

### Course plan

<b>Year:</b> 2024-2025	<b>Semester:</b> <input type="checkbox"/> First <input checked="" type="checkbox"/> Second	<b>Number of students:</b>
<b>Major:</b> Doctor of Dentistry	<input checked="" type="checkbox"/> Basic sciences <input type="checkbox"/> Physiopathology	<b>Department:</b> Physiology
<b>Course Title:</b> Physiology 2 Dentistry	<input checked="" type="checkbox"/> Theoretical <input type="checkbox"/> Practical	<b>Course N. &amp; Credit:</b> 244142, 2
<b>Prerequisite:</b> Cell Physiology	<b>Day &amp; Time:</b> Sunday, 8-10 A.M.	<b>Place:</b> Shahid Soleimani Building
<b>Course Coordinator:</b> Prof. Parham Reisi	<b>Office address:</b> School of Medicine, Department of physiology	<b>Tel:</b> 031-3792 9033
<b>Email:</b> <a href="mailto:p_reisi@med.mui.ac.ir">p_reisi@med.mui.ac.ir</a>	<b>Response Hours and Days:</b> 12-14 every day	<b>Student representative name and mobile number:</b>

**Main objective:** The main goal of this course is to familiarize dental students with the principles of the nervous system, endocrine glands, kidneys, and their relationship to oral and dental health for clinical application.

#### Specific objects:

##### Neurophysiology

1. Familiarity with the structure and function of the central and peripheral nervous systems. (Cognitive domain)
2. Understanding the electrical and synaptic mechanisms in neurons. (Cognitive domain)
3. Identification of sensory receptors, sensory pathways, and the thalamus. (Cognitive domain)
4. Study of pain mechanisms and pain inhibition systems. (Cognitive domain)
5. Understanding the physiology of spinal cord and spinal reflexes. (Cognitive domain)
6. Familiarity with the motor system and mechanisms of balance maintenance. (Cognitive domain)
7. Study of the limbic system, memory, and sleep. (Cognitive domain)
8. Understanding the function of the autonomic nervous system and its role in regulating body organs. (Cognitive domain)

##### Endocrine and Reproductive Physiology

9. Familiarity with endocrine glands and the role of pituitary hormones. (Cognitive domain)
10. Understanding the function of the thyroid gland and adrenal cortex, and their effects on oral health. (Cognitive domain)
11. Study of the role of insulin and glucagon in diabetes and related oral diseases. (Cognitive domain)
12. Understanding calcium and vitamin D metabolism in bone and dental health. (Cognitive domain)

##### Renal and Urinary System Physiology

13. Familiarity with filtration, reabsorption, and tubular secretion processes in the kidneys. (Cognitive domain)
14. Study of urine concentration and dilution mechanisms, and osmolality regulation. (Cognitive domain)

#### References (Text books):

- 1- Guyton and Hall Textbook of Medical Physiology (Latest Edition) and Ganong's Review of Medical Physiology (Latest Edition).
- 2- Berne & Levy Physiology (Latest Version)
- 3- Class Slides and Contents

#### Student evaluation and the value related to each evaluation:

(The assessment tools employed to evaluate students' comprehension of course content and their attainment of the skills and competencies outlined in the learning outcomes.). **The midterm exam covers the nervous system (9.5 points), while the final exam covers the endocrine system (6 points) and the urinary system (4.5 points).**

ASSESSMENT TOOLS	From
Mid-term	9.5
Final	10.5
TOTAL MARKS	20

**Students' responsibilities:**

- 1- Prepare for class by reviewing topics beforehand and afterwards.
- 2- Adhere to class order and rules.
- 3- Ensure attendance in all classes.

**Discipline and educational rules:**

1. Attendance Policy:
  - A deduction of 0.5 points from a total of 20 points will be applied for each unplanned absence. If the number of absences exceeds the permissible limit, the overall score for the course will be reduced to zero.
2. Punctuality:
  - Participants are allowed a maximum grace period of 5 minutes after the scheduled start time to join the class. Beyond this timeframe, latecomers may not be admitted.
3. Mobile Phone Usage:
  - The use of mobile phones is strictly prohibited during class. Participants are expected to keep their phones on silent or vibrate mode and refrain from any phone-related activities to maintain a focused learning environment.

**Other important notes for students:**

Reading the guidelines and rights governing both professors and students.

**Note:** In each class session, a quiz may be taken or questions asked.

**Mid exam date:** In accordance with the schedule

**Final exam date:** In accordance with the schedule

Row	date	Presentation	Topic	Professor	Theoretical or practical	References	Chapter
1	2025/Feb/2	In-person	<b>Introduction to the Structure of the Nervous System and the Principles of Neuronal Function and Electrical Events.</b> <b>Objectives:</b> Introduction to the overall structure of the central and peripheral nervous systems. Understanding functional levels of the nervous system (spinal cord, brainstem, cerebellum, cerebral cortex). Introduction to synapses (chemical and electrical) and types of neurotransmitters. Understanding electrical and ionic events during neuronal excitation or inhibition. Concepts of spatial and temporal summation, neuronal facilitation, and synaptic conduction. The role of dendrites in neuron excitation and mechanisms for terminating mediator activity.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	46-47

2	Feb/9	In-person	<b>Sensory Receptors and Somatic Sensations</b> <b>Objectives:</b> Understanding different types of sensory receptors and the mechanism of converting stimuli into neural signals. Introduction to somatic senses (touch, pressure, vibration, pain, temperature). Examination of sensory signal transmission pathways and the role of the thalamus in processing them.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	47-48
3	Feb/16	In-person	<b>Pain Mechanisms and Related Clinical Disorders</b> <b>Objectives:</b> Continuation of somatic sensation topics. Physiological mechanisms of pain, its types, and pain receptors. Pathways for pain transmission and pain suppression systems. Analysis of referred pain, visceral pain, and mechanisms of clinical disorders related to pain.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	48-49
4	Feb/23	In-person	<b>Spinal Motor Physiology and Reflexes</b> <b>Objectives:</b> Introduction to muscle spindles and their role in the muscle stretch reflex. Analysis of the role of Golgi tendon organs in movement control. Examination of spinal reflexes and the phenomenon of spinal shock.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	55
5	Mar/2	In-person	<b>Brainstem, Motor Cortex, and Balance</b> <b>Objectives:</b> Examination of the role of the brainstem in controlling involuntary movements. Understanding the role of the motor cortex in voluntary movements and the cortical-spinal pathway. Introduction to the vestibular system and its role in balance. Analysis of vestibular reflexes related to balance and their connections with the brainstem and cortex.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	56
6	Mar/9	In-person	<b>Cerebellum and Basal Ganglia</b> <b>Objectives:</b> Exploration of the cerebellum's role in movement coordination and balance regulation. Understanding cerebellar function in motor learning and regulation of complex movements. Analysis of basal ganglia function in movement planning and execution. The relationship between basal ganglia, cortex, and cerebellum in movement regulation.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	57
7	Mar/16	In-person	<b>Limbic System and Memory</b> <b>Objectives:</b> Exploration of the role of the limbic system in regulating emotions and behavior. Understanding the	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and	58-60

			mechanisms of memory and learning. Analysis of brainwaves and different stages of sleep.			Hall)	
8	Apr/6	In-person	<b>Autonomic Nervous System (ANS)</b> <b>Objectives:</b> Understanding the organization of the sympathetic and parasympathetic systems. Analysis of the effects of the autonomic nervous system on various organs of the body. Understanding autonomic tone and drugs affecting its function. Summary and review of key points from previous sessions.	Prof. Reisi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	61
9	Apr/13	In-person	<b>Introduction to Endocrine Glands and Pituitary Hormones</b> <b>Objectives:</b> Introduction to endocrine glands and their overall role in body regulation. Understanding anterior and posterior pituitary hormones and their control by the hypothalamus. Examining the role of growth hormone (GH) and related disorders like acromegaly and dwarfism.	Prof. Soltani	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	75-76
10	Apr/20	In-person	<b>Thyroid Hormones</b> <b>Objectives:</b> Examination of the structure and function of the thyroid gland. Understanding the role of T3 and T4 hormones in regulating basal metabolism and growth. Exploring thyroid gland disorders (e.g., hypothyroidism and hyperthyroidism) and their effects on oral and bone health. Analyzing the relationship between thyroid hormones and osteoporosis.	Prof. Soltani	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	77
11	Apr/27	In-person	<b>Adrenal Cortex Hormones</b> <b>Objectives:</b> Introduction to the structure and function of the adrenal cortex. Understanding the role of cortisol in stress response and metabolism of proteins, fats, and carbohydrates. Analyzing the role of aldosterone in regulating electrolyte balance and body fluids. Exploring disorders of the adrenal cortex (e.g., Addison's disease and Cushing's syndrome) and their effects on oral health and related diseases.	Prof. Soltani	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	78
12	May/4	In-person	<b>Insulin, Glucagon, and Diabetes</b> <b>Objectives:</b> Understanding the role of insulin and glucagon in glucose metabolism regulation. Examining the pathophysiology of Type 1 and Type 2 diabetes. The impact of diabetes on oral	Prof. Soltani	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	79

			health, including gum disease, dry mouth, and wound healing. The role of blood sugar control in preventing oral complications of diabetes.				
13	May/11	In-person	<b>Calcium and Phosphate Metabolism, Vitamin D, Bones, and Teeth</b> <b>Objectives:</b> Examining the role of parathyroid hormone and calcitonin in calcium and phosphate metabolism. Understanding the role of vitamin D in bone and dental health. Exploring the relationship between calcium and vitamin D deficiencies with bone diseases (e.g., rickets and osteoporosis) and their impact on teeth. Calcium and phosphate metabolism during infant breastfeeding.	Prof. Soltani	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	80
14	May/18	In-person	<b>Introduction to Renal Anatomy and Renal Processes</b> <b>Objectives:</b> Familiarization with the structure of the kidneys, nephrons, and the urinary collection system and renal processes. Understanding the mechanism of glomerular filtration and the regulatory factors involved.	Prof. Nasimi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	26-27
15	May/25	In-person	<b>Tubular Reabsorption and Secretion Processes</b> <b>Objectives:</b> Investigating the processes of reabsorption of essential substances and secretion of waste products in the nephrons. Understanding the role of the renin-angiotensin-aldosterone system in regulating kidney function.	Prof. Nasimi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	28
16	Jun/1	In-person	<b>Urine Concentration and Dilution</b> <b>Objectives:</b> Assessing kidney function. Understanding the mechanism of urine concentration and dilution and the role of the loop of Henle.	Prof. Nasimi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	28-29
17	Jun/8	In-person	<b>Osmolarity Regulation and Blood Volume Control</b> <b>Objectives:</b> Familiarization with the regulation of osmolarity and sodium concentration by the antidiuretic hormone (ADH). Blood volume control. Investigating the renal regulation of potassium, calcium, phosphate, and magnesium and their significance in maintaining body homeostasis.	Prof. Nasimi	Theoretical	Textbook of Medical Physiology (Guyton and Hall)	29-30