

Human Anatomy and Physiology II

Theory Course Code: BP201T

for Second Semester Bachelor in Pharmacy

has been written in a simple and lucid language so that the students are able to learn and understand the two subjects —anatomy and physiology—easily, imbibe and retain the knowledge, precisely, and reproduce the facts effectively in their examinations.

The text of anatomy part is well supplemented by numerous simple color line diagrams, while physiology text is accompanied by tables, flowcharts, etc. In addition, the functions of various parts of the tissues and organs are given clinical and applied aspects which emphasise the diseases associated with them. Both these aspects make the subject interesting and easy to understand and memorise.

This textbook for Semester II (Course code BP201T) contains 5 units. Each unit has 1-2 chapters with amalgamation of anatomy and physiology. Unit I is on nervous system—general aspects and particular features of various parts of nervous system including their functions. Unit II provides requisite details of anatomy, physiology and 'Clinical Aspects' of digestive system, including brief description of energetics. Unit III is on respiratory system, its anatomy, regulation of respiration, transport of gases and 'Clinical Aspects'. This unit also includes urinary system, structure and functions of its parts, role of kidneys in acid-base balance and disorders of the urinary system.

Unit IV is on endocrine system—structure and functions of exclusive ductless glands and mixed glands, i.e. both endocrine and exocrine glands. Unit V deals with both the male and female reproductive systems. It includes formation of gametes, e.g. ovum and spermatozoa, structure and functions of various parts of the systems; fertilisation, pregnancy and parturition. Last part of unit V is a brief introduction to genetics and some of the commonly occurring genetic disorders.

Last part of all the chapters is 'Assess Yourself' with the help of long questions, short questions and multiple choice questions. This course content of Semester II Book would be better recapitulated once the practicals are completed with the help of *Human Anatomy and Physiology Practical Workbook for Bachelor in Pharmacy Students* (Course Codes BP107P and BP207P) in their respective laboratories, as theory and practicals complement each other in enhancing learning.

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Theory

for Second Semester Bachelor in Pharmacy

Garg | Joshi | Kundu



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As per the latest syllabus prescribed by Pharmacy Council of India

Krishna Garg
Medha Joshi
Sudipta Kundu



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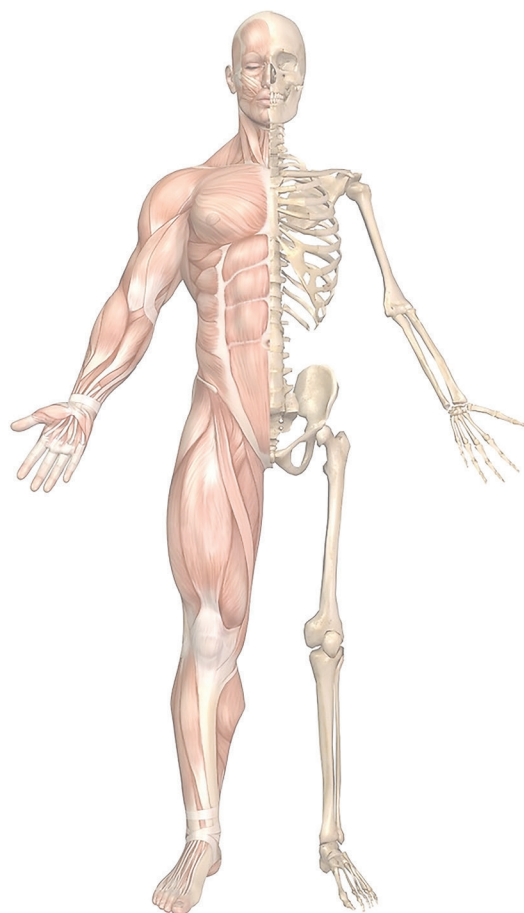
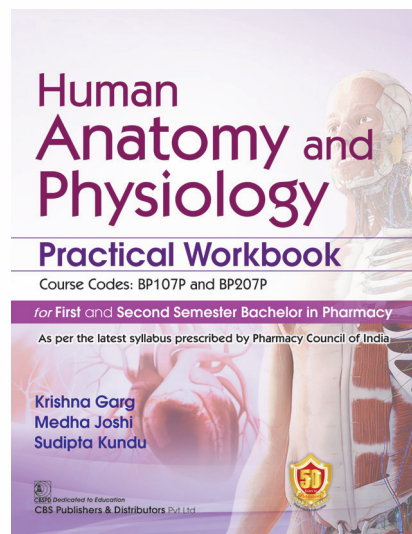
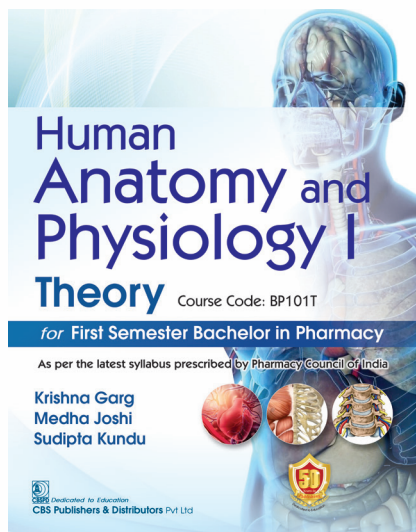
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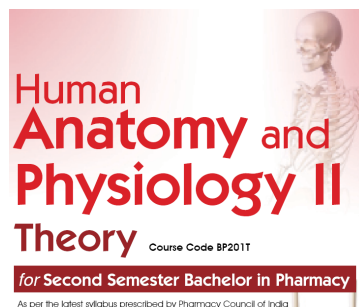


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Preface

Pharmacy is an emerging popular subject in the arena of health sciences. As there are a number of brilliant avenues open to graduates, pharmacy as a subject of learning is gaining a lot of importance. So as to meet the requirements of the pharmacy students, we have decided to prepare this book for second semester Bachelor in Pharmacy students covering both anatomy and physiology, discussing thoroughly all the relevant theoretical and applied aspects of these important subjects.

The latest syllabus of BPharm is subdivided into Semester I and Semester II courses. Accordingly two separate volumes are prepared as *Human Anatomy and Physiology I* and *Human Anatomy and Physiology II*.

This textbook for Semester II (Course Code BP201T) contains 5 units. Each unit has 1–2 chapters with amalgamation of anatomy and physiology. Unit I is on nervous system—general aspects and particular features of various parts of nervous system including their functions. Unit II provides requisite details of anatomy, physiology and ‘Clinical Aspects’ of digestive system, including brief description of energetics. Unit III is on respiratory system, its anatomy, regulation of respiration, transport of gases and ‘Clinical Aspects’. This unit also includes urinary system, structure and functions of its parts, role of kidneys in acid–base balance and disorders of the urinary system.

Unit IV is on endocrine system—structure and functions of exclusive ductless glands and mixed glands, i.e. both endocrine and exocrine glands. Unit V deals with both the male and female reproductive systems. It includes formation of gametes, e.g. ovum and spermatozoa, structure and functions of various parts of the systems: fertilisation, pregnancy and parturition. Last part of unit V is a brief introduction to genetics and some of the commonly occurring genetic disorders.

Each chapter in this book begins with ‘Chapter Outline’ followed by requisite text in simple language, colour line diagrams, tables, flowcharts, etc. The highlights of the each chapter have been summarised as ‘Golden Points’. These are followed by ‘Clinical Aspects’, where common diseases of the particular system are elucidated. These aspects emphasise the importance of its anatomy and physiology given in the text.

The chapter ends with ‘Assess Yourself’ to check on the skills and knowledge acquired from the study of the chapter. This section comprises long and short essay type questions including multiple choice questions (MCQs). We hope the teachers and the students will find this textbook extremely useful in teaching–learning the subjects of anatomy and physiology with ease and clarity.

Krishna Garg
Medha Joshi
Sudipta Kundu

Acknowledgements

We are grateful to the Almighty for His guidance during writing of the text and preparation of the illustrations of the important book titled *Human Anatomy and Physiology II: Theory for Second Semester Bachelor in Pharmacy* students.

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**Krishna Garg
Medha Joshi
Sudipta Kundu**

Syllabus

Human Anatomy and Physiology II (Theory)

Course Code: BP201T

Theory 45 hours (3 Hours/week)

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to:

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time, etc. and also record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system.
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Course Contents

Unit I

10 hours

1. Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

Unit II

06 hours

2. Digestive system

Anatomy of GI tract with special reference to anatomy and functions of stomach (acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

Energetics: Formation and role of ATP, creatinine phosphate and BMR.

Unit III

10 hours

3. Respiratory system

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration, lung volumes and capacities, transport of respiratory gases, artificial respiration, and resuscitation methods.

4. Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid–base balance, role of RAS in kidney and disorders of kidney.

Unit IV

10 hours

5. Endocrine system
Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Unit V

09 hours

6. Reproductive system
Anatomy of male and female reproductive system, functions of male and female reproductive systems, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition.
7. Introduction to genetics
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