09:15                   |  |                                |
| 09:30-10:15                   | Basic Medical Skills (External cardiac massage in adult and infant)                                |                                |
| 10:30-11:15                   |  |                                |
| 11:30-12:15                   |  |                                |
| 12:15-13:30                   | Lunch Break  |                                |
| 13:30-14:15                   | Basic Communication Skills   |                                |
| 14:30-15:15                   |  |                                |
| 15:30-16:15                   | Information and Communication Technologies   |                                |
| 16:30-17:15                   | Information and Communication Technologies   |                                |
| <b>THURSDAY (03.01.2019)</b>  |  |                                |
| 08.30-09:15                   |  |                                |
| 09:30-10:15                   | Individual and Professional Development  |                                |
| 10:30-11:15                   |  |                                |
| 11:30-12:15                   |  |                                |
| 12:15-13:30                   | Lunch Break  |                                |
| 13:30-14:15                   | Individual and Professional Development  |                                |
| 14:30-15:15                   |  |                                |
| 15:30-16:15                   |  |                                |
| 16:30-17:15                   |  |                                |
| <b>FRIDAY (04.01.2019)</b>    |  |                                |
| 08.30-09:15                   | Independent Learning Session   |                                |
| 09:30-10:15                   |  |                                |
| 10:30-11:15                   | Panel: Labware and equipment (spectrophotometry, electrophoresis, cell sorting, DNA amplification) | Biochemistry                   |
| 11:30-12:15                   |  | Medical Genetics<br>Biophysics |
| 12:15-13:30                   | Lunch Break  |                                |
| 13:30-14:15                   | What have we learned this week?  |                                |
| 14:30-15:15                   |  |                                |
| 15:30-16:15                   |  |                                |
| 16:30-17:15                   |  |                                |

**WEEK-8****MONDAY (07.01.2019)**

|             |                             |  |
|-------------|-----------------------------|--|
| 08.30-09:15 | INDEPENDENT STUDY FOR EXAMS |  |
| 09:30-10:15 |                             |  |
| 10:30-11:15 |                             |  |
| 11:30-12:15 |                             |  |
| 12:15-13:30 | Lunch Break                 |  |
| 13:30-14:15 | INDEPENDENT STUDY FOR EXAMS |  |
| 14:30-15:15 |                             |  |
| 15:30-16:15 | Turkish Language            |  |
| 16:30-17:15 | Turkish Language            |  |

**TUESDAY (08.01.2019)**

|             |  |  |
|-------------|--|--|
| 08.30-09:15 | INDEPENDENT STUDY FOR EXAMS                    |  |
| 09:30-10:15 |  |  |
| 10:30-11:15 |  |  |
| 11:30-12:15 |  |  |
| 12:15-13:30 | Lunch Break                                    |  |
| 13:30-14:15 | Ataturk's Principles and History of Revolution |  |
| 14:30-15:15 | Ataturk's Principles and History of Revolution |  |
| 15:30-16:15 | INDEPENDENT STUDY FOR EXAMS                    |  |
| 16:30-17:15 |  |  |

**WEDNESDAY (09.01.2019)**

|             |   |  |
|-------------|---|--|
| 08.30-09:15 | Basic Medical Skills (External cardiac massage in adult and infant) |  |
| 09:30-10:15 |   |  |
| 10:30-11:15 |   |  |
| 11:30-12:15 |   |  |
| 12:15-13:30 | Lunch Break   |  |
| 13:30-14:15 | Basic Communication Skills  |  |
| 14:30-15:15 |   |  |
| 15:30-16:15 | Information and Communication Technologies                          |  |
| 16:30-17:15 | Information and Communication Technologies                          |  |

**THURSDAY (10.01.2019)**

|             |                             |  |
|-------------|-----------------------------|--|
| 08.30-09:15 | INDEPENDENT STUDY FOR EXAMS |  |
| 09:30-10:15 |                             |  |

|                            |                                     |  |
|----------------------------|-------------------------------------|--|
| 10:30-11:15                |                                     |  |
| 11:30-12:15                |                                     |  |
| 12:15-13:30                | Lunch Break                         |  |
| 13:30-14:15                | INDEPENDENT STUDY FOR EXAMS         |  |
| 14:30-15:15                |                                     |  |
| 15:30-16:15                |                                     |  |
| 16:30-17:15                |                                     |  |
| <b>FRIDAY (11.01.2019)</b> |                                     |  |
| 08.30-09:15                | PRACTICAL EXAM AT THE END OF COURSE |  |
| 09:30-10:15                |                                     |  |
| 10:30-11:15                |                                     |  |
| 11:30-12:15                |                                     |  |
| 12:15-13:30                | Lunch Break                         |  |
| 13:30-14:15                | WRITTEN EXAM AT THE END OF COURSE   |  |
| 14:30-15:15                |                                     |  |
| 15:30-16:15                | FEEDBACK SESSION OF THE COURSE      |  |
| 16:30-17:15                |                                     |  |

## READING/STUDYING SOURCES

- Histology and Cell Biology: An Introduction to Pathology (4th Edition); Abraham L. Kierszenbaum, Laura L. Tres; Elsevier Saunders, Philadelphia, 2015.
- Histology: A Text and Atlas with Correlated Cell and Molecular Biology (7th Edition); Micheal H. Ross, Wojciech Pawlina; Lippincott Williams & Wilkins, 2015.
- Molecular Biology of the Cell (6th Edition); Bruce Alberts; Garland Science, New York, 2015.
- Marks' Basic Medical Biochemistry A Clinical Approach (5th Edition); Michael Lieberman, Alisa Peet; Wolters Kluwer, Philadelphia, 2018.
- Harper's Illustrated Biochemistry (30th Edition); Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil; McGraw-Hill, 2015.
- Emery's Elements of Medical Genetics (15th Edition); Peter D. Turnpenny, Sian Ellard; Elsevier, Philadelphia, 2017.
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- The Developing Human: Clinically Oriented Embryology (10th Edition); Keith L. Moore, T. V. N. Persaud, Mark G. Torchia; Elsevier, Philadelphia, 2015.
- Langman's Medical Embryology (13th Edition); T. Sadler; Lippincott Williams & Wilkins, Philadelphia, 2015.