**Al-Nahrain University**

**College of Medicine**

**Al-Nahrain University**

**Department of Human Anatomy**

**College of Medicine**

**Medical Biology**

**1stSemester 2024-2025**

**Coordinator: Shatha Mhmood Hasan**

**Theory: 3 hour/week Credits: 3 credit**

**Practical: 3 hour/week Credits: 1.5 credit**

**Learning objectives**

Cell biology, Biosafety, human anatomy

Cell biology

The course is designed to enable the student to:

1. Understand the concept of cell Biology and different types of living cells

2. This course provides an in-depth exploration of the structure, and function of eukaryotic cells. It covers the fundamental principles of cell biology, including cell structure, organelles, membrane transport, cell division, and cell signaling.

**Biosafety: theoretical, general definition of biohazards and risk assessment with universal safety precaution**

Risk group classification and biosafety level

Biological agents

Biosafety cabinet

Aims: to enable the students to deal with and protect themselves and the environment from the possible risk of different microorganisms

**Introduction to anatomy**

The course is designed to enable the student to:

1- Understand different anatomical terms used in describing: different regions of the body, directions, position, and movement.

2- Give brief descriptions of the basic structures that compose the body.

3- Describe the topography of the human body's skin, fascia, and body cavities.

4- Understand the main structures that contribute in the locomotor, CVS, Nervous systems, and skin formation

•The practical cell biology sessions include the study of the ultrastructure of cells by using photos electron microscopy, and the demonstration of already prepared slides stained

Biosafety practical: personal protective equipment. Types of biosafety cabinets

**Theory**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hour** | **Title** | **description** | **Lecturer** |
| **1** | Introduction to biosafety and security and biosafety barriers in bio labs | Biosafety and security refer to a set of measures and practices designed to protect researchers | **ا.د.قاسم شرهان** |
| **2** | Biosafety level and Biological agents | BSL is a classification system that categorizes laboratories based on the level of containment and safety precautions required for handling specific biological agents | **ا.د.قاسم شرهان** |
| **3** | Biorisk and Biohazard and management system | Biorisk refers to the potential risk associated with biological materials | **ا.د.قاسم شرهان** |
| **4** | Types of biological wastes | Waste that contains pathogens (e.g., bacteria, viruses, fungi) capable of causing diseases in humans or animals | **ا.د.قاسم شرهان** |
| **5** | Transportation of biological materials | Transportation of biological materials involves the movement of living organisms | **ا.د.قاسم شرهان** |
| **6** | Accident response | Accident response refers to the set of actions and procedures implemented in the event of an unexpected incident or emergency | **ا.د.قاسم شرهان** |
| **7** | overveiw |  |  |
| **8** | Introduction to cell biology | Introduction to cells and their significance.  The historical development of cell biology  The cell theory -Chemical composition of the cell. | **أ.م.شذى محمود** |
| **9** | type of living cells | There are two main types or categories of cells: prokaryotic cells and eukaryotic cells—structures and differences between them. | **أ.م. شذى محمود** |
| **10-11** | Molecular organization of plasma membrane & and functions | The plasma membrane, also known as the cell membrane, is a crucial component of all cells in living organisms. Its selective permeability. Study the structure of plasma membrane and its function | **أ.م. شذى محمود** |
| **12** | Transport Across Cell Membranes | Principles of transmembrane  Transport> with a medical applied | **أ.م. شذى محمود** |
| **13** | Exocytosis & endocytosis | Exocytosis and endocytosis are cellular processes involved in the transport of materials across the plasma membrane, with a medical applied | **أ.م. شذى محمود** |
| **14** | The cytoplasm | Cytoplasm is a semi-fluid, gel-like substance that fills the interior of a cell with a medical-applied | **أ.م. شذى محمود** |
| **15-16** | Cytoskeleton | The cytoskeleton is a dynamic network of protein filaments and tubules found in the cytoplasm of eukaryotic cells. With a medical applied | **أ.م. شذى محمود** |
| **17-18** | The endomembrane system | The components of the endomembrane system include: the endoplasmic reticulum, lysosomes, Golgi apparatus, and vesicles, with a medical applied | ا. د. حيدر عبد الرسول |
| **19-20** | Cell junctions | Study the types of connecting junctions, that bind the cells together. | ا. د. حيدر عبد الرسول |
| **21** | Mitochondria**(** structure and function | Structure and function of mitochondria, and Mitochondrial disease | **أ.م. شذى محمود** |
| **22** | Midterm exam |  |  |
| **23-24** | The nucleus (structure and function ) | Structure and functions of the nucleus with a medical applied | **أ.م. شذى محمود** |
| **25-26** | Cell cycle  The cell division (mitosis) | A cell cycle is a series of events that take place in a cell as it grows and divides. And studies the different stages of mitosis. With a medical applied | **أ.م. شذى محمود** |
| **27** | Meiosis | The students will be identified with different stages of meiosis I&II. With a medical applied | **أ.م. شذى محمود** |
| **28** | Cell Aging | Study the hypotheses on why humans age. and  the effects of aging on the organ systems of  the body | ا. د. حيدر عبد الرسول |
| **29** | overview |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Topics** | **Hour** |  |
| **30** | Definitions and descriptions and imaging techniques | Describing different types of planes and lines and their clinical correlation / terms of direction, reclining and movement | م.د.حسين جارالله |
| **31** | Planes and terminology | Describing different types of planes and lines and their clinical correlation/terms of direction, reclining and movement | م.د.حسين جارالله |
| **32** | Body cavities: classification of body cavities (ventral and dorsal body cavities) | Classification of body cavities / parts and membranes / divisions of the abdomino-pelvic region (9 and 4 quadrants**)** | م.د.حسين جارالله |
| **33** | Locomotor system; osteology |  | م.د.حسين جارالله |
| **34** | Locomotor system; myology | Types of muscles / types of muscle action / tendon and tendon sheath / muscles name | م.د.حسين جارالله |
| **35** | Locomotor system; the joints classification and types of synovial joints | Types of bones / anatomy of long bones / classification of human body skeleton; axial and appendicular skeleton  Definition / classification and examples / characteristics of body joints | م.د.حسين جارالله |
| **36** | CVS; the Heart | Anatomy and location of the heart / circulation | م.د.حسين جارالله |
| **37** | CVS; the Blood vessels & Lymphatic system | Classification and definition of blood vessels examples on upper and lower limb vessels/anastomosis  Description of lymphatic drainage/anatomy of lymphatic vessels and nodes / clinical importance | م.د.حسين جارالله |
| **38** | Nervous system; CNS | Classification of the nervous system/anatomy of the brain, brain stem, spinal cord and cerebellum **/** | م.د.حسين جارالله |
| **39** | Nervous system; PNS & autonomic NS | Anatomy of the peripheral nervous system / spinal nerves / cranial nerves / ANS | م.د.حسين جارالله |
| **40** | Skin and fascia, | Anatomy of integumentary system/definition and types of fascia | م.د.حسين جارالله |
| **41** | overview |  | م.د.حسين جارالله |
| **42** | The kingdom monera( introduction and classification) | **1** | **ا.د. قاسم شرهان** |
| **43** | The protozoa | **1** | **ا. د. قاسم شرهان** |
| **44** | The protozoa | **1** | **ا.د. قاسم شرهان** |
| **45** | Overview |  |  |

**Practical:**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Topics** |  | **Hours** |
| **1** | Introduction | **أ.م. شذى محمود** | **3** |
| **2** | Bio safety | **ا.د. قاسم شرهان** | **3** |
| **3** | Compound light microscope | **م.م. غفران مهدي** | **3** |
| **4** | Microtechnique, epithelial cells (Barr Body) | **م.م.نور كاظم** | **3** |
| **5** | Type of cells in the human body | **م.م. غفران مهدي** | **3** |
| **6** | (Electron microscopy) and ultrastructure of eukaryotic cells | **م.م.نور كاظم** | **3** |
| **7** | Ultrastructure of the eukaryotic cell | **م.م.نور كاظم** | **3** |
| **8** | mitosis | **م.م. غفران مهدي** | **3** |
| **9** | Midterm exam |  | **3** |
| **10** | meiosis | **م.م. غفران مهدي** |  |
| **11** | Terminology, Planes, and Body cavities | م.د.حسين جارالله | **3** |
| **12** | Locomotor system | م.د.حسين جارالله | **3** |
| **13** | Heart, blood vessels and lymphatics | م.د.حسين جارالله | **3** |
| **14** | Nervous system | م.د.حسين جارالله | **3** |
| **15** | Review |  |  |
| Total | |  |  |

**Student assessment:**

The minimum requirement for a student to pass is to achieve at least 50% of the total 100 marks assigned for the course.

The marks are distributed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mid-term Theory | Mid-term Practical | Quiz | total | Final Practical | Final Theory | total |
| 15% | 10% | 5 | 30% | 20% | 50% | 70% |

Students who fail the cut-off mark mustard must re-sit for a second trial examination similar to the final one.

**Books and references:**

1. Dalley KL & Dalley AF (2006): Clinically oriented Anatomy. 5th Ed Lippincott Williams& Wilkins. Philadelphia.
2. Molecular Biology of the cell, Bruce Albert,6th Edition (2017)

3-Human Biology, Sylvia S. Mader. Fifteenth Edition (2017)

Cell Biology