香港中文大學(深圳)
The Chinese University of Hong Kong, Shenzhen

Course code	BME2001
Course title (English)	Anatomy/Physiology
Course title (Chinese)	解剖學/生理學
Units	4
Language of Instruction	English
Description (English)	This course adopts a combined structural (anatomical) and functional (physiological) approach of introducing the organization of the human body and various organ systems which are relevant to the students majoring biomedical engineering. Students will be introduced to the basics of the human anatomy (i.e. anatomical directions and positions), and structure and function of the body parts starting from cells/tissues to various organs. Emphases are also put on the basic principles and quantitative concepts based upon which the practice of biomedical engineering can be applied.
Description (Chinese)	本課程主要介紹人體各種器官系統的結構(解剖學上)和功能(生理學上)。學生們會學習一般的人體解剖醫學上的術語(例如，方向和位置)，從細胞和組織開始，去了解各種器官系統在人體是如何構造和機能上運作。本課程著重於指導學生如何將基本的原則和定量的概念應用在生物醫學工程中。

Learning Outcomes

Knowledge:

After completing this course, students should be able to:

- Obtain the basic knowledge of human anatomy and physiology; define the major body structures composing human body and understand how they coordinately work to maintain the homeostasis of the body.
- Describe the basic anatomical features of the body systems and relate them to the specific functions they perform.
- Explain the cellular basis of communications amongst different cells, tissues or organs within the body with the use of chemical messengers and by electrical means.
- Describe the structural and functional organization of the musculoskeletal, cardiovascular and respiratory system and apply the anatomical and physiological knowledge to understand the pathological conditions that cause dysfunctions.
- Explain the processes by how the kidneys regulate the body fluid volume and its composition.
- Summarize how the gastrointestinal system carries out the digestion and absorption of ingested food.
- Outline the roles of various hormones and understand their control and mechanisms of their secretions.
- Describe the organization of the nervous system and state how autonomic nervous system affects body functions.

- Explain how the special senses particularly those in the eyes and ears function in human.
- Outline how some of the altered functions in the kidneys, gastrointestinal, endocrine, and central nervous system affect the body.
- Summarize the general principles on how the tissues and organs work altogether to maintain homeostasis.

Skills

Generic:

- Students are able to explain the gross anatomy/microanatomy of all organ systems in the human body.
- Students are able to be prepared to be the future biomedical engineers and healthcare professionals equipped with knowledge of the anatomical & clinical vocabulary and terminology.
- Students have developed their ability to make judgments about alternative perspectives.
- Students have become more willing to consider different points of view.
- Students have been encouraged to use their own initiative.
- Students have been challenged to come up with new ideas.
- Students have improved their ability to use knowledge to solve problems.
- Students are able to bring information and different ideas together to solve problems.
- Students have developed their ability to communicate effectively with others.
- In their time at university students have improved their ability to convey ideas.
- During their time at university students have developed their ability to write clearly.
- Students feel confident that they can use computer applications when necessary.
- Students have learnt more about using computers for presenting information.

Valued/Attitude:

- Students feel that they can be active participants in their own learning processes.
- Students are able to actively engage in creative activities and discussion with peers and/or supervisors.
- Students have become more confident of their ability to pursue further learning.
- Students realize that they will have to update their knowledge through continuing education.
- During their time at university students have learned how to be more adaptable.
- Students have become more willing to change their views and accept new ideas.

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Indicative Teaching Plan

Week	Content/ topic/ activity
1	Introduction to Anatomy; Basics of cells and tissues; Anatomy of the articulation
2	Introduction to Anatomy of the musculoskeletal system; Cell membrane and transport function; Cell-cell communication and signalling mechanisms; Membrane potential and excitability
3	Organization of the nervous system and autonomic nervous system; Neuron structure and synaptic transmission; Generation and propagation of action potential
4	Principles of homeostatic control and reflexes; Neuromuscular transmission and skeletal muscle contraction; Anatomy of the cardiovascular system; Composition and physical properties of blood
5	Heart – electrical activities, conduction and coupling to contraction; Cardiac cycle; Blood vessels; resistance to flow and capillary exchanges; Control of blood pressure
6	Anatomy of the respiratory system; Mechanics of ventilation and lung volumes; Lung compliance and airway resistance; Oxygen and carbon dioxide transport in blood; Control of ventilation; pH of body fluid and relationship to carbon dioxide and bicarbonate ion concentration
7	Anatomy of the urinary system; Body fluid compartment; Overview of kidney function;
8	Glomerular and renal tubular function; Integrated control of body fluid volume and osmolality; Regulation of acid-base balance
9	Motor system 1; Motor system 2; Sensory physiology – vision; Sensory physiology – hearing and balance
10	Anatomy of endocrine system; Principles of endocrine control; Pituitary and thyroid function; Hormonal control of body metabolism 1; Hormonal control of body metabolism 2
11	Anatomy of the digestive system; Regulation of gastrointestinal function and motility; Gastric and pancreatic function; Digestion and absorption; Gastrointestinal disorders
12	Anatomy of the central nervous system: The brain; Anatomy of the central nervous system: The spinal cord
13	General neurobiology; Central nervous system (CNS) function 1; Central nervous system (CNS) function 2