



SANTOSH
Deemed to be University



Curriculum for M.Sc. Medical Physiology

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SANTOSH DEEMED TO BE UNIVERSITY
GHAZIABAD, NCT OF DELHI



SANTOSH
Deemed to be University



Programme: M.Sc. Medical Physiology

[3 Years Program]

M.Sc. Medical Physiology is a 3-year long postgraduate program that focuses on the study of physiological processes and functions within the human body. Physiology is the branch of biology that deals with the normal functions of living organisms and their parts. Medical Physiology specifically emphasizes the functioning of the human body and its various systems.

Students examine human physiological systems from the molecular and cellular levels to the human body as a whole. The degree in M.Sc. Medical Physiology provides excellent preparation for careers in medical research and the health professions in healthcare disciplines like sports, yoga and nutrition fields, etc.

Introduction to CBCS (Choice Based Credit System) Choice Based Credit System: The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill-based courses. The courses will be evaluated following the grading system, which is considered to be better than the conventional marks system. Grading system provides uniformity in the evaluation and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, which enables the student to move across institutions of higher learning. The uniformity in evaluation system also enables the potential employers in assessing the performance of the candidates.

Definitions:

- (i) 'Academic Program' means an entire course of study comprising its programme structure, course details, evaluation schemes etc. designed to be taught and evaluated in a teaching Department/Centre or jointly under more than one such Department/ Centre
- (ii) 'Course' means a segment of a subject that is part of an Academic Programme
- (iii) 'Program Structure' means a list of courses (Core, Elective, Open Elective) that makes up an Academic Program, specifying the syllabus, Credits, hours of teaching, evaluation and examination schemes, minimum number of credits required for successful completion of the programme etc. prepared in conformity to University Rules, eligibility criteria for admission
- (iv) 'Core Course' means a course that a student admitted to a particular programme must successfully complete to receive the degree and which cannot be substituted by any other course
- (v) 'Elective Course' means an optional course to be selected by a student out of such courses offered in the same or any other Department/Centre

- (vi) 'Open Elective' means an elective course which is available for students of all programmes, including students of same department. Students of other Department will opt for these courses subject to fulfilling of eligibility of criteria as laid down by the Department offering the course.
- (vii) 'Credit' means the value assigned to a course which indicates the level of instruction; One-hour lecture per week equals 1 Credit, 2 hours practical class per week equals 1 credit. Credit for a practical could be proposed as part of a course or as a separate practical course
- (viii) 'SGPA' means Semester Grade Point Average calculated for individual semester.

Some of the major highlights of the M.Sc. in Medical Physiology are as follows:

Level	Postgraduate
Name of the course	Master of Science in Medical Physiology
Short Name	M.Sc. in Medical Physiology
Duration	M. Sc. Medical Physiology is a fulltime 3 years course
Mode	CBCS
Exam Type	Formative and Summative Assessment
Min. Qualification	The candidate who passes B.Sc. ZBC (Zoology, Botany/ Chemistry), B.Sc. Anatomy/ MBBS/ BDS/ Bachelor's degree in any of Biological Sciences/ Life Sciences/ BMLT/ BPT/ B. Pharma/ BAMS with at least 50% aggregate Marks.
Selection Criteria	No Entrance Exam
Total Course Fee	1,70,500/-
Employment Sectors	Biotechnology companies, Medical Writing and publishing companies, Medical consulting firms, Medical education and training organizations, Public Health Organizations Hospitals, Research Colleges/ Universities, Govt. Agencies like Aviation Research, High Altitude Research Institute, Deep Sea Research institute, DRDO, etc.
Job Profiles	Clinical Research Associate, Medical Research Scientist, Medical Writer, Medical Research Associate, Physiology Educator,

Curriculum updating and adoption of innovative pedagogy are major components of academic excellence aimed at providing exposure to cutting edge technological advancements.

1. Standard Structure of the Program at University Level Name of the Degree: M.Sc. Medical Physiology

M.Sc. Medical Physiology is a 3-year long postgraduate program that is being offered at Santosh Deemed to be university, Ghaziabad, Uttar Pradesh. Basically, the programme aims at providing core knowledge of the principles and practice of physiology like structure and function of cell, cell theory, levels of organisation, cell to cell communication, function, integration and adaptation of various organ system.

The course curriculum mainly covers tissue and organism physiology, cell and receptor mechanism and their correlation with various mechanism in all organ systems needed for healthy life. The university is offering this program under the department of physiology based on percentage of marks obtained in qualifying degree/exams from a recognised institution/ university. M.Sc. Medical Physiology involves teaching theory and practical aspects of general and systemic physiology, clinical research, research methodology and biostatistics, etc.

Physiologists in demand in today's sports, yoga & nutrition fields in India & abroad. After completing the course, students get M.Sc. Medical Physiology jobs like medical college teacher, clinical research associate, research scientist, and alike in sectors such as hospitals, research colleges/ universities, exercise physiologist-training of sports people, nutrition physiologist: govt agencies like aviation research, high altitude research institute, deep sea research institute, DRDO, etc. The demand is growing at an accelerated rate, which makes career prospects in this field bright.

In academics, one can go for higher qualifications like Ph.D. In various field of physiology.

Eligibility Criteria: As a minimum criterion of eligibility, aspiring candidates are needed to have attained a B.Sc. in any discipline of Life Sciences, Bachelor's degree in any of Biological Sciences, M.B.B.S, BDS, BAMS, BHMS, B. Pharma, Bachelor's Degree in Agricultural, Veterinary and Fishery Sciences, or equivalent examination with a minimum aggregate score of 50%.

Duration of the program: The M.Sc. is of 3 years duration including one year of compulsory internship.

Semesters - An academic year consists of two semesters. There are total 6 semesters.

- i) Odd Semester: July to December
- ii) Even Semester: January to June

Medium of instruction: English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance: A candidate has to secure minimum-

- i) 75% attendance in theoretical classes.
- ii) 80% in skills training (practical) for qualifying to appear for the final examination.

2. Vision, Mission and Core Values of the Department of Physiology:

Vision:

To be a leading department in the field of Physiology, committed to advancing knowledge and understanding of the human body and its functions, and contributing to the improvement of human health and well-being.

Mission:

Our mission is to conduct high-quality research and provide excellent education and training in the field of Physiology. We strive to foster a collaborative and interdisciplinary environment that promotes scientific discovery and innovation. Through our research efforts, we aim to unravel the underlying mechanisms of human physiology and contribute to the development of novel therapies and interventions. We are also dedicated to educating and training the next generation of scientists and healthcare professionals, current and future challenges in the field of Physiology.

Core Values:

- I. Excellence: We uphold the highest standards of scientific rigor, ethical conduct, and professional excellence in all aspects of our work.
- II. Collaboration: We foster a collaborative and inclusive environment that encourages teamwork, communication, and the exchange of ideas among faculty, staff, and students. We value interdisciplinary approaches and actively to enhance the impact of our research and education efforts.
- III. Innovation: We embrace creativity and innovation in our research endeavours, constantly seeking new approaches, technologies, and methodologies to advance the field of Physiology.
- IV. Education and Training: We are committed to providing exceptional education and training opportunities for students at all levels, from undergraduate to postgraduate. We also emphasize the development of practical skills and the application of knowledge in real-world settings.
- V. Integrity and Ethics: We adhere to the highest standards of integrity, honesty, and ethical conduct in our research, teaching, and all other activities. We promote a culture of ethical behavior, responsible scientific conduct, and respect for confidentiality and privacy.
- VI. Impact: We are dedicated to making a positive impact on society through our research and education efforts. We aim to translate our findings into practical applications and interventions that improve human health and well-being. We also strive to contribute to public health policies and initiatives,

3. Program Objectives:

The program objective for a Master's in Physiology is to provide students with an in-depth understanding of the human body's function and regulation. This program aims to equip students with the knowledge and skills necessary to analyze and interpret physiological processes at the cellular, organ, and system levels.

Specific objectives of a Master's in Physiology program may include:

- I. To provide a comprehensive understanding of the principles and concepts related to physiological function and adaptation.
- II. To develop proficiency in laboratory techniques and data analysis methods used in physiological research.
- III. To enhance critical thinking and problem-solving skills in the context of physiological phenomena.
- IV. To promote the ability to critically evaluate scientific literature and communicate research findings effectively.
- V. To foster an understanding of the impact of physiology on health and disease and the potential applications of physiological knowledge in clinical practice.
- VI. To promote collaboration and teamwork skills through group projects and research activities.
- VII. Understand general principles of medical education (use of appropriate teaching techniques and resources)
- VIII. Effective Communication Skill by Microteachings Formative and summative assessment of Communication and teaching skills in the form of Microteaching & seminar presentations
- IX. Use the library facilities (Literature database using computer, CD ROM, internet search and any other available newer techniques).

4. Program Mapping with Mission Students

- To make students competent for professional career.
- To equip students with effective communication & teamwork skills to acquire professional excellence.
- To nurture students to be sensitive to ethical, societal & environmental issues while conducting their professional work.
- To build strong fundamental knowledge amongst student to pursue higher education or to continue professional development in various fields by leveraging their expertise.

5. Program Outcomes:

- Cognitive Domain:
 - I. Knowledge: Post Graduates will have a comprehensive understanding of physiological concepts, theories, and principles.
 - II. Comprehension: Post Graduates will be able to interpret and explain physiological processes at various levels, including cellular, organ, and system levels.
 - III. Application: Post Graduates will be able to apply their knowledge of physiology to analyze and solve complex physiological problems.
 - IV. Analysis: Post Graduates will be able to critically evaluate scientific literature and experimental data to draw meaningful conclusions about physiological phenomena.
 - V. Synthesis: Post Graduates will be able to integrate knowledge from various areas of physiology to develop a comprehensive understanding of physiological processes.

- VI. Evaluation: Post Graduates will be able to assess the validity and reliability of scientific research methods and conclusions.

Affective Domain:

- I. **Attitudes:** Graduates will demonstrate a positive attitude towards lifelong learning and professional development in the field of physiology.
- II. Values: Graduates will exhibit ethical and responsible conduct in scientific research and practice.
- III. Interests: Graduates will develop a passion for physiological research and its potential applications in healthcare and clinical practice.
- IV. Appreciation: Graduates will value the importance of physiological regulation in maintaining health and preventing disease.
- V. Motivation: Graduates will be self-motivated to learn recent advances in the field of physiology.

Psychomotor Domain:

- **Skills:** Graduates will acquire and demonstrate proficiency in laboratory techniques and experimental procedures commonly used in physiological research.
- **Coordination:** Graduates will develop fine motor skills and hand-eye coordination necessary for performing precise physiological measurements
- **Dexterity:** post Graduates will exhibit the ability to handle and manipulate laboratory equipment and instruments with precision and accuracy.
- **Teaching** Post graduates should be able to effectively teach the basic physiological mechanisms of human body with reference to their implications in the pathogenesis of diseases (pathophysiology) and their management to undergraduate students in medicine and allied health science courses
- **Physical Fitness:** post Graduates will understand the importance of physical fitness in maintaining optimal physiological function
- **Adaptability:** post Graduates will demonstrate the ability to adapt their psychomotor skills to different experimental setups or research protocols.
- **Safety:** post Graduates will adhere to safety protocols and guidelines when working with potentially hazardous materials or equipment in the laboratory.

6. Mapping of the Program Outcome with Program Objectives

- I. To provide students with sound fundamental knowledge in Basic and clinical physiology, Research methodology & Biostatistics
- II. To apply critical reasoning, subject knowledge and research skills to identify and solve problems in order to take appropriate decisions and to enhance problem solving abilities
- III. To broaden knowledge to establish themselves as creative professionals, locally and globally, to pursue life-long learning for continuous self-development. In addition to didactic lectures to provide a holistic education students are exposed to the following teaching-learning practices/programs

Journal Clubs

Slide discussions

Seminars

Participate in workshop, conferences/ CME.

- IV. To provide training for developing professional skills and soft skills such as proficiency in languages, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

7. Semester Wise Distribution of Academics

Sem.	Course code	Course type	Title of the Course	Hours per Week				Course Credit
				L*	T*	P*	Total	
I	Office Use	DSCC-I	GENERAL PHYSIOLOGY, HEMATOLOGY, NERVE MUSCLE PHYSIOLOGY				4	4
I	Office Use	DSCC-II	GENERAL ANATOMY				4	4
I	Office Use	DSEC-I	CLINICAL NUTRITION				3	3
I	Office Use	DSCP-I	GENERAL PHYSIOLOGY, HEMATOLOGY, NERVE MUSCLE PHYSIOLOGY (P)				4	2
I	Office Use	DSCP-II	GENERAL ANATOMY (P)				4	2
I	Office Use	DSEP-I	CLINICAL NUTRITION (P)				4	2
I	Office Use	CP-I	CLINICAL PRACTICE				8	--
I	Office Use	TLR-I	LOGBOOK/SEMINAR/JOURNAL CLUB				3	--
TOTAL							34	17

II	Office Use	DSCC-III	GASTROINTESTINAL TRACT, RESPIRATORY SYSTEM,				4	4
II	Office Use	DSCC-IV	BIOCHEMISTRY				4	4
II	Office Use	DSEC-II	PHYSIOLOGY OF PEDIATRICS GROWTH				3	3
II	Office Use	DSCP-III	GASTROINTESTINAL TRACT, RESPIRATORY SYSTEM(P)				4	2
II	Office Use	DSCP-IV	BIOCHEMISTRY(P)				4	2
II	Office Use	DSEP-II	PHYSIOLOGY OF PEDIATRICS GROWTH(P)				4	2
II	Office Use	CP-II	CLINICAL PRACTICE				8	--
II	Office Use	TLR-II	LOGBOOK/SEMINAR / JOURNAL CLUB				3	--
TOTAL							34	17
III	Office Use	DSCC-V	CARDIOVASCULAR PHYSIOLOGY, RENAL PHYSIOLOGY				4	4
III	Office Use	DSCC-VI	GENERAL MICROBIOLOGY				4	4
III	Office Use	DSEC-III	ELECTROCARDIOGRAPHY (EEG)				3	3
III	Office Use	GEC-I	BIOSTASTICS				3	3

III	Office Use	DSCP-V	CARDIOVASCULAR PHYSIOLOGY, RENAL PHYSIOLOGY(P)				4	2	
III	Office Use	DSCP-VI	GENERAL MICROBIOLOGY(P)				4	2	
III	Office Use	DSEP-III	ELECTROCARDIOGRAPHY (EEG) (P)				4	2	
III	Office Use	PD-I	PROJECT WORK / DISSERTATION				4	--	
III	Office Use	CP-III	CLINICAL PRACTICE				4	--	
TOTAL								34	20
IV	Office Use	DSCC-VII	CENTRAL NERVOUS SYSTEM & PERIPHERAL NERVOUS SYSTEM				4	4	
IV	Office Use	DSCC-VIII	PHYSIOLOGY OF EXERCISE				4	4	
IV	Office Use	DSEC-IV	PULMONARY FUNCTION TEST				3	3	
IV	Office Use	GEC-II	YOGA AND STRESS MANAGEMENT				3	3	
IV	Office Use	DSCP-VII	CENTRAL NERVOUS SYSTEM & PERIPHERAL NERVOUS SYSTEM (P)				4	2	
IV	Office Use	DSCP-VIII	PHYSIOLOGY OF EXERCISE (P)				4	2	
IV	Office Use	DSEP-IV	PULMONARY FUNCTION TEST(P)				4	2	

IV	Office Use	PD-I	PROJECT WORK / DISSERTATION				4	-
IV	Office Use	CP-IV	CLINICAL PRACTICE				4	-
TOTAL							34	20
V	Office Use	DSCC-IX	ENDOCRINE PHYSIOLOGY				4	4
V	Office Use	DSCC-X	REPRODUCTIVE PHYSIOLOGY				4	4
V	Office Use	DSEC-V	NERVE CONDUCTION STUDIES				3	3
V	Office Use	SEC-I	BASIC OF COMPUTER & IT SKILLS				2	2
V	Office Use	GEC-III	BIOMEDICAL WASTE MANAGEMENT				3	3
V	Office Use	DSCP-IX	ENDOCRINE PHYSIOLOGY (P)				4	2
V	Office Use	DSCP-X	REPRODUCTIVE PHYSIOLOGY(P)				4	2
V	Office Use	DSEP III	NERVE CONDUCTION STUDIES (P)				4	2
V	Office Use	PD-I	PROJECT WORK / DISSERTATION				6	-
TOTAL							34	22
VI	Office Use	DSCC-XI	THERMOREGULATION				4	4

VI	Office Use	DSCC-XII	RECENT ADVANCES IN PHYSIOLOGY				4	4
VI	Office Use	DSEC-VI	SPORT PHYSIOLOGY				3	3
VI	Office Use	SEC-II	BLS & ACLS				2	2
VI	Office Use	GEC IV	GENERAL PSYCHOLOGY				3	3
VI	Office Use	DSCP-XI	THERMOREGULATION (P)				4	2
VI	Office Use	DSCP-XII	RECENT ADVANCES IN PHYSIOLOGY(P)				4	2
VI	Office Use	DSEP-	SPORT PHYSIOLOGY-(P)				4	2
VI	Office Use	PD-1	PROJECT WORK /DISSERTATION				6	12
TOTAL							34	34

L* - Lecture

T* - Tutorial

P*- Practical

DSCC – Discipline Specific Core Course

- A Total of 12 Core courses required to be identified

DSCP – Discipline Specific Core Practical programme

- Practical component of the respective Core Courses of the

DSEC – Discipline Specific Elective Course

- A Pool of 8 -10 Courses are to be identified

And submitted with the Syllabi [These

Course will be opted by the students of your

discipline only]

DSEP – Discipline Specific Elective Practical selected by the students

- Practical component of the respective Elective Course

GEC – Generic Elective Course

- A pool of 6 papers required to be identified

and submitted with the Syllabi [These

courses will be opted by the students of other programme]

8. SYLLABUS & CURRICULUM:

ACADEMIC SYLLABUS FOR SEMESTER-I

Discipline Specific Core Course I

Total Hours: Theory: 60 hours

Practical: 60hours

Title of the Course: General Physiology, Hematology, Nerve Muscle Physiology

Course Objectives:

- List various body systems and understand the physiological organization of these systems of the body.
- Define homeostasis. Explain the feedback mechanisms of homeostatic regulation. Give the examples of homeostatic regulations. Understand that dysfunctions are mainly due to failure of homeostatic regulations.
- Give the structure and functions of cell membrane. Name the cell organelles and give their functions. Classify intercellular junctions and give their functions.
- Understand the physiological basis of cell death and the concept of apoptosis.
- Understand the concept of resting membrane potential and action potential and its genesis
- Gives the % distribution of body water in different body fluid compartments.
- Define blood, and give the composition and functions of blood.
- Give the normal value of blood volume in adults and children, and describe the methods of blood volume measurement.
- Give the dimensions of red cell and normal red cell count in different age groups in males and females. List the functions of red cells.
- Give the list of abnormal forms of red cells and the common condition in which these abnormalities are observed.
- Understand steps of erythropoiesis and its regulation
- Say the lifespan of normal RBC. Describe the fate of destroyed red cells.
- List the common causes of hemolytic jaundice. List the biochemical tests to detect hemolytic jaundice. Explain why hemolytic jaundice is common in newborns.
- Give the structure of hemoglobin (Hb) and the steps of Hb synthesis.
- Classify Hb, and give the structure of normal and common abnormal Hb.
- Define anemia and polycythemia. Classify anemia, and give the common causes of each category of anemia. Give the salient blood picture of common types of anemia.
- Classification of leucocytes and the % of different leucocytes in blood
- The steps of leucopoiesis. The principle of regulation of leucocyte. Define Immunity and its classification
- Define hemostasis and list the major steps of hemostasis.
- Understand the role of platelets in temporary hemostatic plug formation.
- Define neuron. List the differences between myelinated and unmyelinated axons. Action potential of nerve and muscle Draw the schematic diagram of neuromuscular junction (NMJ). List the events of neuromuscular transmission at presynaptic,
- Understand the physiological basis of causation of myasthenia gravis and the basis of its treatment.

- Appreciate the organization of muscle fibers and fibrils in skeletal smooth and cardiac muscle.

THEORY TOPICS

Unit 1

The Cell And General Physiology

- Functional organization of the human body: cell as the living unit of the body
- Control of the 'internal environment': Homeostasis & feedback mechanisms
- Genetic code, its expression and genetic control of protein synthesis, cell reproduction
- Transport of substances across cell membranes
- Intercellular junction & Apoptosis
- Membrane potentials: RMP and Action Potential
- Body fluid compartments

Unit 2

Haematology

- Composition and function of blood
- Plasma proteins
- Red blood cells
- Haemoglobin
- Anaemia, and Polycythemia
- Jaundice
- Leukocytes, granulocytes, the Monocyte-macrophage system, and inflammation
- Physiology of immunity and allergy, Innate immunity
- Humoral immunity
- Cellular immunity
- Blood group & types
- Blood transfusion; tissue and organ transplantation
- Hemostasis
- Role of Platelets in hemostasis & applied aspects of platelets
- Blood coagulation
- Comparative and Applied Physiology

Unit 3

Nerve and Muscle Physiology

- Structure, functions of neuron, neuroglia, nerve growth factors
- Classification and Properties of nerve fibres
- Degeneration and regeneration of nerve fibre
- Excitation of skeletal muscle: neuromuscular transmission
- NM blockers & Myasthenia gravis
- Types of Muscle & structure of skeletal muscle
- Contraction of skeletal muscle: Sarcotubular system & excitation-contraction coupling
- Molecular mechanism of muscle contraction

- Mode of muscle contraction & gradation of muscle activity
- Muscular dystrophies & Myopathy
- Excitation and contraction of smooth muscle

Learning Outcomes:

Unit 1

To understand the basic physiological concepts of General physiology

Describe the structure and functions of a mammalian cell

Describe and discuss the principles of homeostasis

Describe apoptosis—programmed cell death

Describe and discuss transport mechanisms across cell membranes

Describe the fluid compartments of the body, its ionic composition and measurements

Describe the fluid compartments of the body, its ionic composition and measurements

Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue

Unit 2

Describe the composition and functions of blood components

Discuss the origin, forms, variations and functions of plasma proteins

Describe erythropoiesis and its regulation and its functions

Describe and discuss the synthesis and functions of Haemoglobin and explain its breakdown.

Describe different types of anaemias and Jaundice discussion

Describe WBC formation and its regulation

Define and classify different types of immunity. Describe the development of immunity and its regulation

Describe the physiological basis of hemostasis and, anticoagulants. Describe bleeding and clotting disorders

Unit -3

Describe the structure and functions of a neuron and neuroglia;

Describe action potential and its properties in different muscle types (skeletal and smooth

Describe the types, functions and properties of nerve fibers

Describe the degeneration and regeneration in peripheral nerves

Describe the pathophysiology of myasthenia gravis.

Describe the different types of muscle fibers and their structure. Describe action potential and its properties in different muscle types (skeletal and smooth)

**List of Books recommended- M.Sc. Medical Physiology
Semester I**

Name of the books	Author/Editor
Textbook of Medical Physiology	Guyton & Hall
Textbook of Physiology, Vols-1&2	A K Jain
Textbook of Medical Physiology	Indu Khurana
Manual of Practical Physiology	A K Jain
Textbook of Practical Physiology	Pal GK

REFERENCE BOOKS

BEST & TAYLOR'S

Physiological Basis of Medical Practice Human Physiology:	O.P. Tandon & Y. Tripathi
The Mechanisms Of Body Function	VANDER, A.J.
Review of Medical physiology	Ganong

ON LINE SOURCES –

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

<https://www.classcentral.com/subject/physiology>

Course Type: Discipline Specific Core Course II

Title of the Course: General Anatomy

Total Hours: Theory: 45 Hours

Practical: 60 Hours

Course Objectives:

1. Understand the Fundamentals: Explain the fundamental concepts of anatomy, and the levels of structural organization in the human body.
2. Analyze Upper Limb and Thorax Anatomy: Identify and describe the bones, joints, muscles, and nerves of the upper limb. Analyze the anatomy of the thoracic cage, heart, and major blood vessels.
3. Explore Lower Limb and Abdomen Anatomy: Examine the bones, joints, muscles, and nerves of the lower limb. Evaluate the anatomy of the hip joint, knee joint, ankle joint,
4. Examine Head and Neck Structures: Investigate the bones, joints, muscles, and nerves of the head and neck. Analyze the anatomy of the skull, and nerves of the head and neck.
5. Comprehend Central Nervous System and Spinal Cord: including the cranial nerves. Describe the anatomy of the spinal cord, spinal tracts, cerebrospinal fluid circulation.

Theory topics

Unit 1: Introduction to Anatomy

Definition of Anatomy and its subdivisions, Anatomical terminology, Basic concepts of cells, tissues, and organs, Levels of structural organization in the human body

Unit 2: Upper Limb and Thorax

Bones, joints, muscles, and nerves of the upper limb, Anatomy of the pectoral girdle and shoulder joint, Anatomy of the axilla, brachial plexus, and cubital fossa, Thoracic cage and its components, Anatomy of the heart and major blood vessels

Unit 3: Lower Limb and Abdomen

Bones, joints, muscles, and nerves of the lower limb, Anatomy of the hip joint, knee joint, and ankle joint, Anatomy of the inguinal region and femoral triangle, Abdominal wall layers and inguinal canal, Anatomy of the abdominal organs and their vasculature

Unit 4: Head and Neck

Bones, joints, muscles, and nerves of the head and neck, Anatomy of the skull and cranial fossae, Anatomy of the face, oral cavity, and pharynx, Anatomy of the neck regions and cervical plexus, Major blood vessels and nerves of the head and neck

Unit 5: Central Nervous System and Spinal Cord

Structure and function of the brain and its major divisions, Anatomy of the cranial nerves, Spinal cord structure and tracts, Cerebrospinal fluid and its circulation, Anatomy of the ventricular system and meninges

Learning Outcomes:

1. **Demonstrate Foundational Knowledge:** Understand the fundamental principles of anatomy, including anatomical terminology, subdivisions, and the hierarchical organization of the human body's structures.
2. **Identify and Describe Structures:** Recognize and describe the bones, joints, muscles, and nerves specific to the upper limb, thorax, lower limb, abdomen, head, neck, and central nervous system.
3. **Analyze Functional Relationships:** Analyze the functional relationships between anatomical structures, such as how joints facilitate movement, nerves innervate muscles, and blood vessels supply organs.
4. **Apply Clinical Relevance:** Apply anatomical knowledge to clinical scenarios, understanding how variations and abnormalities in anatomical structures can contribute to medical conditions, diagnoses, and treatment approaches.
5. **Utilize Anatomical Language:** Effectively communicate anatomical information using accurate terminology, diagrams, and models to convey spatial relationships and anatomical concepts.

LIST OF BOOKS

TEXT BOOKS-

1. "Gray's Anatomy for Students" by Richard Drake, A. Wayne Vogl, and Adam W.M. Mitchell
2. "BD Chaurasia's Human Anatomy" by Dr. B.D. Chaurasia
3. "Inderbir Singh's Textbook of Human Histology: With Colour Atlas & Practical Guide" by Dr. Inderbir Singh

REFERENCE BOOKS-

"Essential of Anatomy: Head and Neck" by Vishram Singh

"Clinically Oriented Anatomy" by K. L. Kumar

ONLINE RESOURCES-

<https://teachmeanatomy.info/>

<https://www.neurosurgicalatlas.com/>

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

ACADEMIC SYLLABUS FOR SEMESTER 2

Course Type: Discipline Specific Core Course III

Title of the Course: Physiology - Gastrointestinal System, Respiratory System

Total Hours: Theory: 60 hours

Practical: 60hours

Gastrointestinal System

Course Objective:

1. Comprehensive understanding of the structure, function, and regulation of the digestive system in the human body.
2. Explore the physiological mechanisms underlying the processes of digestion, absorption, and nutrient metabolism
3. Understand the regulatory mechanisms that maintain homeostasis in the gastrointestinal system.

Theory Topics:

1. Anatomy of the Gastrointestinal System
2. Digestive Processes: Exploring the processes of ingestion, propulsion, mechanical and chemical digestion, absorption, and elimination.
3. Gastrointestinal Motility: Studying the neuromuscular mechanisms that control peristalsis and mixing movements in the gastrointestinal tract.
4. Secretion and Digestive Enzymes: Examining the role of various secretions (e.g., saliva, gastric juices, pancreatic enzymes, bile) in breaking down food.
5. Nutrient Absorption Understanding how nutrients (e.g., carbohydrates, proteins, lipids, vitamins, minerals) are absorbed across the epithelial lining of the small intestine.
6. Hormonal and Neural Regulation: Investigating the endocrine and paracrine signals (e.g., gastrin, cholecystokinin, secretin) and neural pathways.
7. Micro biota and Gut-Brain Axis: Exploring the role of gut micro biota in digestion.
8. Gastrointestinal Diseases: Discussing common gastrointestinal disorders and diseases such as gastro esophageal reflux disease (GERD).

Learning Outcomes:

Upon successful completion of a course on gastrointestinal system physiology, students should be able to:

1. Describe the anatomy and organization of the gastrointestinal system.
2. Explain the key physiological processes involved in digestion, absorption, and metabolism of nutrients.
3. Understand the mechanisms of gastrointestinal motility and secretion.
4. Identify the hormonal and neural regulators of gastrointestinal function.
5. Discuss the role of gut microbiota and the gut-brain axis in digestive health.
6. Analyze and interpret clinical cases related to gastrointestinal disorders.

Respiratory System Physiology**Course Objective:**

- I. Comprehensive understanding of the structure, function, and regulation of the respiratory system
- II. To explore the physiological mechanisms underlying breathing, gas exchange, and oxygen transport
- III. Understand regulatory mechanisms that maintain respiratory homeostasis.

Theory Topics:

1. Anatomy of the Respiratory System: Understanding the structure and organization of the respiratory tract, including the nose, pharynx, larynx, trachea, bronchi, and lungs.
2. Ventilation and Gas Exchange: Exploring the mechanics of breathing, including inspiration and expiration, and the processes of gas exchange in the alveoli.
3. Respiratory Mechanics: Studying the mechanisms of lung compliance, airway resistance, and the role of surfactant in lung function.
4. Gas Transport: Examining the transport of oxygen and carbon dioxide in the blood, including the role of hemoglobin and the oxygen-hemoglobin dissociation curve.
5. Regulation of Respiration: Investigating the neural and chemical control of respiration, including the role of the respiratory centers in the brainstem
6. Respiratory Adaptations: Understanding how the respiratory system adapts to different physiological conditions, such as exercise, high altitudes, and disease.
7. Clinical Applications: Applying knowledge of respiratory physiology to understand and interpret pulmonary function tests, diagnose respiratory disorders.

8. Respiratory Diseases: Discussing common respiratory diseases and conditions.

Learning Outcomes:

Upon successful completion of a course on respiratory system physiology, students should be able to:

1. Describe the anatomy and organization of the respiratory system.
2. Explain the mechanisms of ventilation and gas exchange in the lungs
3. Understand the principles of respiratory mechanics, including lung compliance and airway resistance.
4. Discuss the transport of oxygen and carbon dioxide in the blood and the factors that influence gas exchange.
5. Analyze the neural and chemical regulation of respiration and how it responds to changing physiological conditions.
6. Apply knowledge of respiratory physiology to interpret pulmonary function tests and diagnose respiratory disorders.

List of Books recommended

Semester II

Textbook of Medical Physiology Guyton & Hall

Textbook of Physiology, Vols-1 & 2 A K Jain

Textbook of Medical Physiology Indu Khurana

Manual of Practical Physiology A K Jain

Textbook of Practical Physiology PAL G K

REFERENCE BOOKS-

BEST & TAYLOR'S Physiological Basis of Medical Practice- O.P. Tandon & Y. Tripathi

Human Physiology: The Mechanisms Of Body Function VANDER, A.J. Review of Medical physiology, Ganong

ONLINE SOURCES –

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

<https://www.classcentral.com/subject/physiology>

Course Type: Discipline Specific Core Course IV

Title of the course: Biochemistry

Total Hours: 120 hours

Theory- 60 hours

Practical- 60 hours

Course Objectives:

1. To have basic knowledge of Biochemistry
2. To have basic knowledge of carbohydrates, lipid, protein, enzymes, with molecular biology
3. To have knowledge of Analytical and physical biochemistry, principles and working of colorimetry, photometry, spectrophotometry etc
4. To have knowledge of Organ function tests.

BASICS OF BIOCHEMISTRY:

- (1) Cell structure and function and transport through the biological membrane.
- (2) Chemistry of Biomolecules – carbohydrate, lipids, amino acids, proteins and nucleic acids.
- (3) Chemistry of Blood & Haemoglobin.
- (4) Enzymes – Nature and classification of concepts, Kinetic, mechanism of action.
- (5) Bioenergetics and Biological oxidation.
- (6) Metabolism of Carbohydrates, Proteins, Lipids and Nucleotides.
- (7) Integration of metabolism.
- (8) Nutrition, Vitamins & Minerals.
- (9) Detoxification & Xenobiotics.
- (10) Molecular Biology.
- (11) Organ function tests.
- (12) Immunology
- (13) Analytical & Physical Biochemistry– Electolytes, buffer systems, Law of mass action, viscosity, surface tension, osmosis, Donnan equilibrium, Dialysis, free energy, high energy linkages, molecular weight determination.
- (14) Principles, working & applications of: a) Colorimetry b) Spectrophotometry c) Flame Photometry d) Fluorometry e) Atomic absorption spectroscopy g) Ultra centrifugation.

Learning Outcomes:

Students must know at the end

1. Basic Biochemistry
2. Metabolism of carbohydrates, protein and lipid
3. Chemistry of blood and haemoglobin
4. Enzymes, vitamins, minerals, organ function test etc.
1. At the student must know the chemical processes that occurs in all living cells and organisms and help allied health care professional in understanding the human body functions in both normal state and disease state.
2. Must know basic to essential biochemistry and its application in medical field

LIST OF BOOKS

1. Concise text book of Biochemistry DM Vasudevan, Sukhas Mukherjee 2nd edition
2. Text book of Biochemistry U, Satyanaryan, U Chakrapani

REFERENCE BOOKS –

- "Harper's Illustrated Biochemistry" by Robert K. Murray, David Bender, Kathleen M. Botham, Peter J. Kennelly, Victor W. Rodwell, and P. Anthony Weil (Indian adaptation by Dr. K. S. Vasudevan)
- "Textbook of Biochemistry for Medical Students" by D.M. Vasudevan, S. Sreekumari, and Kannan Vaidyanathan

ON LINE RESOURCES

https://www.youtube.com/channel/UCv_PnJwd_q7mAv7nGHw7XHQ/video
<https://www.elsevier.com/education/health-faculty-hub/medical-resources>
<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

ACADEMIC SYLLABUS FOR SEMESTER III

Discipline Specific Core Course- V

Total Hours: Theory: 60 hours

DSCC - V A:

Cardiovascular Physiology

Course Objectives:

1. Comprehensive Understanding: Provide students with a comprehensive understanding of the structure, function, and regulation of the cardiovascular system.
2. Cardiovascular Processes Exploration: physiological mechanisms underlying key processes, including heart function, blood circulation, and vascular regulation.
3. Homeostasis Maintenance: Examine the regulatory mechanisms responsible for maintaining homeostasis in cardiovascular function, including blood pressure and heart rate.
4. Clinical Relevance: Highlight the clinical significance of cardiovascular physiology by discussing how deviations from normal function

Theory Topics:

1. Anatomy of the Cardiovascular System Understanding the structure and organization of the heart, blood vessels, and the circulatory system.
2. Cardiac Physiology: Exploring the electrical and mechanical properties of the heart, including cardiac cycle, conduction system, and cardiac output.
3. Blood Circulation Studying the circulation of blood throughout the body, including systemic and pulmonary circulation.
4. Blood Pressure Regulation: Examining the mechanisms that regulate blood pressure, such as baroreceptors, renin-angiotensin-aldosterone system, and autonomic nervous system control.
5. Vascular Physiology: Understanding the function of blood vessels, including vascular resistance, compliance, and the microcirculation.
6. Hemodynamics analyzing the principles of fluid dynamics and how they apply to blood flow in arteries, veins, and capillaries.
7. Cardiovascular Adaptations Investigating how the cardiovascular system adapts to various physiological conditions, such as exercise, stress, and changes in posture.
8. Cardiovascular Diseases: Discussing common cardiovascular diseases and conditions,

Learning Outcomes

Upon successful completion of a course on cardiovascular system physiology, students should be able to:

1. Describe the anatomy and organization of the cardiovascular system.
2. Explain the mechanisms of cardiac physiology and how they contribute to heart function.
3. Understand the principles of blood circulation
4. Discuss the regulation of blood pressure and its significance in cardiovascular health
5. Analyze the function of blood vessels and their role in circulation.

Course Type: Discipline Specific Core Course- V

DSCC- V B:

Renal Physiology

Course Objectives:

1. Comprehensive Understanding: Provide students with a comprehensive understanding of the structure, function, and regulation of the renal (urinary) system.
2. Renal Processes Exploration: physiological mechanisms underlying key processes, including filtration, reabsorption, secretion, and urine formation.
3. regulatory mechanisms responsible for maintaining homeostasis in fluid and electrolyte balance, blood pressure, and acid-base balance through renal function.
4. Clinical Relevance Highlight the clinical significance of renal physiology
5. Interdisciplinary Knowledge: Encourage an interdisciplinary approach by integrating principles of anatomy, physiology, biochemistry and nephrology

Theory Topics:

1. Anatomy of the Renal System: Understanding the structure and organization of the kidneys.
2. Renal Filtration: Exploring the processes of glomerular filtration and the factors that influence filtration rate.
3. Tubular Reabsorption and Secretion: Studying the reabsorption of essential substances (e.g., glucose, ions) and the secretion of waste products.

4. Urine Formation: Examining the formation of urine through the concentration and dilution of filtrate
- 5 Regulation of Renal Blood Flow: Understanding how the renal system regulates blood flow and glomerular filtration rate
- 6 Acid-Base Balance: Investigating the mechanisms by which the renal system regulates pH and acid-base balance in the body.
7. Renal Diseases: Discussing common renal diseases and conditions,

Learning Outcomes:

Upon successful completion of renal system physiology, students should be able to:

1. Describe the anatomy and organization of the renal system, including the nephron structure.
2. Explain the mechanisms of renal filtration and the factors influencing glomerular filtration rate.
3. Understand the processes of tubular reabsorption and secretion of solutes in the nephrons.
4. Discuss the formation of urine and how it is influenced by hormonal and physiological factors.
5. Analyze the role of the renal system in regulating blood flow, blood pressure, and electrolyte balance.
6. Evaluate the mechanisms by which the renal system maintains acid-base balance.
7. Recognize and differentiate common renal diseases and their pathophysiology.

LIST OF BOOKS

Name of the Book	Author
Textbook of Medical Physiology	Guyton & Hall
Textbook of Physiology, Vols-1&2	A K Jain
Textbook of Medical Physiology	Indu Khurana
Textbook of Practical Physiology	PAL G K

REFERENCE BOOKS-

BEST & TAYLOR'S Physiological Basis of Medical Practice	O.P. Tandon & Y. Tripathi
Human Physiology: The Mechanisms Of Body Function	VANDER, A.J.
Review of Medical physiology	Ganong

ON LINE SOURCES –

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

Course Type: Discipline Specific Core Course- VI

Total Hours: Theory: 60 Hours

Title of the Course: General Microbiology

Course Objectives

1. Introduction to Microbiology: Provide students with a fundamental understanding of microbiology, its history, and its significance in various fields.
2. Microbial Diversity Explore the diversity of microorganisms, including bacteria, viruses, fungi, and protozoa, and their roles in ecosystems and human health.
3. Microbial Structure and Function: Examine the structure, metabolism, and reproduction of microorganisms, emphasizing the differences between various microbial groups.
4. Microbial Growth and Control: Study the factors affecting microbial growth, methods of microbial control, and principles of sterilization and disinfection.
5. Microbial Genetics Introduce the basics of microbial genetics, including DNA replication, transcription, translation, and genetic recombination.
6. Microbial Pathogenesis Understand the mechanisms by which microorganisms cause disease in humans and the host's immune response.
7. Applied Microbiology: Explore practical applications of microbiology in biotechnology, food and beverage production, environmental microbiology, and medical microbiology.
8. Laboratory Skills: Develop basic microbiological laboratory skills, including aseptic techniques, microscopy, and microbial culture methods.

Theory Topics:

1. Introduction to Microbiology: Historical overview, Importance and relevance of microbiology
2. Microbial Diversity: Bacteria, viruses, fungi, and protozoa, Microbial taxonomy and classification
3. Microbial Structure and Function: Cellular structures and components, Metabolic pathways and energy production
4. Microbial Growth and Control: Environmental factors affecting growth, Sterilization and disinfection methods

5. Microbial Genetics: DNA structure and replication, Transcription and translation, Genetic recombination and mutation
6. Microbial Pathogenesis: Host-pathogen interactions, Immune response to infections
7. Applied Microbiology: Biotechnology and genetic engineering, Food microbiology and safety
Environmental microbiology, Medical microbiology and infectious diseases
8. Laboratory Skills -Aseptic techniques, Microscopy and staining, Microbial culture and identification

Learning Outcomes

1. Demonstrate a basic understanding of microbiology, its historical development, and its significance in various fields
2. Identify and differentiate between major groups of microorganisms, including bacteria, viruses, fungi, and protozoa
3. Describe the structure, metabolism, and reproductive strategies of microorganisms.
4. Explain the factors that influence microbial growth and the methods used to control microbial populations.
5. Understand the basics of microbial genetics, including DNA structure, replication, and genetic mechanisms
6. Discuss the principles of microbial pathogenesis and the host's immune response to infections.
7. Perform essential microbiological laboratory techniques with proficiency, including aseptic handling, microscopy, and microbial culture.

LIST OF BOOKS

"Ananthanarayan and Paniker's Textbook of Microbiology" by C.K. Jayaram Paniker:

REFERENCE BOOKS

"Essentials of Medical Microbiology" by Apurba Sankar Sastry:

Review of Medical Microbiology" by Apurba Sankar Sastry and Sandhya Bhat:

ONLINE RESOURCE

<https://www.microbes.info/>

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

ACADEMIC SYLLABUS FOR SEMESTER IV

Course Type: Discipline Specific Core Course- VII

Title of the course: Central Nervous System

Total Hours: Theory: 60 Hours

Course Objectives:

1. Introduction to Nervous System Physiology: Provide students with a fundamental understanding of the structure, function, and significance of the nervous system in the human body.
2. Neurophysiological Processes Explore the key neurophysiological processes, including neuron structure, action potentials, and synaptic transmission.
3. Central Nervous System (CNS) Understand the organization and functions of the brain and spinal cord, including sensory perception, motor control, and integration of neural signals.
4. Peripheral Nervous System (PNS) Study the PNS, including sensory and motor neurons, autonomic nervous system, and reflexes.
5. Neural Plasticity Investigate the concept of neural plasticity and its role in learning, memory, and adaptation.
6. Sensory Systems: Examine the physiology of sensory systems, including vision, hearing, taste, smell, and touch.
7. Motor Systems: Explore the physiology of motor systems, including muscle contraction, reflexes, and voluntary movement.
8. Clinical Relevance: Discuss the clinical relevance of nervous system physiology in diagnosing and understanding neurological disorders and conditions.

Theory Topics

Introduction to Nervous System Physiology, Overview of the nervous system,

Historical perspective and significance

Neurophysiological Processes, Neuron structure and function, Generation and propagation of action potentials, Synaptic transmission and neurotransmitters

Central Nervous System (CNS), Brain anatomy and organization, Functions of different brain regions,

Spinal cord function and reflexes

Peripheral Nervous System (PNS)

Sensory and motor neurons, Autonomic nervous system and homeostasis, Reflex arcs and their role

Neural Plasticity:

Learning and memory,

Adaptation and brain plasticity

Sensory And Motor Systems:

Learning Outcomes:

Upon successful completion of this short course in nervous system physiology, students should be able to:

1. Demonstrate a basic understanding of the nervous system's structure and functions
2. Explain the fundamental neurophysiological processes, including neuronal communication and synaptic transmission
3. Identify and describe the key components and functions of the central nervous system (CNS) and peripheral nervous system (PNS).
4. Discuss the concept of neural plasticity and its role in learning and adaptation
5. Analyze the physiology of sensory systems, including vision, hearing, taste, smell, and touch.
6. Explain the physiology of motor systems, including muscle contraction, reflexes, and voluntary movement.
7. Recognize the clinical relevance of nervous system physiology in diagnosing and understanding neurological disorders and conditions

Discipline Specific Core Course- VIII

Total Hours: 60 Hours

DSCC – VIII A

Special Senses:

Course Objectives:

1. Introduction to Special Senses Physiology: Provide students with a fundamental understanding of the physiology of special senses, including vision, hearing, taste, smell, and touch.
2. Sensory Mechanisms: Explore the sensory mechanisms and specialized structures involved in each of the special senses.
3. Neurophysiology of Perception: Understand the neural pathways and processing of sensory information that result in perception.
4. Clinical Relevance: Discuss the clinical significance of special senses physiology in diagnosing and understanding sensory disorders and conditions.

Theory Topics:

1. Introduction to Special Senses Physiology
 - Overview of special senses
 - Importance and relevance of studying special senses
2. Vision Physiology
 - Anatomy of the eye
 - Visual processing and photoreceptor function
 - Visual pathways and perception
3. Hearing and Auditory Physiology
 - Anatomy of the ear
 - Auditory transduction and processing
 - Hearing pathways and perception
4. Taste and Olfaction Physiology
 - Taste bud structure and taste perception
 - Olfactory receptor function and olfaction processing
 - Gustatory and olfactory pathways
5. Tactile Sensation and Touch Physiology
 - Mechanoreceptors and tactile sensation
 - Cutaneous senses and sensory pathways
 - Proprioception and kinesthetic perception
6. Neurophysiology of Perception
 - Neural coding and representation of sensory information
 - Sensory adaptation and perception modulation
7. Clinical Relevance
 - Sensory disorders and conditions related to special senses
 - Diagnostic tools and techniques for assessing sensory function
 - Therapeutic interventions and research in sensory physiology

Learning Outcomes:

Upon successful completion of this short course in special senses physiology, students should be able to:

1. Demonstrate a basic understanding of the physiology of special senses, including vision, hearing, taste, smell, and touch.
2. Explain the sensory mechanisms and specialized structures involved in each of the special senses.
3. Understand the neural pathways and processing of sensory information that lead to perception
4. Recognize the clinical relevance of special senses physiology in diagnosing and understanding sensory disorders and conditions.

Exercise Physiology

Course Objectives:

1. Introduction to Exercise Physiology: Provide students with a fundamental understanding of exercise physiology, focusing on how the body responds to physical activity and exercise.
2. Exercise and Muscle Function: Explore the physiological changes that occur in muscles during exercise, including muscle contraction, energy metabolism, and muscle adaptations.
3. Cardiovascular and Respiratory Responses: Understand the cardiovascular and respiratory systems' responses to exercise, including changes in heart rate, blood pressure, and pulmonary function.
4. Energy Metabolism: Examine energy production and utilization during exercise, including the aerobic and anaerobic pathways and the role of nutrition.
5. Training Principles: Introduce the principles of exercise training, including resistance training, aerobic conditioning, and flexibility exercises.
6. Environmental and Altitude Physiology: Discuss how environmental factors and altitude impact exercise performance and adaptation.
7. Clinical Applications: Explore the clinical applications of exercise physiology, including exercise prescription for health and fitness, rehabilitation, and the prevention of chronic diseases.

Theory Topics:

1. Introduction to Exercise Physiology
 - Definition and scope of exercise physiology
 - Historical perspective and importance
2. Exercise and Muscle Function
 - Muscle contraction and its phases
 - Energy sources during exercise
 - Muscle adaptations to training
3. Cardiovascular and Respiratory Responses
 - Heart rate, stroke volume, and cardiac output during exercise
 - Blood pressure regulation
 - Respiratory responses and oxygen delivery
4. Energy Metabolism
 - Aerobic and anaerobic energy systems
 - Substrate utilization (carbohydrates, fats)
 - Nutrition and hydration for exercise

5. Training Principles

- Resistance training and muscle hypertrophy
- Aerobic conditioning and cardiovascular fitness
- Flexibility exercises and joint mobility

6. Environmental and Altitude Physiology

- Effects of temperature, humidity, and altitude on exercise
- Acclimatization and adaptation

7. Clinical Applications

- Exercise prescription for various populations (e.g., athletes, elderly, individuals with chronic conditions)
- Rehabilitation and injury prevention
- Role of exercise in disease prevention and management

Learning Outcomes:

Upon successful completion of this short course in exercise physiology, students should be able to:

1. Demonstrate a basic understanding of exercise physiology and its significance in human health and performance.
2. Explain the physiological changes that occur in muscles during exercise, including muscle contraction, energy metabolism, and adaptations to training.
3. Understand the cardiovascular and respiratory system responses to exercise, including heart rate, blood pressure, and pulmonary function.
4. Discuss energy production and utilization during exercise, including the aerobic and anaerobic energy systems and the role of nutrition.
5. Apply the principles of exercise training, including resistance training, aerobic conditioning, and flexibility exercises.
6. Analyze the impact of environmental factors and altitude on exercise performance and adaptation.
7. Recognize the clinical applications of exercise physiology, including exercise prescription for different populations and its role in rehabilitation and disease prevention

List of Books

Name of the Books

Author

Textbook of Medical Physiology

Guyton & Hall

Textbook of Physiology, Vols-1& 2

A K Jain

Textbook of Medical Physiology

Indu Khurana

REFERENCE BOOKS-

BEST & TAYLOR'S Physiological Basis of Medical Practice

O.P. Tandon & Y. Tripathi

Human Physiology: The Mechanisms Of Body Function

VANDER, A.J.

Review of Medical physiology

Ganong

Practical Books-

Manual of Practical Physiology

A K Jain

Textbook of Practical Physiology

PAL G K

ON LINE SOURCES –

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

<https://www.classcentral.com/subject/physiology>

ACADEMIC SYLLABUS FOR SEMESTER V

Discipline specific core course -IX

Total hour - 60

Title of the course: Reproductive Physiology

Course Objectives:

1. Introduction to Endocrine Physiology: Provide students with a fundamental understanding of the endocrine system, its role in regulating bodily functions, and its significance in human health.
2. Hormone Production and Regulation: Explore the mechanisms of hormone production, release and regulation by endocrine glands and tissues.
3. Hormone Actions: Understand how hormones exert their effects on target cells and tissues through various signaling pathways.
4. Endocrine Glands and Organs: Study the anatomy and functions of major endocrine glands and organs, including the hypothalamus, pituitary gland, thyroid, adrenal glands, pancreas, and gonads.
5. Endocrine Disorders: Discuss common endocrine disorders, their causes, symptoms, and management.

Theory Topics:

1. Introduction to Endocrine Physiology
 - Overview of the endocrine system
 - Importance and relevance of endocrine physiology
2. Hormone Production and Regulation
 - Endocrine glands and their hormone secretion
 - Feedback loops and hormonal regulation
3. Hormone Actions
 - Hormone receptors and signaling pathways
 - Mechanisms of hormone action
4. Endocrine Glands and Organs
 - Hypothalamus and pituitary gland
 - Thyroid and parathyroid glands
 - Adrenal glands and corticosteroids
 - Pancreas and insulin regulation
 - Gonads and sex hormones
5. Endocrine Disorders
 - Diabetes mellitus and insulin resistance
 - Thyroid disorders (e.g., hyperthyroidism, hypothyroidism)
 - Adrenal disorders (e.g., Cushing's syndrome, Addison's disease)
 - Reproductive hormone disorders (e.g., polycystic ovary syndrome, infertility)

Learning Outcomes:

Upon successful completion of course in endocrine physiology, students should be able to:

1. Demonstrate a basic understanding of the endocrine system, its components, and its role in regulating bodily functions
2. Explain the mechanisms of hormone production, release, and regulation by endocrine glands and tissues.
3. Understand how hormones exert their effects on target cells and tissues through various signaling pathways.
4. Describe the anatomy and functions of major endocrine glands and organs, including their hormone production and roles.
5. Recognize common endocrine disorders, their causes, clinical manifestations, and potential treatment options.

Discipline specific core course - X

Total hours: 60

Title of the course: Endocrine Physiology

Course Objectives

1. Introduction to Reproductive Physiology. Provide students with a fundamental understanding of the reproductive system, its function, and its significance in human biology and health.
2. Hormonal Regulation: Explore the role of hormones in reproductive physiology, including their synthesis, secretion, and interactions within the endocrine system.
3. Reproductive Anatomy: Study the anatomy of the male and female reproductive systems, including the structures involved in gametogenesis and fertilization.
4. Reproductive Processes Understand the physiological processes of gametogenesis, fertilization, implantation, pregnancy, and childbirth.
5. Reproductive Health: Discuss issues related to reproductive health, contraception, infertility, and sexually transmitted infections (STIs).

Theory Topics

1. Introduction to Reproductive Physiology
 - Overview of the reproductive system
 - Importance and relevance of reproductive physiology
2. Hormonal Regulation
 - Role of hormones (e.g., gonadotropins, sex steroids) in reproduction
 - Hormonal feedback loops and regulation
3. Reproductive Anatomy
 - Male reproductive system (testes, epididymis, etc.)
 - Female reproductive system (ovaries, uterus, etc.)

- Structures involved in fertilization
- 4. Reproductive Processes
 - Gametogenesis (spermatogenesis and oogenesis)
 - Fertilization and early embryonic development
 - Pregnancy and childbirth
- 5. Reproductive Health
 - Contraception methods and their mechanisms
 - Infertility causes, evaluation, and treatments
 - Common sexually transmitted infections (STIs) and prevention

Learning Outcomes:

Upon successful completion of course in reproductive physiology, students should be able to:

1. Demonstrate a basic understanding of the reproductive system, its function, and its importance in human biology and health.
2. Explain the hormonal regulation of reproductive processes, including the synthesis, secretion, and feedback mechanisms of reproductive hormones.
3. Describe the anatomy of the male and female reproductive systems, including the structures involved in gametogenesis and fertilization.
4. Understand the physiological processes of gametogenesis, fertilization, implantation, pregnancy, and childbirth.
5. Recognize issues related to reproductive health, including contraception methods, causes of infertility, and prevention and management of sexually transmitted infections (STIs).

List of Books

	Author
Textbook	
Textbook of Medical Physiology	Guyton & Hall
Textbook of Physiology, Vols-1 & 2	A K Jain
Textbook of Medical Physiology	Indu Khurana
Practical Books	
Manual of Practical Physiology	A K Jain
Textbook of Practical Physiology	PAL G K
Reference Books	
BEST & TAYLOR'S Physiological Basis of Medical Practice	O.P. Tandon & Y. Tripathi
Human Physiology: The Mechanisms Of Body Function	VANDER, A.J.
Review of Medical physiology	Ganong

ON LINE SOURCES –

<https://www.elsevier.com/education/health-faculty-hub/medical-resources>

<https://libguides.schoolcraft.edu/c.php?g=675692&p=4761013>

<https://www.classcentral.com/subject/physiology>

ACADEMIC SYLLABUS FOR SEMESTER VI

Discipline Specific Core Course – XI

Total hours: 60

Title of the course: Thermoregulation

Course Objectives:

1. Introduction to Thermoregulation Physiology: Provide students with a fundamental understanding of the physiological mechanisms and processes that regulate body temperature.
2. Thermoregulatory Mechanisms: Explore the various mechanisms the body uses to maintain temperature homeostasis, including thermosensors, temperature regulation centers, and effectors.
3. Temperature Regulation in Humans: Understand how the human body responds to changes in environmental temperature, including heat and cold stress.
4. Adaptations and Acclimatization. Study the processes of adaptation and acclimatization that allow the body to adjust to different temperature conditions.
5. Clinical Applications: Discuss the clinical relevance of thermoregulation physiology in conditions such as fever, heatstroke, hypothermia, and hyperthermia.

Theory Topics:

1. Introduction to Thermoregulation Physiology
 - Overview of thermoregulation
 - Significance of temperature homeostasis
2. Thermoregulatory Mechanisms
 - Thermosensors and their locations
 - Temperature regulation centers (hypothalamus)
 - Effectors (sweat glands, blood vessels)
3. Temperature Regulation in Humans
 - Responses to heat stress (sweating, vasodilation)
 - Responses to cold stress (shivering, vasoconstriction)

4. Adaptations and Acclimatization

- Long-term adaptations to temperature changes
- Physiological adjustments for living in different climates

5. Clinical Applications

- Fever and its mechanisms
- Heat-related illnesses (heatstroke, heat exhaustion)
- Cold-related illnesses (hypothermia, frostbite)

Learning Outcomes:

Upon successful completion of course on the physiology of thermoregulation, students should be able to:

1. Demonstrate a basic understanding of the physiological mechanisms responsible for regulating body temperature.
2. Explain how the body detects changes in temperature through thermosensors and how the hypothalamus serves as a temperature regulation centre.
3. Describe the physiological responses to heat stress, including sweating and vasodilation, as well as responses to cold stress, such as shivering and vasoconstriction.
4. Understand the processes of adaptation and acclimatization that allow the body to adjust to different temperature conditions over time.
5. Recognize the clinical relevance of thermoregulation physiology in conditions like fever, heatstroke, hypothermia, and hyperthermia, and discuss appropriate interventions and treatments.

Discipline Specific Core Course - XII

TOTAL HOURS: 60

Title of the course: Recent Advances in Physiology

Course Objectives:

1. Explore Cutting-Edge Physiology Provide an overview of the latest advancements in the field of physiology.
2. Understand Emerging Concepts. Comprehend new theories, technologies, and discoveries shaping contemporary physiology.
3. Promote Critical Thinking: Encourage students to analyze and evaluate recent research and its implications.

Theory Topics:

1. Recent Advances in Cellular Physiology:

- Explore breakthroughs in cell signalling, and molecular biology.

2. Advanced Topics in Neurophysiology: -

Delve into modern neuroscience discoveries, including brain imaging, neuroplasticity,

3. Cutting-Edge Cardiovascular Physiology:

- Examine the latest research on heart function, and cardiovascular diseases.

4. Emerging Trends in Exercise Physiology

Understand the impact of novel training techniques, wearable devices, and personalized exercise regimens.

5. Recent Developments in Endocrine Physiology

- Explore new insights into hormone regulation, endocrine disorders.

Learning Outcomes:

1. Stay Updated: Stay current with the latest advances in physiology research and technology.

2. Apply Recent Discoveries: Apply newfound knowledge to understand and analyze complex physiological concepts.

3. Critical Thinking: Develop critical thinking skills to assess the significance and limitations of recent research findings.

LIST OF BOOKS

TEXT BOOKS

Textbook of Medical Physiology

Textbook of Physiology, Vols-1 & 2

Textbook of Medical Physiology

Textbook of Practical Physiology

AUTHOR

Guyton & Hall

A K Jain

Indu Khurana

PAL G K

REFERENCE BOOKS

BEST & TAYLOR'S Physiological Basis of Medical Practice

Human Physiology: The Mechanisms Of Body Function

Review of Medical Physiology

O.P. Tandon & Y. Tripathi

VANDER, A.J.

Ganong

ONLINE REFERENCES

- ICMR WEBSITE FOR PHYSIOLOGY UPDATES
- BBC HEALTH WEBSITE
- <https://journals.physiology.org/journal/advances>

PRACTICAL TOPICS

SEMESTER I

Discipline Specific Core Practical – I

TOTAL HOURS: 60

PHYSIOLOGY

- The Compound Microscope
- Collection of Blood Samples
- Hemocytometry
- The Diluting Pipettes
- Hemocytometry (Cell Counting)
- The Counting Chamber
- Examination of Fresh Blood:
- Preparing a Peripheral Blood Film
- Estimation of Hemoglobin
- The Red Cell Count
- Determination of Hematocrit (Hct)(Packed Cell Volume; PCV)
- Normal Blood Standards (Absolute Corpuscular Values and Indices)
- The Total Leukocyte Count (TLC)
- White Cell Count
- Staining a Peripheral Blood Film
- The Differential Leukocyte Count
- The Cooke-Arneth Count (Arneth Count) Study of Morphology of Red Blood Cells
- The Reticulocyte Count
- Erythrocyte Sedimentation Rate (ESR)
- Blood Grouping (Syn: Blood Typing)
- Tests for Hemostasis
- (Bleeding time; Coagulation time; Platelet count; and other tests)
- Osmotic Fragility of Red Blood Cells
- (Syn: Osmotic Resistance of Red Blood Corpuscles)
- Specific Gravity of Blood and Plasma
- (Copper Sulphate Falling Drop Method of Philips and van Slyke)

- Determination of Viscosity of Blood

Discipline Specific Core Practical - II

TOTAL HOURS: 60

PRACTICAL SYLLABUS

ANATOMY

1. Bones and Joints of the Upper Limb.
 - a) Identification of major bones of upper limb.
 - b) Examination of thoracic organs (lungs, heart) and associated structures.
2. Overview of lower limb and abdominal anatomy and their clinical significance.
 - a) Introduction to anatomical planes, sections, and terminology.
 - b) Bones and Joints of the Lower Limb Identification of major bones (femur, tibia, fibula) and joints (hip, knee, ankle).
3. Abdomen
 - a) Identification of abdominal muscles (rectus abdominis)
 - b) Examination of peritoneal structures and organ relationships.
4. Bones and Joints of the Skull and Neck
 - a) Identification of major bones (skull, cervical vertebrae, hyoid bone, etc.) and joints (temporo-mandibular joint, atlanto-occipital joint).
 - b) Examination of joint movements and ligament attachments.
 - c) Identification of major muscles (facial muscles, muscles of mastication) of the head and neck.
5. Examination of the tongue, palate, tonsils, and related structures.

Discipline Specific Core Practical - III

TOTAL HOURS: 60

GIT

- Gastric function test

RESPIRATORY

- Respiratory system examination,
- Stethography: Recording of Normal and Modified Movements of Respiration
- Determination of Breath Holding Time (BHT)
- Spirometry (Determination of Vital Capacity,

- Peak Expiratory Flow Rate, and Lung Volumes and Capacities
- Pulmonary Function Tests (PFTs)
- Cardiopulmonary Resuscitation (CPR)

(Cardiopulmonary-Cerebral Resuscitation (CPCR))

Discipline Specific Core Course - IV

TOTAL HOURS: 60

PRACTICAL

1. Qualitative analysis of carbohydrates e.g., Glucose
2. Identification tests for proteins Albumin etc.
3. Quantitative method of reducing sugars and proteins
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of Ph
9. LIPID PROFILE
10. KFT
11. Cardiac enzymes
12. Liver function test

Discipline Specific Core Practical - V

TOTAL HOURS: 60

CARDIOVASCULAR SYSTEM

- Recording of Systemic Arterial Blood Pressure
- Effect of Posture, Gravity and Muscular Exercise on Blood Pressure and Heart Rate
- Cardiac Efficiency Tests (Exercise Tolerance Tests)
- Demonstration of Carotid Sinus Reflex
- Demonstration of Venous Blood Flow
- Recording of Venous Pressure
- Demonstration of Triple Response
- Electrocardiography (ECG)
- Experiments on Student Physiography

Discipline Specific Core Practical - VI

TOTAL HOURS: 60

GENERAL MICROBIOLOGY

Microbial Classification and Taxonomy

- Classification of microorganisms
- Taxonomic hierarchy
- Naming and identifying microorganisms

Microbial Growth and Nutrition

- Microbial growth phases
- Factors affecting microbial growth
- Culture media preparation

Sterilization and Disinfection

- Methods of sterilization
- Disinfection techniques
- Sterile technique in the lab

Bacterial Morphology and Structure

- Bacterial cell structure
- Cell wall, cell membrane, and cytoplasm
- Flagella, pili, and capsules

Bacterial Staining Techniques

- Gram staining
- Acid-fast staining
- Endospore staining

Bacterial Culture and Identification

- Aseptic techniques

Virology

- Virus structure and classification
- Viral replication cycles
- Diagnostic techniques for viruses

Mycology

- Fungi classification
- Fungal structure and reproduction
- Fungal identification
- Parasitology
- Types of parasites
- Parasite life cycles
- Parasitic diseases and control

Discipline Specific Core Practical – VII

TOTAL HOURS: 60

CENTRAL NERVOUS SYSTEM (CNS)

- Examination of sensory system
- Examination of motor system
- Examination of cranial nerve

Discipline Specific Core Practical - VIII

TOTAL HOURS: 60

A. SPECIAL SENSES

- Testing visual acuity
- Testing of colour vision
- Perimetry
- Test of hearing
- Test of taste sensation
- Test of smell

Discipline Specific Core Practical - VIII

TOTAL HOURS: 60

B. EXERCISE PHYSIOLOGY

- ISOMETRIC EXERCISE
- ISOTONIC EXERCISE
- Effect of exercise on different parameters
- study of human fatigue Mosso's ergograph
- study of human fatigue hand-grip dynamometer
- Effect of various factors on human fatigue

Discipline Specific Core Practical - IX

TOTAL HOURS: 60

REPRODUCTIVE PHYSIOLOGY

- Semen Analysis
- Pregnancy Diagnostic Tests
- Contraception method
- Menstrual cycle mapping
- Antenatal check ups

Discipline Specific Core Practical - X

TOTAL HOURS: 60

ENDOCRINE PHYSIOLOGY

-Hormone Receptor Assays

Binding assays to study hormone-receptor interactions

Investigating the specificity and affinity of hormone receptors

Hormone Feedback Loops

-Measurement of hormone levels and feedback regulation in response to changing conditions

Studying the role of negative and positive feedback mechanisms

Blood Glucose Regulation

-Measurement of blood glucose levels and the effects of insulin and glucagon

Oral glucose tolerance tests and insulin sensitivity assessments

Thyroid Function test and its interpretation

-Thyroid hormone assays and interpretation of results

Observation of thyroid tissue under the microscope

Investigation of adrenal hormones, including cortisol and adrenaline

Assessment of the adrenal gland's response to stress

-Monitoring changes in sex hormones during the menstrual cycle

Investigation of hormonal regulation of male and female reproductive systems

Discipline Specific Core Practical - XI

TOTAL HOURS: 60

Thermoregulation And Integrated Topics

Tutorial on fever and other topics

HYPOTHERMIA

HYPERTHERMIA

Discipline Specific Core Practical - XII

TOTAL HOURS: 60

RECENT ADVANCES-

Tutorial and seminars of recent advances

ELECTIVE COURSES

Discipline Specific Elective Course – I

Total Hours: 30

Title of the course: Clinical Nutrition

Course Objectives:

1. Fundamental Understanding to providing students with a comprehensive understanding of the principles and concepts of clinical nutrition.
2. Nutritional Assessment Teach methods for assessing the nutritional status of individuals and populations.
3. Dietary Interventions Explore dietary strategies for the prevention and management of various medical conditions.
4. Nutritional Counseling: Develop skills in providing nutrition counseling and education to individuals and communities.
5. Evidence-Based Practice Promote the use of scientific research and evidence-based guidelines in clinical nutrition practice.

Theory Topics:

1. Introduction to Clinical Nutrition:
 - Basics of nutrition, macronutrients, and micronutrients
 - Role of nutrition in health and disease
2. Nutritional Assessment:
 - Dietary assessment methods
 - Anthropometric measurements
 - Biochemical markers of nutritional status
3. Clinical Conditions and Nutritional Interventions:
 - Diabetes and carbohydrate metabolism
 - Cardiovascular diseases and dietary recommendations
 - Malnutrition and weight management
 - Gastrointestinal disorders and therapeutic diets
4. Nutrition Across the Lifecycle:
 - Pediatric nutrition
 - Geriatric nutrition
 - Pregnancy and lactation nutrition
5. Nutrition Counseling and Communication
 - Effective communication with patients and clients
 - Behavior change theories and techniques
 - Cultural competence in nutrition counseling
6. Nutrition and Public Health:
 - Nutrition in community health and public policy
 - Nutritional challenges in global health
7. Evidence-Based Practice in Clinical Nutrition:
 - Critical appraisal of nutrition research
 - Application of evidence-based guidelines

Learning Outcomes:

1. Demonstrate a comprehensive understanding of the principles and concepts of clinical nutrition.
2. Conduct nutritional assessments using various methods and tools to evaluate the nutritional status of individuals and populations.
3. Apply dietary interventions and therapeutic diets to prevent and manage various medical conditions effectively.
4. Provide nutritional counseling and education to individuals and communities, promoting healthy eating behaviors and lifestyle changes.
5. Utilize evidence-based research and guidelines in clinical nutrition practice, making informed decisions about dietary recommendations.

List of the Books:

1. Krause's Food Nutrition and Diet Therapy, 13th Edition, W.B. Saunders Ltd. (2000), Mahan, L.K. and Escott-Stump, S.
2. Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised-Enlarged), Bapp Co. 1985. Swaminathan S.
3. Basic Nutrition And Diet Therapy (8th Edition), Robinson

Discipline Specific Elective Core Course - II**TOTAL HOURS: 30****Title of the course: Physiology of Pediatrics And Growth****Course Objectives:**

1. Pediatric Physiology Basics: Provide fundamental knowledge of physiological processes in infants and children.
2. Childhood Health: Understand unique aspects of pediatric physiology and its relevance to child health.
3. Clinical Applications: Apply pediatric physiology principles to clinical scenarios and healthcare practices.

Theory Topics:

1. Developmental Physiology:
 - Explore growth and development milestones in children.
 - Understand age-related changes in organ systems.
2. Pediatric Cardiovascular Physiology:
 - Learn about pediatric heart development and cardiac function in children.
 - Study common pediatric cardiovascular conditions.
3. Respiratory Physiology in Pediatrics:
 - Examine the respiratory system in children, including lung development.

- Discuss pediatric respiratory disorders and their management.
4. Nutrition and Digestive Physiology
- Understand pediatric nutritional needs and dietary considerations.
 - Study pediatric gastrointestinal physiology and common digestive issues.
5. Pediatric Neurophysiology:
- Explore the developing nervous system in children.
 - Discuss neurological conditions and developmental milestones.

Learning Outcomes

1. Basic Understanding: Gain a foundational understanding of pediatric physiology.
2. Child Health Awareness: Appreciate the importance of pediatric physiology in child health and well-being.
3. Clinical Application: Apply knowledge to recognize, assess, and manage pediatric health conditions.

LIST OF BOOKS

TEXTBOOKS

	AUTHOR
Textbook of Medical Physiology	Guyton & Hall
Textbook of Medical Physiology	Indu Khurana
Textbook of Practical Physiology	PAL G K
IAP hand book of developmental and behavioral pediatrics	Samir H Dalwai

REFERENCE BOOKS

BEST & TAYLOR'S Physiological Basis of Medical Practice	O.P. Tandon & Y. Tripathi
Human Physiology: The Mechanisms Of Body Function	VANDER, A.J.

Discipline Specific elective course III

Total Hours: 30

Title of the course: Electroencephalography (EEG)

Course Objectives:

1. Fundamental Understanding: Provide students with a foundational understanding of EEG principles and techniques.
2. EEG Applications: Explore the various clinical and research applications of EEG in neuroscience and healthcare.
3. EEG Interpretation: Develop the skills to interpret EEG recordings and recognize abnormal patterns.
4. Clinical Integration: Integrate EEG knowledge into clinical practice for diagnosis and treatment.

Theory Topics:

1. Introduction to EEG

- Basics of brain electrical activity
- Historical perspective and evolution of EEG

2. EEG Recording Techniques:

- Electrode placement and montage
- Signal acquisition and amplification

3. Normal EEG Patterns:

- Normal brainwave frequencies and amplitudes
- Sleep stages and EEG changes during sleep

4 Abnormal EEG Patterns:

- Epileptiform activity and seizure disorders
- EEG patterns in neurological disorders (e.g., stroke, dementia)

5. Clinical EEG Applications:

- Diagnostic use of EEG in epilepsy
- Monitoring in intensive care units
- EEG in sleep disorders and neurology

6. EEG in Research:

- Cognitive and neuroscientific research applications
- Event-related potentials (ERPs) and functional connectivity

7. EEG Interpretation Skills:

- Recognizing normal and abnormal EEG patterns
- Identifying specific EEG features in clinical contexts

Learning Outcomes:

Upon successful completion of the course on EEG, students should be able to:

- Demonstrate a foundational understanding of EEG principles, including electrode placement and recording techniques.
- Identify and interpret normal EEG patterns, sleep stages, and changes during sleep.
- Recognize abnormal EEG patterns associated with epilepsy, neurological disorders, and other clinical conditions.
- Apply EEG knowledge in clinical settings, contributing to the diagnosis and treatment of neurological and neuropsychiatric disorders.
- Understand the role of EEG in research, including its use in cognitive and neuroscientific studies, and analyze EEG data in research contexts.

LISTS OF BOOKS:

Neurology, U.K. Misra & J. Kolita, Clinical Neurophysiology.

Neurology, Jun kimura, 4th Edition (2014), Electro diagnosis in disease of nerve.

Neurology, Sydney Sunderland, Nerve and nerve injury, Churchill living stone (1st edition).

Neurology, U. K. Misra, Clinical EEG.

Discipline Specific Elective Course – IV

Total Hours: 30

Title of the course: Preventive Yoga Practice

Course Objectives:

1. Holistic Health Promotion: Promote holistic well-being through the practice of preventive yoga.
2. Stress Reduction: Equip individuals with tools to manage stress and prevent related health issues.
3. Healthy Lifestyle: Encourage the adoption of a healthy lifestyle through yoga, including dietary and behavioral choices.
4. Mind-Body Connection Enhance awareness of the mind-body connection and its role in preventing illness.

Theory Topics:

1. Introduction to Preventive Yoga:
 - Definition and principles of preventive yoga
 - Historical and cultural aspects
2. Yoga Asanas (Postures):
 - A comprehensive study of yoga poses and their benefits for physical health
3. Pranayama (Breath Control):
 - Breath awareness and control techniques
 - The role of pranayama in stress reduction
4. Meditation and Mindfulness:
 - Techniques for mental relaxation and clarity
 - Mindfulness practices for stress prevention
5. Diet and Nutrition:
 - Yogic dietary guidelines for preventive health
 - Mindful eating and its impact on well-being
6. Stress Management:
 - Identifying sources of stress
 - Coping strategies, including relaxation techniques
7. Lifestyle and Behavior:
 - The importance of a balanced lifestyle
 - Positive behavior changes for preventive health

Learning Outcomes:

Upon successful completion of the course on Preventive Yoga Practice, participants should be able to:

1. Understand the principles of preventive yoga and its role in holistic health promotion.
2. Practice a variety of yoga asanas and pranayama techniques for physical and mental well-being.
3. Utilize meditation and mindfulness practices to reduce stress and enhance mental clarity.
4. Adopt yogic dietary guidelines and mindful eating habits for improved nutrition and health.
5. Identify sources of stress and apply stress management techniques for prevention
6. Embrace a balanced lifestyle and make positive behavior changes that contribute to preventive health.

This course aims to empower individuals with the knowledge and skills to incorporate preventive yoga practices into their daily lives, promoting physical and mental well-being and reducing the risk of various health issues.

LIST OF BOOKS

TEXTBOOKS

Medical Physiology

Practical Physiology

Author

Guyton & Hall

PAL G K

REFERENCE BOOKS

BEST & TAYLOR'S Physiological Basis of Medical Practice

Anatomy And Physiology Of Yogic Practice

O.P. Tandon & Y. Tripathi

MMGORE

Discipline Specific Elective Course - V

Total Hours: 30

Title of the course: Nerve Conduction Velocity (NCV) studies

Course Objectives:

1. Understanding Neural Function: Provide students with a fundamental understanding of nerve conduction and its role in neural function.
2. NCV Techniques Familiarize students with the principles and techniques used in NCV studies.
3. Interpretation of Results- Enable students to interpret NCV study results and recognize abnormalities indicative of various neurological conditions.
4. Clinical Application: Prepare students to apply NCV knowledge and skills in clinical settings for diagnostic and therapeutic purposes.

Theory Topics:

1. Neural Physiology
 - Principles of nerve conductionAction potentials and nerve impulses
2. Nerve Conduction Techniques:
 - Electrophysiological equipment and instrumentation
 - Electrode placement and stimulation techniques
3. Normal NCV Parameters:
 - Reference values for NCV parameters
 - Age and gender considerations
4. Interpreting NCV Results:
 - Assessing nerve conduction velocities
 - Identifying abnormalities (e.g., demyelination, axonal loss)
- 5 Clinical Applications:
 - Diagnosis and monitoring of peripheral neuropathies (e.g., diabetic neuropathy, carpal tunnel syndrome)
 - Localization of nerve lesions
 - Intraoperative neuromonitoring
6. Safety and Ethics
 - Ensuring patient safety during NCV studies

- Ethical considerations and patient communication

Practical:

1. Human Physiology Lab And Neurology Dept
2. Nerve Conduction Techniques:
 - Electrophysiological equipment and instrumentation
 - Electrode placement and stimulation techniques
3. Normal NCV Parameters:
 - Reference values for NCV parameters
 - Age and gender considerations
4. Interpreting NCV Results:
 - Assessing nerve conduction velocities

Learning Outcomes:

Upon successful completion of the Nerve Conduction Velocity (NCV) studies course, students should be able to:

1. Demonstrate a solid understanding of nerve conduction principles and the role of NCV in neural function.
2. Proficiently perform NCV studies using appropriate techniques, equipment, and electrode placement.
3. Accurately interpret NCV study results, identifying normal parameters and abnormalities indicative of various neurological conditions.
4. Apply NCV knowledge and skills in clinical settings for diagnostic purposes, aiding in the diagnosis and monitoring of peripheral neuropathies and nerve lesions.
5. Ensure patient safety during NCV studies and adhere to ethical considerations and communication practices when interacting with patients.

List of Books

TEXTBOOKS

Medical Physiology
Practical Physiology

AUTHOR

Guyton & Hall
PAL G K

REFERENCE BOOKS

Neurology- U.K. Misra & J. Kolita Clinical Neurophysiology

Neurology- Jun kimura,4th Edition (2014), Electro diagnosis in disease of nerve

Discipline Specific Elective Course - VI

Total Hours: 30

Title of the course: Sports Physiology

Course Objectives:

1. Understanding Exercise Physiology: Provide students with a comprehensive understanding of the

physiological responses and adaptations to exercise and physical activity.

2 Sports Performance: Explore the impact of exercise physiology on sports performance and the optimization of training regimens.

3. Applied Sports Science: Teach students how to apply sports physiology principles in real-world athletic settings to enhance performance and prevent injuries.

Theory Topics:

1. Introduction to Sports Physiology:
 - Overview of exercise physiology and its relevance to sports
 - Historical perspective and key milestones
2. Energy Systems and Metabolism
 - ATP production and energy sources during exercise
 - Anaerobic and aerobic metabolism
3. Cardiovascular Responses to Exercise
 - Heart rate, stroke volume, and cardiac output
 - Blood pressure regulation during exercise
4. Respiratory Responses to Exercise:
 - Ventilation and gas exchange
 - Oxygen transport and utilization
5. Muscular Adaptations:
 - Muscle fiber types and hypertrophy
 - Neuromuscular adaptations and strength training
6. Endurance and Performance Enhancement
 - Training methods for endurance and anaerobic sports
 - Periodization and training load management
7. Nutrition and Hydration in Sports
 - Dietary strategies for athletes
 - Fluid and electrolyte balance
8. Recovery and Injury Prevention
 - Post-exercise recovery strategies
 - Common sports injuries and their prevention
9. Performance Assessment:
 - Methods for assessing aerobic and anaerobic fitness
 - Biomechanical analysis of sports movements

Practical:

Human physiology lab and physiotherapy department

Learning Outcomes:

Upon successful completion of the Sports Physiology course, students should be able to:

1. Demonstrate a comprehensive understanding of the physiological responses and adaptations to exercise and

physical activity.

2. Analyze and evaluate the impact of exercise physiology on sports performance, including the optimization of training regimens for different sports and athletes.

3. Apply sports physiology principles in practical settings to enhance athletic performance, prevent injuries, and design effective training and nutrition programs.

4. Recognize the importance of recovery strategies in sports and apply injury prevention measures to minimize the risk of sports-related injuries.

LIST OF BOOKS

Textbooks

Textbook of Medical Physiology

Textbook of Practical Physiology

Physiology of sports and exercise

Author

Guyton & Hall

PAL G K

Jack H. Wilmore

Discipline Specific Elective Course - VII

Total Hours: 30

Title of the course: Pulmonary Function Testing (PFT)

Course Objectives:

1. Understanding Respiratory Physiology: Provide students with a comprehensive understanding of the principles of respiratory physiology and lung function.
2. PFT Techniques: Familiarize students with the various techniques and equipment used in pulmonary function testing.
3. Interpretation of Results: Enable students to interpret PFT results and recognize patterns indicative of various respiratory conditions.
4. Clinical Application: Prepare students to apply PFT knowledge and skills in clinical settings to aid in the diagnosis and management of respiratory disorders.

Theory Topics:

1. Respiratory Anatomy and Physiology:
 - Structure and function of the respiratory system
 - Mechanics of breathing and gas exchange
2. Pulmonary Function Testing Equipment:
 - Spirometry
 - Peak flow meters
 - Body plethysmography
 - Gas diffusion tests
3. PFT Techniques:
 - Spirometry basics and maneuver techniques
 - Flow-volume and volume-time curves
 - Lung volumes and capacities
4. Interpreting PFT Results:
 - Normal values and reference ranges
 - Patterns of obstruction and restriction
 - Evaluation of diffusion capacity
5. Clinical Applications of PFT:
 - Diagnosis and management of asthma and chronic obstructive pulmonary disease (COPD)
 - Preoperative assessment and fitness for surgery
 - Monitoring disease progression and treatment efficacy
6. Quality Assurance in PFT:
 - Ensuring accuracy and reliability of PFT equipment and procedures
 - Safety precautions and infection control

Practical:

Human Lab Physiology And TB Chest Department

Learning Outcomes:

Upon successful completion of the Pulmonary Function Testing (PFT) course, students should be able to:

1. Demonstrate a comprehensive understanding of respiratory physiology and lung function, including the mechanics of breathing and gas exchange.
2. Proficiently use PFT equipment and techniques, including spirometry, flow-volume curves, and lung volume assessments.
3. Interpret PFT results accurately, recognizing patterns indicative of various respiratory conditions such as obstructive and restrictive disorders.
4. Apply PFT knowledge and skills in clinical settings to aid in the diagnosis, management, and monitoring of respiratory disorders, contributing to patient care.
5. Understand and adhere to quality assurance practices, ensuring the accuracy and reliability of PFT equipment and procedures while maintaining safety and infection control standards.

List of Books

Textbooks	Author
Hyatt Interpretation Of Pulmonary Fuction Test	Paul D. Scanton
Pulmonary Fuction Test Made Easy	Jayant R Shah
Textbook of Medical Physiology	Guyton & Hall
Textbook of Practical Physiology	PAL G K

Generic Elective Course Offered By University

GEC 1 BIOSTASTICS

GEC 2 GENERAL PSYCHOLOGY

GEC 3 YOGA ANS STRESS MANAGEMENT

GEC 4 INTRODUCTION TO ENTREPRENEURSHIP (LINCOLN UNIVERSITY)

GEC 5 BASICS OF AVIATION SCIENCE(DPU)

GEC 6 BASICS OF HOSPITALITY (SPU)

GEC 7 HUMAN RIGHT, GENDER AND ENVIRONMENT

9. Structure of the program:

PG Activities

SEMINAR:

It will be a comprehensive description of a topics selected by the guide/teacher and is related to syllabus including recent advances.

The student needs to present through audiovisual mode before all students and teacher so that all are benefitted.

JOURNAL CLUB DISCUSSION:

Student will identify an article of relevance to the course published in a peer reviewed scientific journal. The student will prepare a power point on the same and present it before the teachers and other students. It will be followed by a critical analysis in terms of feedback, queries, additional inputs if need be and ways to improve presentation skills etc.

PRACTICALS:

- Hands on training on what has been taught theoretically
- Research Meetings: Including allotment of guide; dissertation protocol preparation and presentation; periodic update on predefined duration as deemed appropriate on research progress, data verification, issues encountered during research and their resolution plan; dissertation writing and submission within stipulated timelines.
- Term Test: Every 6 month for Internal Assessment in 2nd year and 3rd Year.
- .Pre-University examination will be held one month prior to University examination.
- . Dissertation: Protocol to be submitted in the 3rd semester of 2nd year and dissertation to be submitted in 3rd year by the end of 5th Semester.

CLINICAL POSTINGS:

The department should generate liaison with clinical department an provide experiential learning experiences for the clinical postings

M.Sc. Medical Physiology [Semester based programme]

Exam Scheme

Semester-I				
Paper Code	Paper Name	IA	MA	Total
DSCC-I	GENERAL PHYSIOLOGY, HEMATOLOGY, NERVE MUSCLE PHYSIOLOGY	25	75	100
DSCC-II	GENERAL ANATOMY	25	75	100
DSEC-I	CHOICE BASED <From Pool of Elective Courses>	25	75	100
DSCP-I	HEMATOLOGY PRACTICAL NERVE MUSCLE PRACTICALS	25	75	100
DSCP-II	ANATOMY PRACTICAL	25	75	100
DSEP-I	CHOICE BASED <From Pool of Elective Courses>	25	75	100
CP-I	Clinical Practice- Hospital lab			
TLR-I	Seminar/ journal club /Group Discussion			
Total				700
Semester-II				
DSCC-III	GASTROINTESTINAL TRACT, RESPIRATORY SYSTEM,	25	75	100
DSCC-IV	Biochemistry	25	75	100
DSEC-II	Choice based elective <From Pool of Elective Courses>	25	75	100
DSCP-III	GASRTIC FUNCTION TEST	25	75	100

	RESPIRATORY SYSTEM EXAMINATION, SPIROMETRY, VITALOGRAPHY, STETHOGRAPHY,			
DSCP-IV	Biochemistry practical	25	75	100
DSEP-II	Choice based elective	25	75	100
CP-II	Clinical Practice- Hospital lab			
TLR-II	Seminar/ journal club /Group Discussion/ log book			
Total				700
Semester-III				
DSCC-V	Cardiovascular physiology Renal physiology	25	75	100
DSCC-VI	General microbiology	25	75	100
DSEC-III	choice based elective <From Pool of Elective Courses>	25	75	100
GEC-I	Generic Elective Courses	25	75	100
DSCP-V	EXAMINATION OF CARDIOVASCULAR SYSTEM Blood pressure, pulse, RFT	25	75	100
DSCP-VI	MICROBIOLOGY PRACTICAL	25	75	100
DSEP-III	Choice based elective Acc to elective DSEC-III	25	75	100
PD-I	Project Work / Dissertation - DRC		-	-
CP-III	Clinical Practice-Hospital Lab			
Total				750
Semester-IV				

DSCC-VII	Central nervous system, peripheral nervous system	20	80	100
DSCC-VIII	Physiology of exercise	20	80	100
DSEC-IV	<From Pool of Elective Courses>	20	80	100
GEC-II	Generic Elective Courses	20	80	100
DSCP-VII	Examination of sensory and motor system CRANIAL NERVES	20	80	100
DSCP-VIII	EFFECT OF EXERCISE ON DIFFERENT PARAMETERS	20	80	100
DSEP-IV	ACCORDING TO DSEC IV <From Pool of Elective Courses>	20	80	100
PD-I	Project Work / Dissertation		200	200
CP-IV	Clinical Practice-Hospital Posting		50	50
Total				950
Semester-V				
DSCC-IX	ENDOCRINE PHYSIOLOGY	20	80	100
DSCC-X	REPRODUCTIVE PHYSIOLOGY	20	80	100
DSEC-V	<From Pool of Elective Courses>	20	80	100
SEC-I	<SWAYAM / MOOCS / NPTEL / Institution offered Skill courses>- Basics of computer and IT skills, data analysis, Personality development etc(Any one)	20	80	100
GEC-III	<From Pool of Generic Elective Courses>	20	80	100

DSCP-IX	Hormone analysis and implications	20	80	100
DSCP-X	Pregnancy Test, Semen Analysis Sdl & Project Presentation	20	80	100
DSEP-V	According to DSEC V	20	80	100
PD-I	Project Work / Dissertation	-	-	-
				800
Semester-VI				
DSCC-XI	Thermoregulation	20	80	100
DSCC-XII	RECENT ADVANCES IN PHYSIOLOGY	20	80	100
DSEC-VI	<From Pool of Elective Courses>	20	80	100
SEC-II	<SWAYAM / MOOCS / NPTEL / Institution offered Skill courses> BLS & ACLS [AHA Certified]	20	80	100
GEC-IV	Generic Elective Courses	20	80	100
DSCP-XI	ALL CRANIAL NERVES TEST AND FUNCTIONS AND BASIC LESIONS	20	80	100
DSCP-XII	SLEEP STUDY- PROJECT WORK	20	80	100
DSEP-VI	ACCORDING TO DSEC VII	20	80	100
PD-I	Project Work / Dissertation	-	-	-
Total				800

Criteria for appearing in Examination

- Minimum allied of 75% attendance in the theory & practical each.
- Submission of Thesis by the end of 5th semester.
- Completed Logbook with 6th monthly performance report submitted to Guide/ HOD.
- Internal Assessment (As mentioned above).
- Recommended Book (As mentioned above).