MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED HEALTHCARE SCIENCES & TECHNOLOGY

Suraram X Roads, Jeedimetla,
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MALLA REDDY VISHWAVIDYAPEETH (Deemed to be University)

Program

Bachelor of Science (BSc.)

Physician Associate Studies (BPA)

2026

MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF ALLIED HEALTHCARE SCIENCES & TECHNOLOGY

Bachelor of Physician Associate Studies (BPA)

VISION

1. To develop competent and compassionate healthcare professionals.
2. To promote quality patient care and clinical excellence.
3. To encourage lifelong learning and evidence-based practice.
4. To contribute to community health and healthcare system improvement.

MISSION

1. To provide strong theoretical and clinical training in medical sciences.
2. To develop clinical skills, communication, and professionalism.
3. To promote ethical practices and patient-centered care.
4. To prepare graduates for team-based healthcare delivery.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. Graduates will become skilled physician associates in clinical settings.
2. Graduates will apply clinical knowledge for patient care and diagnosis.
3. Graduates will demonstrate professionalism, ethics, and communication skills.
4. Graduates will engage in continuous learning and career development.

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PROGRAM OUTCOMES (POs)

1. Apply medical knowledge and clinical skills in patient care.
2. Perform patient assessment, diagnosis, and basic management.
3. Demonstrate effective communication and teamwork in healthcare.
4. Practice with ethical responsibility and patient safety.

PROGRAM SPECIFIC OUTCOMES (PSOs)

1. Perform clinical procedures and assist in diagnosis and treatment.
2. Support physicians in emergency, critical care, and routine care.
3. Apply pharmacological and therapeutic knowledge safely.
4. Participate in preventive, promotive, and rehabilitative healthcare.

COURSE OUTCOMES (COs)

1. Understand basic and clinical medical sciences concepts.
2. Demonstrate clinical examination and procedural skills.
3. Interpret laboratory and diagnostic investigations.
4. Apply clinical reasoning and decision-making in patient care.

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Bachelor of Physician Associate Studies (BPA)

COURSE STRUCTURE

Curriculum overview (BPA)

Credit point is awarded for every 30 hours of practical work and 1 credit point for every 15 hours of theory.

First Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
01	**Professionalism**	20	10	30
02	**Anatomy-I**	50	50	100
03	**Physiology-I**	50	60	110
04	**Biochemistry and Molecular Biology-I**	40	50	90
05	**Introduction to Microbiology**	40	50	90
06	**Introduction to Healthcare Delivery System in India**	30	30	60
07	**Functional English and soft skills**	20	40	60
08	**Community Orientation-I**	20	10	30
	Total hours **Total Credits: 28**	**270**	**300**	**570**

Second Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
09	**Professionalism**	10	10	20
10	**Anatomy II**	50	70	120
11	**Physiology II**	50	70	120
12	**Biochemistry and Molecular Biology-II**	50	30	80
13	**Medical Microbiology**	60	40	100
14	**Introduction to computers**	30	50	80
15	**Community orientation -II / Clinical skills**	20	30	50
	Total hours **Total Credits: 28**	**270**	**300**	**570**

Third Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
16	**Pathology**	50	60	110
17	**General Medicine-I**	50	60	110
18	**Pharmacology and toxicology-I**	50	30	80
19	**ENT, Ophthalmology & Dermatology**	50	80	130
20	**Basics of Surgery**	50	40	90
21	**Community Orientation / Engagement**	20	30	50
	Total hours **Total Credits: 28**	**270**	**300**	**570**

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Fourth Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
22	**General Medicine-II**	50	60	110
23	**Advanced Surgery**	70	60	130
24	**Pharmacology & Toxicology-II**	40	40	70
25	**Psychology & Introduction to Behavioral Medicine**	40	50	80
26	**Medical Communication**	30	40	70
27	**Community Medicine and Clinical Research - I**	40	50	80
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

Fifth Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
28	**Emergency Medicine**	80	80	160
29	**Paediatrics**	70	80	140
30	**Introduction to healthcare management**	30	40	45
31	**Medical Ethics and Law**	40	40	35
32	**Introduction to healthcare management**	50	60	50
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

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Sixth Semester

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
33	**Non-Communicable Diseases**	70	80	150
34	**Geriatrics**	60	70	150
35	**Obstetrics and Gynaecology**	70	80	150
36	**Critical care**	30	30	60
37	**Community Medicine and Clinical Research-III**	40	40	60
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

Semesters VII and VIII-Clinical Year/Internship

Students will be posted six months in general medicine with a focus in primary care and six months in surgery-3 months in general surgery and 3 months in any specialty medicine of their choice (medical or surgical). The thesis worked over the preceding semesters will be completed and submitted by the interns at the end of Semester VI and subjected to scrutiny. Successful completion of the thesis to the satisfaction of the reviewers forms an essential part of the PA programme. Five days a week will be devoted to clinical training and one day would be dedicated to activities for academic advancements. The interns should be provided adequate living expenses as stipend during the internship period. If the teaching institute does not have adequate clinical facilities, they should arrange for an internship in an external site. It is the teaching institute 's responsibility to provide stipend, and arrange for mentors at the external site. An intern should not do clinical work for more than 10 hours in a day. In case if the duty hours overshoots, the intern should be financially compensated for the overtime.

Year IV Semester VII

Course Code	Course Title	Credits/Week			Hours/Semester			Assesments		Total
		L	P	C	L	T/P	Total	INT	EXT	
	Internship	2	20	22	30	900	930	-	100	100
	Project work		06	06		270	270		100	100
Total		**2**	**26**	**28**	**30**	**1170**	**1200**	**-**	**200**	**200**

Year IV Semester VII

Course Code	Course Title	Credits/Week			Hours/Semester			Assesments		Total
		L	P	C	L	T/P	Total	INT	EXT	
	Internship	2	20	22	30	900	930	-	100	100
	Project work		06	06		270	270		100	100
Total		**2**	**26**	**28**	**30**	**1170**	**1200**	**-**	**200**	**200**

Introduction

The PA programs worldwide follow the traditional medical education model, with clinical training integrated alongside didactic lectures.

The undergraduate curriculum is designed to educate PAs as generalists, focusing on efficient primary care. Initially, PAs work as dependent practitioners with physicians, but as they gain qualifications and experience, they take on increasing responsibilities and independent decision-making. In areas with a shortage of physicians, experienced PAs may work with minimal onsite supervision, through remote support delivered through phone, computer, or telemedicine ensuring PAs are never without assistance.

Physician Associate training provides a strong foundation in basic, behavioural, and clinical sciences, along with ancillary subjects (e.g., computer education, clinical research). For PAs who work closely with patients, a patient-centric approach in clinical practice is essential. A patient-centric approach to teaching for PAs emphasizes the patient as the central focus of healthcare delivery. This teaching methodology prioritizes developing students‘ skills in patient-centered care, which involves understanding, respecting, and responding to patients' preferences, needs, and values throughout the course of care. The introduction of subjects such as professionalism, ethics, and communication etc., along with clinical subjects, supports this approach.

The National Curriculum Taskforce on PAs has developed a career and qualification map based on the National Skills Qualification Framework (NSQF). This framework outlines a career pathway, with level 5 as the entry point after completing a 4-year Bachelor of Physician Associate studies program (BPA).

Foundation courses has also been designed to bring all potential healthcare professionals at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation courses that has been prescribed for all the allied and healthcare professional courses have been modified in this document to suit the PA educational needs.

1.0 Scope of the BPA Program

Upon completing the PA program, graduates will be qualified to work as PAs across a wide range of healthcare settings. They will assist physicians and surgeons in diagnosing, treating, and managing patient care in various specialties, including primary care, emergency medicine, surgery, pediatrics, and more.

Graduates will be trained to:

- Conduct thorough patient assessments
- Order and interpret diagnostic tests
- Prescribe medications and perform medical procedures under supervision
- Provide support in clinical settings, improving efficiency and patient outcomes.

Additionally, PA graduates can contribute to clinical research, public health initiatives, and healthcare policy. The program also offers opportunities for specialization in specific fields, with pathways for career advancement in academics, research, and clinical medicine.

1.1 Learning Objectives of the BPA program

1.1.1 Able to engage in providing primary care, specialty care through the elicitation of an appropriate history, physical exam, understanding when/what to order in regard to further testing, following a process of differential diagnosis and clinical decision making, determining a diagnosis and treatment plan, as well as preventative measures under the scope of the attending physician

1.1.2 Able to recognize and appropriately engage support/referral from physician and healthcare team when the patient‘s health care needs are greater than the PA‘s ability

1.1.3 Able to understand their professional role in the healthcare team, and interact in a collegial interdisciplinary manner with a focus on maximizing the care for the patients

1.1.4 Able to understand how the social determinants of health impact the patient and incorporate them into care plan

1.1.5 Able to engage advocacy as well as social accountability activities as they relate to patient care.

1.2 Eligibility for admission

It is recommended that the students entering the BPA program have:

1. Passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian

University or a duly constituted Board with at least 50% marks in Physics, Chemistry and Biology (in each of the subjects).

2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed with at least 50% marks in each of the following subjects: Physics, Chemistry, Biology and English up to 12thStandard level.
3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.
    a. English, Physics, Chemistry, Botany, Zoology
    b. English, Physics, Chemistry, Biology and any other language
4. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 40 years
5. He/she must furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and conduct certificate from the **educational institution last attended or any recognized person (s) as applicable by the University Rules testifying to satisfactory general character.**

6. The initial PA programs will admit traditional students. Future expansion may consider bridge programs and lateral career transitions for second-career health professionals (e.g., Nurses, AHPs), but at present, no lateral entry is allowed.

1.3 Duration of the program

4-year programme (3 years-didactic + 1 year internship)

1.4 Academic calendar and mode of education

On-campus, semester patter, full time.

1.5 Coaching pattern

Five days a week-on all working days: theory, lab and clinical rotations.

One day in a week (excluding 5 days of didactic coaching): Group discussion, presentations, seminars, guest lecturers+ library hours. This, the students will preferably do on Saturdays or any other fixed day of the week (as suitable by the training institution). Classroom lectures will not occur on this day.

1.7 Medium of instruction

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

1.8 Attendance:

A candidate must secure minimum 80% attendance in overall with at least

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

1.9 Teaching and learning methods for BPA

A variety of teaching methods will be employed, including lectures, seminars, small group discussions, laboratory and bedside demonstrations, hands-on clinical practice or simulations/mannequins, educational videos, and online tutorials. Emphasis will be placed on laboratory/bedside clinical training, group discussions, and presentations. Classroom

lectures will provide foundational knowledge, supporting the practical skills learned during lab and clinical training.
Community-based engagement and outreach, along with preparatory and reflective exercises throughout the program, will deepen students' understanding of their roles as healthcare providers. All students are required to maintain a lab diary and log book, where applicable, which will be evaluated and supervised by lab instructors and clinical preceptors periodically.

1.10 Performance assessment of students

Students will be continuously assessed during their clinical rotations, with periodic evaluations of their lab diaries and logbooks (Internal assessment). The OSCE method of evaluation will be used to assess clinical skills by external faculty**.**
A university level written examination will be conducted at the end of each semester. The OSCE method of evaluation will be used to assess clinical skills by external faculty.

1.11 Vacation and holidays

Students are entitled to ten days of festival and national holidays, 15 days of semester-end holidays (after each semester), and any additional holidays (including study leave) as determined by the teaching institute.

1.12 Competencies of BPA graduates

- **Medical Knowledge:**

  - Acquire foundational knowledge in biomedical and clinical sciences, including understanding pathophysiology, diagnosis, treatment, and prevention.
  - Use scientific principles to distinguish between normal and abnormal findings, interpret diagnostic data, and manage medical and surgical conditions.

  - **Interpersonal & Communication Skills:**
  - Communicate clearly with patients, families, and healthcare teams, using verbal, nonverbal, and written methods.
  - Present patient cases, collaborate with physicians, and maintain professional relationships with patients and team members.

- **Patient Care:**
    - Collect accurate patient histories, conduct physical exams, and develop evidence-based treatment plans.
    - Show proficiency in clinical skills, patient-focused care, and health promotion practices.

Professionalism:

- Practice ethically, demonstrating respect, integrity, and accountability in patient care.
- Commit to ongoing professional development, self-reflection, and adhere to legal and regulatory standards.

Practice-based Learning & Improvement:

- Continuously assess and analyze clinical practice to enhance patient care.
- Use medical literature and technology to support lifelong learning and evidence- based practices

Systems-based Practice:

- Navigate healthcare systems effectively, ensuring care that balances quality with cost.
- Work with healthcare teams to enhance patient outcomes and address healthcare disparities.

YEAR-I-SEMESTER I

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
01	**Professionalism**	20	10	30
02	**Anatomy-I**	50	50	100
03	**Physiology-I**	50	60	110
04	**Biochemistry and Molecular Biology-I**	40	50	90
05	**Introduction to Microbiology**	40	50	90
06	**Introduction to Healthcare Delivery System in India**	30	30	60
07	**Functional English and soft skills**	20	40	60
08	**Community Orientation-I**	20	10	30
	Total hours **Total Credits: 28**	**270**	**300**	**570**

BPA 01. PROFESSIONALISM L/T/P/C:1/-/1/2

Learning Objectives

1. To understand the concept of professionalism in healthcare.
2. To learn professional, ethical, and moral values required for healthcare workers.
3. To understand proper behavior, communication, and teamwork in clinical settings.
4. To develop awareness of cultural sensitivity and patient-centered care.

Learning Outcomes

1. Able to demonstrate professional behavior and ethical conduct in healthcare settings.
2. Able to apply values like integrity, empathy, confidentiality, and responsibility in practice.
3. Able to work effectively as part of a healthcare team.
4. Able to interact respectfully with patients from different cultural backgrounds.

Goal:

This course will present what it means to be a professional and how a specialized profession is different from a usual vocation. It explains how relevant professionalism is in terms of healthcare systems and how it affects the overall environment. This course will also bring forward the importance of professional identity of the Physician Associate in India.

Total Lecture Hours: 20 Theory

Professional values –Integrity, Objectivity, Empathy, Professional competence and due care, Confidentiality Personal values-ethical and moral values

Attitude and behaviour – professional behaviour, bias's, treating all patients equally Code of conduct, professional accountability, responsibility and misconduct Differences between professions and importance of teamwork
Cultural issues in the healthcare environment

Practical – 10 hours

Group scenarios with role play to reinforce knowledge gained through theoretical lectures

BPA 02. ANATOMY – I L/T/P/C:3/-/2/5

Goal:

This course is designed to provide foundational knowledge and skills in human anatomy, anatomical terminology, regional anatomy, and developmental embryology. Students will gain a comprehensive understanding of the structure and function of the human body, regional anatomy, and anatomical landmarks. The course also emphasizes the clinical relevance of anatomy, helping students to relate their anatomical knowledge to clinical scenarios and medical procedures.

Teaching methods and settings

The combination of interactive lectures, practical dissection, prosection, imaging, virtual reality, and hands-on clinical skills
The settings would include traditional lecture halls, anatomy labs, simulation centers, and relevant clinical settings.

Learning Objectives

By the end of the course, students will be able to:

- Understand the definition, scope, and different approaches to the study of anatomy (gross, regional, systemic, microscopic).
- Master standard anatomical terminology, planes, axes, positions, and major anatomical landmarks.
- Study the basic principles of developmental embryology and its clinical relevance.
- Relate anatomical knowledge to clinical conditions and procedures (e.g., venipuncture, catheterization, lumbar puncture).
- Interpret basic imaging techniques (X-ray, CT, MRI) to study anatomical structures and common pathologies.

Learning Outcomes

1. Able to identify and describe major structures of the human body.
2. Able to use correct anatomical terms, planes, and body positions.
3. Able to understand basic embryology and tissue structure.
4. Able to apply anatomical knowledge in clinical procedures and imaging interpretation.

Pre-requisites

- Basic knowledge in biology, chemistry, and physiology.

Theory (50 hours)

Topic	Content
1. Introduction to Anatomy (5 hours)	- Description of Anatomy: Approaches to studying anatomy (gross, regional, systemic, microscopic, cross-sectional, functional, applied). - Microscopic Anatomy – integrated with molecular biology.
2. Overview of Developmental Embryology (5 hours)	- Basic principles of human development from fertilization to fetal stages. - Clinical relevance of embryological development and congenital anomalies.
3. Foundations of Gross Anatomy (5 hours)	- Anatomical Nomenclature: Standard anatomical terms, directional terms, regions, and anatomical landmarks. - Planes and Axes: Introduction to body planes (sagittal, coronal, transverse) and axes (vertical, horizontal, etc.). - Body Regions: Identification of anatomical regions and clinical significance. - Body Systems: Overview, with detailed coverage in Anatomy II.
4. Regional Anatomy (30 hours)	*In-depth study of each body region with a focus on muscles, bones, nerves, blood vessels, and clinical relevance. Imaging techniques (e.g., X-rays, CT, MRI) and cross-sectional anatomy should be integrated where applicable.* - **4.1 Head and Neck Anatomy (5 hours)**: Cranial cavity, facial bones, muscles, cranial nerves, blood supply, clinical conditions. - **4.2 Thoracic Anatomy (5 hours)**: Thoracic wall, pleurae, lungs, heart, mediastinal structures, clinical relevance. - **4.3 Abdominal Anatomy (5 hours)**: Abdominal wall muscles, organs, blood supply, clinical relevance. - **4.4 Pelvic Anatomy (5 hours)**: Pelvic girdle, floor, organs, neurovascular structures, clinical relevance. - **4.5 Upper Limb Anatomy (5 hours)**: Bone groups, muscles, joints, vasculature, clinical relevance. - **4.6 Lower Limb Anatomy (5 hours)**: Thigh, knee, leg, ankle, foot, clinical relevance.
5. Introduction to Clinical Procedures (5 hours)	- Anatomical locations for procedures: blood sampling, catheterization, intubation, lumbar puncture, suturing, CPR.
6. Histology (5 hours)	- Identification of tissue types and microscopic anatomy integration.

Teaching methods/tools

Practical sessions will include cadaver dissection, prosections, anatomical models, charts, X-rays, CT, MRI, angiograms, and histology slides.

Practical (50 hours)

Topic	Content
1. Orientation to Anatomy Labs	- Become familiar with tools and equipment handling, anatomical positions, and directional terms.
2. Histology	- Microscopic examination of tissue types.
3. Regional Anatomy Dissection (8 hours each)	- **3.1 Upper Limb**: Dissection of scapula, shoulder joint, arm, forearm, and hand. Identification of muscles, tendons, arteries, veins, and nerves. - **3.2 Thoracic Anatomy**: Dissection of chest wall, pleurae, lungs, heart, and mediastinal structures. - **3.3 Abdominal Anatomy**: Study of abdominal wall muscles, organs, and blood supply. - **3.4 Pelvic Anatomy**: Dissection of pelvic girdle, pelvic floor, pelvic organs, and neurovascular structures. - **3.5 Head and Neck**: Identification of cranial nerves, muscles, and blood vessels. Study of skull bones, oral and nasal cavities, and lymph nodes. - **3.6 Lower Limb**: Study of bones, muscles, joints, tendons, and neurovascular structures in the lower limb.
4. Clinical Skills Practice	- Identify major anatomical landmarks and locate sites for venipuncture and arterial puncture. - Observe and relate procedures to anatomy studied (e.g., endotracheal intubation, lumbar puncture, central venous catheterization).
5. CPR and Defibrillation Landmarks	- Practice on models.
6. Study of Histology Slides	- Tissue structure identification.
7. Microanatomy	- To be explored in molecular biology.

PHYSIOLOGY

Physiology (I and II) will be taught through a combination of lectures, practical labs, rotations in clinical settings, simulations etc., These methodologies aim to give students a deep understanding of physiological principles and how they apply to human health and disease. The practical component of these courses allows students to directly engage with physiological processes, and the clinical integration ensures they can apply their knowledge to real-world patient care scenarios.

BPA 03. PHYSIOLOGY-I L/T/P/C:3/-/2/5

Goal:

The aim of the Physiology I course is to provide students with an in-depth understanding of the functions of the human body at the cellular, tissue, and organ system levels. Students will learn the physiological mechanisms that regulate homeostasis, understand the principles of human metabolic processes, and be able to apply this knowledge in clinical contexts.

Learning Objectives:

By the end of Physiology I, students should be able to:

- Understand the basic principles of physiology, including homeostasis and feedback mechanisms.
- Describe the cellular basis of physiology, including membrane transport and cellular signalling.
- Explain the structure and function of tissues and organs, focusing on cardiovascular, respiratory, digestive, and renal physiology.
- Identify the physiological mechanisms of fluid and electrolyte balance, and their importance in maintaining homeostasis.
- Understand the physiological regulation of temperature, acid-base balance, and blood pressure.
- Demonstrate the ability to integrate knowledge of physiological systems and their roles in maintaining health.

Learning Outcomes

1. Able to explain basic physiological processes in the human body.
2. Able to understand function of major organ systems and their regulation.
3. Able to perform and interpret basic physiological experiments.
4. Able to relate physiological knowledge to clinical situations and patient care.

Pre-requisites:

Basic understanding of biology, chemistry, and biochemistry, which will be taught concurrently.

Theory (50 hours)

Topic	Content
1. Introduction to Physiology (5 hours)	- Definition and scope of physiology. - Overview of homeostasis and the role of feedback mechanisms. - Basic principles of cell physiology (membrane transport, action potentials). - Tissue types and their functions.
2. Cellular Physiology (10 hours)	- Structure and function of cells. - Transport across cell membranes (diffusion, osmosis, active transport). - Resting membrane potential, action potential, and their roles in cellular communication. - Signal transduction (hormonal, neuronal, and second messengers). - Cellular metabolism (glycolysis, Krebs cycle, oxidative phosphorylation).
3. Cardiovascular System (10 hours)	- Structure and function of the heart: - Cardiac cycle, electrical activity of the heart, and the conduction system. - Heart sounds, ECG, and blood pressure regulation. - Blood vessels and blood pressure regulation: - Vasomotor control, blood flow, and autoregulation. - Hemodynamics: Blood flow, resistance, and cardiac output.
4. Respiratory System (10 hours)	- Structure and function of the respiratory system. - Mechanism of breathing (inhalation, exhalation). - Pulmonary ventilation and lung mechanics. - Gas exchange and transport (O_2 and CO_2). - Control of respiration (central and peripheral chemoreceptors). - Acid-base balance and the role of the lungs.
5. Renal System (5 hours)	- Structure and function of the kidneys. - Glomerular filtration, tubular reabsorption, and secretion. - Regulation of water, sodium, and electrolyte balance. - Acid-base balance and renal regulation.

6. **Digestive System (5 hours)**	- Structure and function of the digestive organs. - Mechanism of digestion and absorption of nutrients. - Gastrointestinal motility and secretions. - Regulation of the digestive process (neural and hormonal control). - Liver function in metabolism.
7. **Endocrine System (5 hours)**	- Introduction to hormones and their functions. - Endocrine glands and their secretions. - Regulation of growth, metabolism, and reproduction. - Homeostatic control by hormones (insulin, glucagon, thyroid hormone, etc.).

Practical: (60 hours)

- **Study Methodology**: The practical component will be based on laboratory experiments, demonstrations, and clinical skill workshops. Students will perform experiments, interpret physiological data, and integrate the theory learned in the classroom into real-world applications.

Topic	Content
1. Introduction to Laboratory Techniques (2 hours)	- Lab Safety. - Introduction to Equipment: Microscopes, Thermometers, Spirometers, Sphygmomanometer.
2. Cell Physiology and Membrane Transport (6 hours)	- **Osmosis Experiment**: Observe changes in volume over time using dialysis bags with different concentrations. - **Diffusion Experiment**: Study the diffusion of dye through agar plates. - **Active Transport Simulation**: Observe the active transport of ions using a model or virtual simulation.
3. Cardiovascular Physiology (12 hours)	- **Measuring Blood Pressure**: Use a sphygmomanometer to measure systolic and diastolic pressures and pulse rate. - **ECG Recording**: Record ECG, observe P-QRS-T waves, and analyze heart rhythms. - **Heart Rate Variability**: Measure heart rate at rest and after exercise to study autonomic nervous system influence. - **Blood Flow and Hemodynamics**: Measure blood pressure changes when moving from lying to standing.

4. Respiratory Physiology (10 hours)	- **Spirometry**: Measure tidal volume, inspiratory reserve volume, expiratory reserve volume, vital capacity, and FEV1. - **Effect of Breathing Patterns on Lung Volumes**: Measure changes in lung volumes after hyperventilation or deep breathing. - **Blood Gas Analysis**: Measure O_2 and CO_2 levels in arterial blood and interpret the data.
5. Renal Physiology (8 hour	- **Measuring Urine Volume and Composition**: Measure volume, specific gravity, color, and pH of urine. - **Renal Clearance Experiments**: Perform a clearance test using inulin or creatinine to calculate renal clearance.
6. Digestive Physiology (6 hours)	- **Salivary Amylase Activity**: Measure the rate of starch breakdown by salivary amylase. - **Effect of pH on Digestive Enzyme Activity**: Test enzyme activity at different pH levels.
7. Endocrine Physiology (6 hours)	- **Glucose Tolerance Test**: Measure blood glucose levels after administering glucose solution. - **Thyroid Function Test**: Measure thyroid hormone levels and discuss their impact on metabolism.

BPA 04. BIOCHEMISTRY AND MOLECULAR BIOLOGY L/T/P/C:2/-/2/4

Teaching methods and settings: interactive lectures, case studies, and discussions of clinical scenarios using multimedia tools for illustrating biochemical pathways and molecular mechanisms. Practicals involve laboratory sessions involving direct interaction with biochemical assays, data analysis, and interpretation.

Goal:

To provide students with a comprehensive understanding of the molecular and biochemical foundations of human life processes, focusing on their relevance to clinical practice. The course will emphasize the application of biochemical principles in diagnosing and solving

clinical problems, particularly those related to metabolic disorders and cellular functions.

Learning objectives

At the end of the course, students should be able to:

1. Describe the structure and function of cells, organelles, and biological membranes, and explain membrane transport mechanisms and ion channels in cellular processes.
2. Classify and explain the structure and function of biomolecules such as carbohydrates, lipids, proteins, and amino acids, and understand stereoisomerism in biomolecules.
3. Investigate the structure and function of hemoglobin and myoglobin, and understand the molecular mechanisms of oxygen transport, storage, and disorders like sickle cell anemia and thalassemia.
4. Understand the molecular mechanisms involved in muscle contraction and the role of plasma proteins in health and disease.
5. Define enzymes, explain enzyme kinetics, and describe factors influencing enzyme activity and inhibition.
6. Explain major metabolic pathways (carbohydrates, amino acids, lipids) and how they are interlinked, and understand metabolic regulation and adaptations in different nutritional states.
7. Discuss blood glucose regulation and its dysfunction in conditions like diabetes mellitus, and explain metabolic derangements in such diseases.

Learning Outcomes

1. Able to explain structure and function of cells, biomolecules, enzymes, and membranes.
2. Able to describe hemoglobin, muscle contraction, and oxygen transport mechanisms.
3. Able to understand major metabolic pathways and their regulation in the body.
4. Able to relate biochemical processes to clinical conditions like diabetes and blood disorders.

Prerequisites

Basic knowledge of biology, chemistry, and physics.

Theory (40 hours)

Topic	Content
1. Cell Structure and Function, Subcellular Organelles, Biological Membranes and Transport Mechanisms (5 hours)	- Overview of cell structures and organelles. - Mechanisms of membrane transport: diffusion, osmosis, and active transport. - Ion channels and their role in cellular function.
2. Biomolecules and Stereoisomerism (10 hours)	- Classification and function of carbohydrates, lipids, proteins, and amino acids. - Introduction to stereoisomerism and its importance in biochemical processes. - Chemical structure and function of monosaccharides, amino acids, and fatty acids. - Structure-function relationships in proteins and examples of their physiological roles. - Hemoglobin and myoglobin: O_2 transport mechanisms and clinical implications. - Muscle contraction: molecular mechanisms and clinical relevance. - Plasma proteins and their roles in health and disease.
3. Enzymes and Enzyme Kinetics (5 hours)	- Enzyme nomenclature and classification. - Basic enzyme kinetics: Km, Vmax, and enzyme-substrate interactions. - Factors influencing enzyme activity: temperature, pH, substrate concentration. - Enzyme inhibition: competitive and non- competitive inhibition.
4. Metabolic Pathways and Interrelationships (10 hours)	- Principles of metabolism and pathway characteristics. - Carbohydrate, amino acid, and lipid metabolism. - Interconnections between metabolic pathways and energy production.

5. Regulation of Metabolism (10 hours)	- Organ interrelationships in metabolism (liver, muscle, adipose). - Blood glucose regulation and dysfunction in diabetes mellitus. Metabolic adaptations in different nutritional states: fed, fasting, and starvation. - Metabolic derangements in diabetes mellitus.

Practical (50 hours)

Topic	Content
1. Introduction to the Laboratory (2 hours)	- Identify and use basic laboratory equipment (e.g., pipettes, test tubes, microscopes). - Learn safety procedures (e.g., wearing lab coats, using gloves, disposing of waste correctly).
2. Cell Structure & Function - Microscopic Examination (6 hours)	- Observe and identify basic cell structures using a light microscope. - Prepare slides of animal and plant cells. - Identify key structures like the nucleus, mitochondria, and cell membrane. - Draw and label the structures observed under the microscope.
3. Membrane (6 hours)	- Use simple models (e.g., egg membranes or cell membrane models) to observe membrane structure. - Study the permeability of membranes using basic materials like water, dyes, and oils.
4. Membrane Transport (8 hours)	- **Diffusion**: Place dye in water and observe its spread over time. - **Osmosis**: With potato strips or dialysis tubing to observe water movement. - **Active Transport**: Simulate the use of ATP in transporting ions across membranes using simple models. - Record results and discuss how these processes apply to human cells.
5. Ion Channels (6 hours)	- Study ion movement across membranes using simple models or simulations. - Simulate ion transport across membranes using an artificial model or computer simulation. - Observe how ion movement is affected by changes in concentration and membrane properties. - Record findings and explain how this relates to human physiology.

6. Enzyme (8 hours)	- Investigate enzyme function, kinetics, and inhibition. - **Enzyme Nomenclature and Classification**: Familiarize with enzyme types. - **Enzyme Kinetics**: Study simple reactions like amylase activity and catalase activity. - **Amylase Activity**: Observe breakdown of starch into simpler sugars. - **Catalase Activity**: Observe the breakdown of hydrogen peroxide into oxygen and water. - Record time taken for reactions and calculate Km and Vmax. - Study factors influencing enzyme activity (temperature, pH, substrate concentration). - Demonstrate enzyme inhibition using enzyme-substrate models.
7. Regulation of Metabolic Pathways (8 hours)	- **Organ Interrelationships**: Perform assays to measure glucose and glycogen in liver, muscle, and adipose tissue. - **Blood Glucose Regulation**: Use a glucometer to measure blood glucose levels at different times (e.g., fasting, after a meal). - **Metabolic Adaptation**: Simulate fasting and feeding states and observe changes in plasma glucose, protein, and lipid levels. - Discuss findings in the context of diabetes and other metabolic states.
8. Interpretation of Biochemical Data (4 hours)	- Analyze and interpret experimental data from previous experiments (e.g., enzyme activity, blood glucose levels). - Identify normal and abnormal patterns in metabolic data, linking them to clinical conditions. - Discuss how laboratory findings help in diagnosing diseases like diabetes and metabolic disorders.

BPA 05. INTRODUCTION TO MICROBIOLOGY L/T/P/C:2/-/2/4

Settings and learning methodology

A combination of classroom lectures, clinical exposure, and hands-on laboratory sessions will be used. The teaching methodologies include interactive lectures, case-based learning, problem-solving exercises, and demonstrations to facilitate both theoretical understanding and practical skills.

Goal:

To introduce students to the world of microorganisms, their classification, and their role in health and disease. This course covers the basic principles of microbiology with a focus on bacterial structure, function, and interactions with the human host, laying the foundation for clinical microbiology.

Learning Objectives:

By the end of this course, students should be able to:

1. Understand the diversity of microorganisms and their ecological roles.
2. Identify and classify major groups of microorganisms (bacteria, viruses, fungi, protozoa, helminths).
3. Describe the general features of microbial structure, physiology, and reproduction.
4. Explain microbial mechanisms of pathogenesis and host defense mechanisms.
5. Recognize the role of microorganisms in disease transmission and public health.
6. Apply basic laboratory techniques for microbial identification and analysis.

Learning Outcomes

1. Able to understand different types of microorganisms and their roles in nature.
2. Able to identify and classify major groups of microorganisms.
3. Able to describe basic structure, growth, and reproduction of microbes.
4. Able to explain how microorganisms cause disease and how the body defends against them.
5. Able to understand the role of microbes in disease spread and public health.
6. Able to perform basic laboratory techniques for identifying microorganisms

Theory (40 Hours)

No.	Topic	Content
1	**Introduction to Microbiology (3 Hours)**	History of microbiology and its significance in healthcare. Classification and nomenclature of microorganisms (Binomial system).
2	**Basic Microbial Structure and Function (6 Hours)**	Prokaryotic vs. Eukaryotic cells. Structure of bacteria (cell wall, membrane, flagella, pili, capsules). Binary fission and microbial reproduction. Structure and classification of viruses. Basic characteristics of fungi, protozoa, and helminths.
3	**Microbial Physiology (5 Hours)**	Microbial metabolism: nutritional requirements, energy production. Growth and reproduction: growth phases, measurement of growth. Microbial genetics: DNA replication, transcription, translation, and mutations.
4	**Human Microbiota (4 Hours)**	Normal flora: Sites of colonization and importance. Host-microbe interactions: Symbiosis, commensalism, mutualism, parasitism. Role of microbiota in immunity and disease prevention.
5	**Pathogenesis of Infectious Diseases (5 Hours)**	Mechanisms of microbial pathogenicity. Virulence factors: Enzymes, exotoxins, endotoxins. Infection process: Entry, adhesion, colonization, invasion, dissemination.
6	**Infection Transmission and Control (5 Hours)**	Modes of transmission: Direct, indirect, and vector-borne. Nosocomial infections: Prevention and sources. Infection control measures: Hand hygiene, disinfection, sterilization.

7	**Host Defense Mechanisms (4 Hours)**	Innate immunity: Barriers, phagocytosis, complement system. Adaptive immunity: Humoral and cellular immunity. Immunization. Principles of vaccination, immune response to vaccines, and the concept of memory immunity. Types of vaccines.
8	**Introduction to Antimicrobial Therapy (4 Hours)**	Overview of antimicrobial agents: Antibiotics, antivirals, antifungals. Mechanisms of action and spectrum of activity. Antimicrobial resistance: Causes and strategies for prevention.
9	**Laboratory Diagnosis of Infectious Diseases (3 Hours)**	Basic microbiological laboratory techniques: Culture, staining, and microscopy. Identification methods: Biochemical tests, molecular techniques. Antimicrobial susceptibility testing: Disc diffusion, MIC.

Practical (50 Hours)

No.	Topic	Content
1	**Microscopy and Staining Techniques (7 Hours)**	Learn gram staining, acid-fast staining, and special stains. Examine bacterial and fungal specimens under the microscope.
2	**Cultivation of Bacteria (8 Hours)**	Take part in the preparation of agar media and inoculation techniques. Observe bacterial growth and use of selective/differential media.
3	**Identification of Bacterial Species (8 Hours)**	Observe biochemical identification tests: Catalase, coagulase, oxidase. Get familiarized with the laboratory diagnosis of common pathogens.
4	**Antibiotic Susceptibility Testing (6 Hours)**	Learn the Kirby-Bauer disk diffusion method. Determine the minimum inhibitory concentration.
5	**Collection of Clinical Samples (6 Hours)**	Observe and get familiarized with techniques for obtaining clinical samples (blood, urine, sputum, wound swabs). Learn safe handling and transportation of specimens.
6	**Nosocomial Infections and Infection Control (5 Hours)**	Observe infection control practices in the hospital. Understand the waste management protocols in laboratories and healthcare settings.
7	**Microbial Pathogenesis in Disease (10 Hours)**	Discuss clinical scenarios (mock scenarios or from clinical cases) like urinary tract infection, pneumonia, tuberculosis. Learn how to identify hospital-acquired infections and the common pathogens involved.

BPA 06. INTRODUCTION TO HEALTHCARE DELIVERY SYSTEM IN INDIA

L/T/P/C:2/-/1/3

Goal:

This course provides the students a basic insight into the main features of Indian health care delivery systems and how it compares with other systems of the world.

Learning Objectives

1. To understand the structure of healthcare delivery system in India.
2. To learn about national health programs, policies, and AYUSH systems.
3. To understand demography and vital statistics in public health.
4. To gain basic exposure to different healthcare systems through practical observation.

Learning Outcomes

1. Able to explain primary, secondary, and tertiary healthcare systems in India.
2. Able to describe national health programmes and AYUSH systems.
3. Able to understand basic concepts of demography and health statistics.
4. Able to observe and compare different healthcare delivery systems in practice.

Theory (30 hours)

No.	Topic	Subtopics
1	**Introduction to Healthcare Delivery System**	a. Healthcare delivery system in India at primary, secondary, and tertiary care b. Community participation in healthcare delivery system c. Health system examples in developing and developed countries d. Private sector e. National Health Mission f. National Health Policy g. Issues in healthcare delivery system in India

2	**National Health Programmes**	Background, objectives, action plan, targets, operations, achievements, and constraints in various National Health Programmes
3	**Introduction to AYUSH System of Medicine and medical pluralism**	Ayurveda, Yoga and Naturopathy, Unani ,Siddha Homeopathy
4	**Health Scenario in India - Past, Present, and Future**	Overview of the health scenario, changes over time, and emerging trends for the future of healthcare in India
5	**Demography & Vital Statistics**	a. Demography – Concepts b. Vital events of life and its impact on demography c. Significance and recording of vital statistics d. Census & its impact on health policy

Practical (30 hours)

During the practical hours, the student students will have guided visits to different health systems and observe their functioning. They will shadow providers of AYUSH (one day allotted for each system) to understand the functioning of medical pluralism in India and patient preferences.

BPA 07. FUNCTIONAL ENGLISH AND SOFT SKILLS L/T/P/C:1/-/1/2

Goal and justification

English is the language used for written communication in Medicine in India. Effective communication is an important tool in medicine and directly affects the outcomes in patient care. A student may be very good in clinical skills but may perform poorly in his/her profession due to lack of adequate English language skills. Though English is taught in schools, it is commonly observed that there is a wide gap in the communication skills as students converge from diverse backgrounds. This review course in English attempts to bridge this gap. A brief review of the English grammar will be done in the class room and students will be given ample exercises to perform during the practical training. The soft skills training help develop in a student the right attitude to deal with patients and peers, help build interpersonal relationships and leadership skills.

Learning objectives

At the end of this course, the student should be able to:

- Be capable of understanding speeches and lectures
- Use English language effectively in day to day communications concerning patient care and professional issues.
- Capable of presenting clear, detailed descriptions on a wide range of subjects related to medicine
- Able to use the language in reasoning and arguing.

The medical domain related specific language skills will be dealt in the subject _medical communications‘ in Semester IV

Learning Outcomes

1. Able to understand speeches and lectures related to academic and clinical topics.
2. Able to communicate effectively in English in patient care and professional situations.
3. Able to present clear descriptions of medical and healthcare-related topics.
4. Able to use English for reasoning, discussion, and expressing opinions confidently.

Total lecture hours: 20

S. No.	Topic
1	Review of English grammar
2	Principles of effective reading, listening, and writing
3	Composing sentences
4	Composing paragraphs
5	Precis Writing and paraphrasing
6	Principles of writing essays
7	Developing paragraphs from hints, story writing
8	Letter writing principles
9	Soft skills in: Self-management, ownership of tasks, manners, social etiquette, effective communication skills, interpersonal skills, bedside manners, time management, adaptability and flexibility, conduct in difficult situations

Practical (40 hours)

English: Each lecture will be followed by guided practical exercises.

Soft skills: Discussions on case-based scenarios and role-play exercises will be embedded within class room lectures.

BPA 08. Community Orientation-I

L/T/P/C:1/-/-/1

Goals:

To provide the students with transformative educational experiences as they engage in ‗health' activities within a wide variety of communities.

Learning Objectives

This longitudinal course will build on itself with each semester, increasing the students' understanding and engagement with communities and the people within. Students will learn to identify social determinants of health as they engage during their training. The students will also gain experience and a deeper understanding of providing health care with social accountability to the patient/community as a core concept.

Learning Outcomes

1. Able to understand social determinants of health and their impact on individuals and communities.
2. Able to apply knowledge of community health while interacting with patients and populations.
3. Able to demonstrate awareness of social accountability in healthcare delivery.
4. Able to develop a community-oriented approach to patient care and health promotion.

Theory (20 hours)

S. No.	Topic and Hours	Content
1	**Introduction to Public Health (4 hours)**	- What is Public Health?
		- Core functions of public health: assessment, policy development, assurance
		- History and the development of public health in India
		- Basic principles and practice of public health
		- Public Health vs. Clinical Medicine: How They Intersect
2	**Social Determinants of Health (6 hours)**	- Defining social determinants: socioeconomic status, education, housing, access to care
		- The impact of social inequality on health outcomes with historical and contemporary examples from India
		- Addressing social determinants in clinical practice
3	**Health Promotion and Disease Prevention (4 hours)**	- Primary, Secondary, and Tertiary Prevention
		- Strategies for Disease Prevention (Vaccination, Screening, Lifestyle Modifications)
		- Health Promotion in Clinical Practice
4	**Health Indicators (6 hours)**	- Definition
		- Morbidity and mortality rates: Disease prevalence, mortality rates, and life expectancy
		- Infant mortality rate: The number of infant deaths per 1,000 live births
		- Chronic disease prevalence: Rates of conditions like diabetes, hypertension, or heart disease
		- Access to healthcare: Measures of availability and accessibility of healthcare services
		- Behavioural health indicators: Rates of smoking, alcohol use, exercise, and nutrition

Practical (10 hours)

Students will visit a local community to observe and identify key social determinants of health, such as housing, education, access to clean water, healthcare facilities, and employment. The aim is to understand how these factors influence health outcomes in real life.

Books for reference

1. Introduction to Public Health by Mary-Jane Schneider – Publisher: Jones & Bartlett Learning, Year: 2016
2. Social Determinants of Health: A Comparative Approach by Alan Davidson – Publisher: Oxford University Press, Year: 2017

YEAR I-SEMESTER II

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
09	**Professionalism**	10	10	20
10	**Anatomy II**	50	70	120
11	**Physiology II**	50	70	120
12	**Biochemistry and Molecular Biology-II**	50	30	80
13	**Medical Microbiology**	60	40	100
14	**Introduction to computers**	30	50	80
15	**Community orientation -II / Clinical skills**	20	30	50
	Total hours **Total Credits: 28**	**270**	**300**	**570**

BPA 09. PROFESSIONALISM L/T/P/C:1/-/-/1

Goal:

This course introduces students to the concept of professionalism in healthcare, focusing on professional values, ethics, and teamwork. It highlights the importance of professional identity and behaviour for PAs in India and their impact on patient care, communication, and collaboration within healthcare teams.

Learning Outcomes:

By the end of this course, students will be able to:

- Demonstrate professionalism, including integrity, empathy, and confidentiality, in clinical settings.
- Make ethical decisions based on established principles.
- Recognize and manage bias, ensuring equal care for all patients.
- Work effectively within healthcare teams to provide collaborative patient care.
- Practice culturally sensitive communication to deliver respectful, inclusive care.

Learning Objectives

By the end of this course, students will be able to:

1. Understand the principles of professionalism in healthcare, including integrity, empathy, and confidentiality.
2. Apply ethical principles in clinical decision-making situations.
3. Identify and reduce personal bias to ensure equitable patient care.
4. Develop effective teamwork and communication skills within healthcare settings.

Theory (10 hours)

Topic	Content
1. Professional Values (2 Hours)	Integrity, objectivity, empathy, professional competence, and confidentiality.
2. Personal Values: Ethical and Moral Values (2 Hours)	Ethical vs. moral values, personal integrity, and their impact on professional conduct.
3. Attitude and Behaviour (2 Hours)	Professional behaviour in healthcare, addressing biases, and treating patients equally.
4. Code of Conduct, Professional Accountability, and Misconduct (2 Hours)	Code of conduct for healthcare professionals, professional accountability, and implications of misconduct.
5. Differences Between Professions and Importance of Teamwork (1 Hour)	Understanding roles in a healthcare team and the significance of teamwork in patient care.
6. Cultural Issues in the Healthcare Environment (1 Hour)	Cultural competence, overcoming cultural barriers, and providing respectful care.

Topic	Content
Practical (10 Hours)	
1. Demonstrate professional values through role-play scenarios	Integrity and confidentiality through role-play scenarios.
2. Discuss and analyze ethical dilemmas	Focus on decision-making frameworks and resolving ethical dilemmas in healthcare.
3. Role-play scenarios to address biases	Emphasize impartial treatment in healthcare delivery.
4. Team-based tasks	Case reviews, care planning, and clinical decision-making to promote collaboration in healthcare teams.
5. Role-play interactions with patients	Focus on cultural sensitivity and effective communication with diverse cultural backgrounds.

Books for reference

1. Medical Ethics: A Guide for Medical Students – Dr. S. R. S. Reddy, Elsevier India, 2010
2. Professionalism in Medicine: A Case-Based Guide – Dr. Sangeeta S. S., Jaypee Brothers Medical, 2014
3. Cultural Competence in Health Care: A Practical Guide – Dr. S. N. A. Sharma, Jaypee Brothers Medical, 2017
4. Principles of Biomedical Ethics – Tom L. Beauchamp & James F. Childress, Oxford University Press, 2012

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BPA 10. ANATOMY – II L/T/P/C:3/-/2/5

Goal:

To provide a detailed understanding of human anatomy across all major body systems The course emphasizes clinical relevance and imaging techniques, and aims to prepare students for clinical practice by integrating systemic anatomy with clinical scenarios.

Learning Objectives

By the end of this course, students will be able to:

1. Understand the normal structure and function of major human body systems.
2. Describe the anatomical and physiological basis of common clinical conditions.
3. Develop basic skills in clinical examination and interpretation of imaging techniques.
4. Integrate theoretical knowledge with practical applications in patient care settings.

Learning Outcomes

By the end of this course, students will be able to:

1. Identify and explain the structure and function of musculoskeletal, nervous, respiratory, cardiovascular, gastrointestinal, urinary, endocrine, lymphatic, reproductive, and sensory systems.
2. Correlate anatomical knowledge with common diseases and clinical conditions.
3. Perform basic clinical examination techniques and interpret simple diagnostic imaging findings.
4. Demonstrate application of anatomical knowledge in clinical reasoning and patient assessment.

Theory (50 hours)

Topics	Content
1. Musculoskeletal System (8 hours)	Bones: Structure, Classification, Functions; Joints: Types, Movements; Muscles: Major muscles, Actions, Innervations; Clinical Relevance: Fractures, Dislocations, Sprains, Strains, Joint Infections, Muscle Injuries; Imaging: Basic imaging (fractures, arthritis, etc.)

2. Nervous System (10 hours)	CNS (Brain, Spinal Cord); PNS (Cranial & Spinal nerves, Autonomic Nervous System); Functional Areas of the Brain (Sensory, Motor Areas); Clinical Relevance: Neurological Disorders (Stroke, MS, Parkinson's); Imaging: CT, MRI of brain and spine
3. Respiratory System (6 hours)	Anatomy: Upper & Lower Respiratory Tract, Lungs, Diaphragm; Mechanism of Breathing; Gas Exchange; Clinical Relevance: Asthma, Pneumonia, COPD; Imaging: Chest X-ray, CT
4. Cardiovascular System (6 hours)	Heart Anatomy: Chambers, Valves, Conduction System; Vascular System: Arteries, Veins; Cardiac Cycle; Clinical Relevance: Myocardial Infarction, Arrhythmias, Stroke; Imaging: Chest X-ray, Echocardiography, Angiography, MRI
5. Gastrointestinal System (6 hours)	Anatomy: Oral cavity, Esophagus, Stomach, Intestines, Accessory Organs; Digestion & Absorption; Clinical Relevance: Ulcers, IBD, Crohn's Disease, Appendicitis, Cirrhosis; Imaging: Abdominal X-ray, CT, Ultrasound
6. Urinary System (5 hours)	Anatomy: Kidneys, Renal Blood Supply, Nephron Structure, Urinary Tract; Clinical Relevance: Kidney Stones, UTIs, Nephrotic Syndrome; Imaging: Renal Ultrasound, CT Scans
7. Endocrine System (5 hours)	Endocrine Glands: Pituitary, Thyroid, Adrenal, Pancreas, Gonads; Hormones & Regulation; Clinical Relevance: Diabetes, Hyperthyroidism, Addison's Disease; Imaging: Ultrasound, CT

8. Lymphatic System (4 hours)	Anatomy: Lymph Nodes, Lymphatic Vessels, Spleen, Thymus, Tonsils; Function: Immunity, Fluid Balance, Fat Absorption; Clinical Relevance: Lymphoma, Lymphedema; Imaging: Lymphoscintigraphy, Ultrasound
9. Reproductive System (4 hours)	Male & Female Reproductive System: Anatomy; Pregnancy & Development; Clinical Relevance: PCOS, Prostate Cancer, Erectile Dysfunction; Imaging: Ultrasound for Male/Female Reproductive Pathologies

10. Sensory System **(4 hours)**	Anatomy: Eyes, Ears, Skin; Sensory Pathways: Visual, Auditory, Tactile; Clinical Relevance: Sensory Deficits, Disorders

Practical hours (70)

Topics	Content
1. Musculoskeletal System (12 hours)	Dissection of Bones, Joints, Muscles; Clinical Skills: Palpation, Flexibility & Strength Assessment, Sprain/Strain/Fracture/Dislocation Examination
2. Nervous System (10 hours)	Dissect Brain, Spinal Cord, Cranial/Spinal Nerves; Clinical Skills: Neurological Examination (Cranial Nerves, Motor/Sensory Function, Reflexes); Neuroimaging: CT, MRI
3. Respiratory System (8 hours)	Dissect Respiratory Structures; Clinical Skills: Stethoscope Use, Chest Palpation; Imaging Skills: Chest X-ray, CT
4. Cardiovascular System (8 hours)	Dissect Heart and Blood Vessels; Clinical Skills: Pulse, Auscultation, Blood Pressure Measurement, ECG; Imaging Skills: Echocardiography, Angiography
5. Gastrointestinal System (8 hours)	Abdominal Dissection; Clinical Skills: Abdominal Palpation, Inspection, Percussion; Imaging Skills: Abdominal Pathologies Interpretation
6. Urinary System (7 hours)	Dissect Kidneys, Urinary Tract; Clinical Skills: Palpation for Kidney Enlargement/Tenderness; Imaging Skills: Renal Pathologies Interpretation
7. Endocrine System (4 hours)	Study Thyroid & Parathyroid Anatomy; Clinical Skills: Palpation for Goiter/Masses; Imaging Skills: Ultrasound, CT
8. Lymphatic System (3 hours)	Dissect Lymph Nodes; Clinical Skills: Palpation for Infection/Malignancy; Imaging Skills: Lymphoscintigraphy
9. Reproductive System (5 hours)	Study Male/Female Reproductive Anatomy; Clinical Skills: Testes & Pelvic Examination; Imaging Skills: Pelvic Ultrasound for Reproductive Pathologies

Books for reference

1. "Human Anatomy" by Dr. B.D. Chaurasia, CBS Publishers, 2013
2. "Gray's Anatomy for Students" by Richard Drake, A. Wayne Vogl, Adam W. M. Mitchell, Elsevier, 2013

BPA 11. PHYSIOLOGY – II L/T/P/C:3/-/2/5

Goal:

Physiology II builds upon the foundational concepts learned in Physiology I and delves deeper into advanced physiological systems, particularly focusing on the nervous, musculoskeletal, reproductive, and immune systems. This course also integrates the clinical applications of these systems, emphasizing their role in maintaining homeostasis and responding to pathologies.

Learning Objectives:

By the end of Physiology II, students should be able to:

- Understand the organization and function of the nervous system, including sensory and motor functions.
- Describe the mechanisms of muscle contraction, muscle types, and their role in movement.
- Explain the physiology of the immune system, including the innate and adaptive immune responses.
- Understand the physiological regulation of the reproductive system, including hormonal control and reproductive processes.
- Integrate the physiological functions of multiple organ systems to explain complex clinical conditions and their pathophysiology.

Learning Outcomes :

By the end of this course, students will be able to:

1. Explain the structure and function of the nervous system, including sensory and motor pathways.
2. Describe the process of muscle contraction and differentiate between various muscle types in the human body.
3. Explain the mechanisms of innate and adaptive immunity and their role in body defense.
4. Describe hormonal regulation and physiological processes involved in the male and female reproductive systems.
5. Apply integrated physiological knowledge to understand the pathophysiology of common clinical conditions.

Pre-requisites:

Completion of Physiology I and basic understanding of cellular biology and biochemistry.

Theory (50 hours)

Topic	Content
1. Nervous System (15 hours)	Structure and function of CNS and PNS, neurons and neuroglia: structure, function, and communication. Synaptic transmission and neurotransmission. Mechanisms of neurotransmitter release, receptors, and signal transduction. Sensory physiology: mechanoreception, photoreception, thermoreception, nociception. Motor control and reflexes: muscle tone, voluntary and involuntary movements, motor cortex, spinal cord reflexes, basal ganglia, cerebellum.
2. Musculoskeletal Physiology (10 hours)	Muscle types and properties: skeletal, smooth, and cardiac muscle—structure, function, and regulation. Mechanism of muscle contraction (sliding filament theory). Muscle fatigue and recovery. Muscle strength and exercise physiology: muscle recruitment, force generation, neuromuscular junction physiology, excitation-contraction coupling. Bone and joint physiology: bone formation, remodeling, repair, biomechanics of joints and movements.
3. Immune System Physiology (8 hours)	Innate immunity: physical barriers, phagocytosis, inflammation, complement system. Adaptive immunity: antigens, antibodies, antigen-presenting cells, B and T lymphocyte responses, memory cells, immunological memory. Immunoregulation: cytokines and their role, immunological tolerance, and autoimmunity.
4. Reproductive System Physiology (7 hours)	Male and female reproductive systems: anatomy and physiology of male and female reproductive organs. Hormonal regulation: hypothalamic-pituitary-gonadal axis. Oogenesis, spermatogenesis, fertilization. Physiology of pregnancy and lactation.
5. Advanced Integration (10 hours)	Integration of physiology across organ systems: hormonal regulation of metabolism and energy balance. Interactions between the cardiovascular, renal, and endocrine systems in maintaining homeostasis. Clinical integration and pathophysiology: hypertension, diabetes, respiratory failure, and the impact of aging on organ systems.
6. Clinical Physiology (3 hours)	Clinical assessments: interpretation of vital signs, laboratory data, diagnostic tests. Physiological aspects of disease diagnosis and monitoring.

Practical (70 Hours)

Topic	Content
1. Nervous System Physiology (12 hours)	Measuring action potentials: frog nerve-muscle preparation or nerve conduction simulator. Reflex testing: patellar reflex, Achilles reflex, latency, and intensity. Sensory testing: measuring sensory thresholds with a two-point discriminator and monofilaments for pain and pressure sensation. Visual and auditory tests.
2. Musculoskeletal Physiology (14 hours)	Muscle contraction experiments: recording muscle contractions in frog skeletal muscle using a myograph. Exercise physiology: measuring heart rate, blood pressure, and respiratory rate during physical activities. Bone and joint mechanics: kinematic measurements using goniometers to assess joint range of motion.
3. Immune System Physiology (8 hours)	Immunological assays: performing ELISA to detect antibodies or antigens in serum samples. Phagocytosis: observing phagocytic activity of white blood cells using a microscope in response to bacteria.
4. Reproductive System Physiology (8 hours)	Hormonal assays: measuring levels of estrogen and testosterone using simulation kits or assays. Discussing hormonal levels during different phases of the menstrual cycle or physical stimuli.
5. Clinical Physiology (10 hours)	ECG analysis: interpreting ECGs, correlating clinical condition with heart rate, voltages, cardiac rhythms, and common arrhythmias. Blood pressure and blood gas analysis: measuring arterial blood pressure, interpreting changes, analyzing oxygen and carbon dioxide levels and acid-base balance.

BPA 12. BIOCHEMISTRY AND MOLECULAR BIOLOGY – II L/T/P/C:3/-/1/4

Goal

To provide students with a deeper understanding of the biochemical processes involved in food assimilation, digestion, metabolism, and storage, while emphasizing their clinical relevance. The course aims to integrate core concepts in nutrition, hormonal regulation, genetics, and RNA biology, with a focus on the biochemical mechanisms underlying health and disease. By the end of the course, students will be able to analyze biochemical data, interpret clinical scenarios, and understand the molecular foundations of metabolic disorders and genetic diseases.

Learning Objectives:

At the end of the course, students will be able to:

- Understand the biochemical mechanisms of digestion, absorption, and storage of nutrients and their impact on metabolism.
- Explain the biochemical roles of macronutrients and micronutrients in maintaining metabolic functions and overall health.
- Describe the biochemical pathways and regulatory mechanisms involved in the metabolism of carbohydrates, fats, and proteins.
- Identify the role of hormones in metabolism, fluid balance, and homeostasis, and recognize disorders associated with hormonal dysregulation.
- Demonstrate an understanding of acid-base regulation and its clinical relevance, particularly in the interpretation of arterial blood gas (ABG) results.
- Apply knowledge of genetics to understand inheritance patterns, genetic mutations, and the use of genetic testing in disease diagnosis and management.
- Explain the role of RNA in gene expression and regulation, and its clinical relevance in diagnostics and therapy.
- Gain hands-on experience in laboratory techniques used to assess metabolic status, hormone levels, genetic information.

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the biochemical processes involved in digestion, absorption, storage of nutrients, and overall metabolism.
2. Describe the metabolic pathways of carbohydrates, proteins, and fats and their regulatory mechanisms.

3. Interpret the role of hormones, acid–base balance, and genetic mechanisms in maintaining human health and disease states.
4. Apply theoretical knowledge in laboratory techniques to assess metabolic status, hormone levels, and genetic information in clinical settings.

Theory (50 Hours)

Topics	Sub-topics
1. Food Assimilation, Absorption, Digestion, Metabolism, and Storage (10 hours)	- Digestion of Macronutrients: Carbohydrates, fats, and proteins. - Digestive Enzymes: Action on carbohydrates, lipids, and proteins (e.g., amylase, lipase, proteases). - Absorption in the Gut: Transport mechanisms for glucose, amino acids, lipids; enzymes involved. - Nutrient Uptake: Biochemical pathways for vitamins and minerals (e.g., iron, calcium, magnesium). - Nutrient Storage and Mobilization: Glycogen, triglycerides, and protein storage in the body; mobilization during fasting and feeding states.
2. Biochemical Effects of Nutrition on Metabolism, Cell Functions, and Overall Health **(10 hours)**	- Macronutrients and micronutrients: Role of proteins, carbohydrates, fats, vitamins, and minerals in metabolism. - Metabolic Pathways: Glycolysis, TCA cycle, electron transport. - Nutritional Deficiencies and Disorders: Biochemical consequences. - Nutrition and Cell Functions: Influence on cell signalling, gene expression, and metabolic regulation.

3. Hormones and Their Role in Metabolism and Homeostasis (10 hours)	- Hormone Definition and Classification: Peptide, steroid, and amine hormones. - Hormone Receptors: Types and their role in signal transduction. - Hormone Synthesis and Secretion: Biosynthesis and release mechanisms. - Mechanism of Action: Receptor binding and downstream signalling. - Hormonal Regulation of Metabolism: Insulin, glucagon, thyroid hormone, etc. - Regulation of Water and Electrolyte Balance: Aldosterone, ADH, and fluid balance. - Hormonal Regulation of Reproduction:

	- Menstrual cycle, pregnancy. Disorders of Hormonal Regulation: Hypothyroidism, diabetes, Cushing's syndrome. - Hormonal Interactions with Drugs: Effects on metabolism.
4. Homeostasis with Emphasis on pH, Buffering, and Electrolyte Balance (10 hours)	- Acid-Base Regulation: pH regulation and homeostasis. - Buffers: Bicarbonate, phosphate, and protein buffers. - Compensatory Mechanisms: Respiratory and renal regulation. - Acidosis and Alkalosis: Pathophysiology, causes, and effects. - Fluid and Electrolyte Balance: Sodium, potassium distribution, and disorders. Assessment of Acid-Base Status: Interpretation of ABG results.
5. Introduction to Genetics in Medicine (5 hours)	- Genetic Principles: Relevance in disease diagnosis and treatment. - DNA Structure and Function: Chromosomes, genetic code. - Gene Expression and Regulation: Transcription, translation, epigenetics. - Genetic Mutations and Disorders: Common genetic disorders (e.g., sickle cell anemia, cystic fibrosis). - Inheritance Patterns: Mendelian inheritance, autosomal dominant and recessive. - Genetic Testing for Diagnosis: PCR, sequencing, microarrays. Genetic Counselling: Risk assessment and management of inherited diseases.

6. RNA: Structure, Function, and Clinical Relevance (5 hours)	- RNA Structure and Types: mRNA, tRNA, rRNA, and non- coding RNAs. - RNA Transcription and Post-transcriptional Modifications. - RNA Translation and Protein Synthesis: Mechanism of translation. - Gene Regulation by RNA: Role in gene silencing and regulation. - Clinical Relevance of RNA: RNA in disease (e.g., COVID- 19), diagnostic applications. - RNA-based Therapeutics: mRNA vaccines, gene editing.

Practical (30 Hours)

Topics	Sub-topics
1. Collection and Analysis of Gastric Juice (5 hours)	- Understand the biochemical composition of gastric juice and its role in digestion. - Collect gastric juice for analysis of pH, enzyme activity (e.g., pepsin), and digestive capacity.
2. Measurement of pH in Biological Fluids (4 hours)	- Measure and interpret pH of biological fluids (blood, urine, gastric juice). Use pH meters to assess pH changes under physiological conditions and understand buffering mechanisms.
3. Interpretation of Arterial Blood Gas Results (5 hours)	- Analyze ABG data from clinical cases to diagnose acid-base disorders. Assess compensatory mechanisms.
4. Estimation of Blood Analytes (Glucose, Cholesterol, Uric Acid, Electrolytes, Urea) (5 hours)	- Measure blood analytes using clinical kits. Discuss their relevance in clinical scenarios like diabetes, kidney disease, cardiovascular disorders.
5. Hormone Assay Simulation (4 hours)	- Simulate hormone assays (e.g., insulin, glucagon, cortisol). - Understand hormonal regulation of metabolism and fluid balance.
6. Genetic Testing Simulation (4 hours)	- Simulate genetic testing (e.g., PCR diagnostics). - Identify genetic mutations associated with diseases like cystic fibrosis or sickle cell anemia.
7. RNA Isolation and Analysis (3 hours)	- - Explore RNA structure and its diagnostic relevance.

Books for reference

- Biochemistry by Satyanarayana U, Chakrapani U, Elsevier, 4th Edition, 2018.
- Harper's Illustrated Biochemistry by Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor **W. Rodwell, McGraw-Hill, 30th Edition, 2019**

. BPA13. MEDICAL MICROBIOLOGY L/T/P/C:4/-/1/5

Goal

To provide an in-depth understanding of medical microbiology with an emphasis on the etiology, pathogenesis, laboratory diagnosis, treatment, and prevention of infectious diseases encountered in clinical practice.

Learning Objectives:

- By the end of this course, students should be able to:
- Identify the major bacterial, viral, fungal, and parasitic pathogens responsible for human diseases.
- Understand the pathogenesis, clinical manifestations, and complications of infectious diseases.
- Utilize laboratory techniques for accurate diagnosis of infectious diseases
- Apply infection control practices to prevent and manage healthcare-associated infections.

Learning Outcomes:

By the end of this course, students will be able to:

1. Identify and differentiate major bacterial, viral, fungal, and parasitic pathogens causing human infections.
2. Explain the pathogenesis, clinical features, and complications of common infectious diseases.
3. Demonstrate the ability to use basic laboratory diagnostic techniques for detection of infectious agents.
4. Apply infection control and prevention practices to reduce and manage healthcare-associated infections.

Theory (60 Hours)

Topics	Content
1. Bacterial Infections and Pathogenesis (8 hours)	- Overview of normal human microbiota and its role in disease. - Virulence factors: Exotoxins, endotoxins, enzymes, and surface proteins. - Nosocomial infections: Prevention, risk factors, and control.
2. Immune Responses to Bacterial Infections (6 hours)	- Innate immunity: Skin, mucous membranes, phagocytosis. - Adaptive immunity: Antibodies, T cells, and cytokines. - Immune evasion strategies by pathogens.
3. Antimicrobial Chemotherapy (6 hours)	- Types of antimicrobial agents: Antibiotics, antivirals, antifungals. - Mechanisms of antimicrobial action. - Antimicrobial resistance: Mechanisms, epidemiology, and prevention.
4. Bacterial Diseases and Pathogens (12 hours)	- Key bacterial pathogens (Staphylococcus, Streptococcus, E. coli, Mycobacterium, Salmonella). - Clinical presentation, diagnosis, and treatment of bacterial infections. - Laboratory diagnosis: Culture, PCR, serology, and rapid tests.
5. Viral Infections and Pathogenesis (10 hours)	- Key viral pathogens (Influenza, HIV, Hepatitis, Herpes). - Virus-host interactions and pathogenesis of viral diseases. - Clinical manifestations, diagnosis, and treatment of viral infections.
6. Parasitic Infections (6 hours)	- Protozoa and helminths: Life cycles, pathogenesis, and clinical features. - Common parasitic diseases (malaria, amoebiasis, schistosomiasis). - Laboratory diagnosis: Microscopy, antigen detection, molecular methods.

7. Fungal Infections (5 hours)	- Classification of fungi: Yeasts, molds, and dimorphic fungi. - Pathogenesis and clinical features of fungal infections. - Laboratory diagnosis of fungal infections.
8. Infection Control and Prevention (4 hours)	- Principles of infection control: Standard precautions, transmission-based precautions. - Sterilization, disinfection, and hygiene in healthcare. - Surveillance and outbreak management in hospitals.
9. Healthcare-Associated Infections (3 hours)	- Etiology, risk factors, and prevention strategies. - Infection control guidelines: NABH, JCI standards.
10. Biomedical Waste Management (3 hours)	- Principles of biomedical waste management in healthcare. - Segregation, collection, and disposal of medical waste.

Practical (40 Hours)

Topics	Content
1. Collection and Processing of Clinical Samples (6 hours)	- Get introduced to collection techniques for blood, urine, sputum, and wound swabs. - Familiarize with the use of transport media and sterile techniques for handling clinical samples.
2. Identification of Pathogens in Clinical Samples (8 hours)	- Gain experience in microbiological analysis of common pathogens from clinical samples. - Learn techniques in microscopy and biochemical identification to differentiate between bacterial species.
3. Antibiotic Sensitivity Testing (6 hours)	- Hands-on experience with Kirby-Bauer disk diffusion method for testing antibiotic susceptibility. - Familiarize with the procedure for determining minimum inhibitory concentration using dilution techniques.

4. Infection Control Measures in Healthcare (8 hours)	- Observe infection control protocols in healthcare settings, including proper hand hygiene, use of PPE, and disinfection procedures. Understand the role of healthcare workers in preventing nosocomial infections.

5. Case Studies and Clinical Scenarios (8 hours)	- Apply microbiological techniques to diagnose, manage, and treat infectious diseases like sepsis, pneumonia, and meningitis. - Interpretation of blood cultures, identification of pathogens, and appropriate antibiotic therapy. Guide treatment decisions based on microbiological results.
6. Biomedical Waste Handling and Management (4 hours)	- Gain practical knowledge of biomedical waste management in healthcare settings. Understand hospital protocols for managing medical waste and ensuring environmental and legal compliance.
7. Immunological Techniques in Clinical Diagnostics (4 hours)	- Familiarize with immunological techniques in diagnosing infections. Observe serological tests (e.g., ELISA) to detect antibodies for specific pathogens like HIV, hepatitis, and syphilis.
8. Vaccination and Immune Response in Clinical Practice (4 hours)	- Understand clinical application of vaccines and their role in preventing infections. - Assess vaccine efficacy by measuring antibody responses (e.g., Hepatitis B, Influenza). - Interpret immunological data to inform clinical decisions.

BPA 14. INTRODUCTION TO COMPUTERS L/T/P/C:2/-/2/4

Goal:

To introduce the students to basics of using computers in context to their most common applications at the workplace such as: using Windows, understanding and using the Internet for knowledge acquisition, networking, making clinical presentations using PowerPoint, using Excel as a database etc., students will develop confidence and competence using these tools for data management, communication, and presentation.

Learning objectives

- Be able to identify computer hardware and peripheral devices
- Understand file management
- Accomplish creating basic documents, worksheets, presentations and databases
- Distinguish the advantages and disadvantages of networks
- Acquire working knowledge with email and recognize email etiquette
- Explore the Web and how to conduct research
  - Identify computer risks and safety

Learning Outcomes

By the end of this course, students will be able to:

1. Identify and describe basic computer hardware, peripheral devices, and their functions.
2. Perform effective file management and create basic documents, spreadsheets, presentations, and databases.
3. Understand computer networks, including their advantages and disadvantages.
4. Use email and internet resources effectively while applying proper email etiquette, online research skills, and computer safety practices.

Theory (30 hours) and Practical (50 hours) combined

Topic	Description
1. Computer Fundamentals	Introduction to computers, history, and parts (CPU, RAM, Storage).
2. Operating Systems	Overview of Windows, Mac OS, and Linux.
3. Customizing Desktop	Customizing Desktop, Start Menu, Taskbar, and file migration.
4. Basic Computer Functions	Save files, recognize formats, create folders, printer/Peripheral setup, troubleshooting.
5. Keyboard Functions	Familiarization with keyboard and special function keys.
6. Windows 11	Exploring and customizing Windows 11 desktop, start menu, taskbar, and folder migration.
7. File Management Settings	Folder views, accessibility settings in Windows 11, and MS-Word/Excel usage.
8. MS Word	Creating, organizing, and formatting documents, collaborating features (Merge, Edit, Track Mode).
9. MS Excel	Creating, analyzing, and formatting data, formulas, and workbook management.
10. MS PowerPoint	Creating, formatting presentations, managing comments, and exporting slides.
11. Internet Concepts	Browsing, downloading data, reading/writing emails.
12. URL & E-mail Concepts	Creating email accounts, sending/receiving emails, searching online, understanding online risks.
13. Social Media & Networking	Using LinkedIn, sharing knowledge on platforms like X, Academia.edu.
14. OneNote & Class Notebook	Creating sections, pages, and multimedia notes for collaboration.
15. Online Storage & Sharing	Using cloud storage platforms (Google Drive, OneDrive, Dropbox), and secure file sharing.

BPA 15. COMMUNITY MEDICINE -II L/T/P/C:1/-/1/2

Goal:

This course aims to provide PA students with a foundational understanding of environmental health, epidemiology, and infectious disease control. The course emphasizes how these concepts affect health outcomes, patient care, and community health, and equips students with the knowledge to recognize and address public health challenges in clinical and community settings.

Settings and learning methodologies

The course will be delivered through a combination of theoretical lectures, practical exercises, and community-based activities. Theoretical concepts will be reinforced through real-world examples, field visits, and student engagement with local health initiatives.

1. **Classroom Setting:**
    - For theoretical discussions, case studies, and group activities.
    - Use of multimedia (e.g., videos, charts, and infographics) to explain complex environmental and epidemiological concepts.
2. **Community Field Visits:**
    - Visits to local communities to observe public health issues in action, such as water sanitation, food safety, and environmental hazards.
    - Interactions with local health workers to discuss the role of public health interventions and policies.
3. **Clinical Setting:**
    - Observation of infectious disease control measures in clinical practice.
    - Infection prevention and control activities, including vaccination campaigns and safe practices.

Learning Objectives:

- Identify and assess environmental health hazards, including air and water quality, occupational risks, toxicology, and climate change.
- Educate patients on the health impacts of environmental exposures and preventive measures.
- Advocate for policies and interventions that reduce environmental health risks.
- Define key epidemiological terms and concepts, such as incidence, prevalence, morbidity, and mortality rates.
- Understand the role of epidemiology in identifying health trends, patterns, and disease outbreaks.
- Differentiate between various types of epidemiological studies (descriptive, analytical, and experimental).
- Recognize the key epidemiological features of common infectious diseases (HIV, Influenza, TB, etc.).
- Understand infection control and prevention strategies in clinical settings.
- Discuss vaccination strategies and the importance of community immunity in preventing the spread of infectious diseases.
- Develop strategies for preventing foodborne diseases, promoting water safety, and addressing occupational health issues in community settings.
- Integrate knowledge of the built environment, food safety, and climate change in health promotion.

Learning Outcomes

By the end of this course, students will be able to:

1. Identify and analyze environmental and occupational health hazards and their impact on human health.
2. Explain key epidemiological concepts and apply them to understand disease patterns, trends, and outbreaks.
3. Differentiate between various epidemiological study designs and interpret basic findings from public health data.
4. Apply knowledge of infection control, vaccination, food safety, and environmental health principles to promote community health and disease prevention.

Theory (20 hours)

Topic	Hours	Content
1. Environmental Health	**10**	- **Air Quality and Pollution**: Indoor/Outdoor Air Quality- **Water Quality and Sanitation**: Waterborne diseases, Pathogens, Impact of poor sanitation, Sanitation education- **Water Pollution**: Contaminants (lead, mercury, pesticides, pharmaceuticals), Health risks- **Access to Clean Water**: Health disparities, Advocacy for water safety- **Toxicology and Environmental Chemicals**: Exposure to hazardous chemicals, Healthcare providers' role, Environmental toxicology- **Occupational Health**: Workplace hazards, Occupational diseases (respiratory diseases, cancers), Safety standards, Healthcare provider role- **Climate Change and Health**: Health impacts, Vulnerable populations, Mitigation and adaptation- **Built Environment and Public Health**: Urban planning, Housing and health, Green spaces- **Food Safety and Contamination**: Foodborne diseases, Prevention measures, Government health policies, Global initiatives
2. Basics of Epidemiology	**6**	- **Introduction to Epidemiology**: Role, Key terms (population, health-related events, distribution, determinants)- **Measures of Disease Frequency**: Incidence, Prevalence, Morbidity and Mortality rates- **Types of Epidemiological Studies**: Descriptive, Analytical, Experimental
3. Infectious Disease Control	**4**	- **Epidemiology of Infectious Diseases**: HIV, Influenza, TB- **Infection Control**: Prevention in clinical practice- **Vaccination Strategies**: Community immunity
Practical	**30**	- **Environmental Health**: Visit a neighborhood to assess air/water quality and conduct interviews/surveys on water usage and hand hygiene- **Occupational Health**: Observe ergonomic hazards in a hospital and discuss mitigation measures- **Climate Change and Health**: Visit PHC to observe climate change impacts on health (e.g., vector-borne diseases, heatstroke), read/discuss news articles on local climate change issues- **Basics of Epidemiology**: Calculate disease frequency measures using case studies and mock data, group analysis of health studies, present findings- **Infectious Disease Control**: Role-play scenarios of infectious disease outbreaks and observe infection control measures in a hospital

Books for reference:

1. Textbook of Preventive and Social Medicine by K. Park – Publisher: Banarsidas Bhanot Publishers, Year: 25th Edition, 2019.
2. Essentials of Epidemiology in Public Health by Ann Aschengrau and George R. Seage III – Publisher: Jones & Bartlett Learning, Year: 4th Edition, 2019.

YEAR II-SEMESTER III

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
16	**Pathology**	50	60	110
17	**General Medicine-I**	50	60	110
18	**Pharmacology and toxicology-I**	50	30	80
19	**ENT, Ophthalmology & Dermatology**	50	80	130
20	**Basics of Surgery**	50	40	90
21	**Community Orientation / Engagement**	20	30	50
	Total hours **Total Credits: 28**	**270**	**300**	**570**

BPA 16. PATHOLOGY L/T/P/C:3/-/2/5

Goal:

To provide students with a thorough understanding of the mechanisms and causes of disease, enabling them to understand the natural history, clinical manifestations, and diagnostic principles of various diseases.

Learning Objectives:

By the end of the course, students will be able to:

- Understand cell injury mechanisms, tissue changes, and the healing capacity of the body.
- Grasp the normal homeostatic mechanisms and their derangements.
- Understand the pathogenesis, clinical effects, and clinico-pathological correlations of common diseases.
- Learn about neoplasia and its clinical significance in various tissues.
- Correlate morphology (macroscopic and microscopic) with disease processes.
- Understand hematological disorders, their diagnosis, and prognosis.
- Perform and interpret simple clinico-pathological procedures on biological samples.

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain mechanisms of cell injury, tissue response, and healing processes in the human body.
2. Describe homeostatic mechanisms and their alterations in common disease conditions.
3. Correlate the pathogenesis and clinico-pathological features of common diseases, including neoplasia and hematological disorders.
4. Demonstrate basic interpretation of morphological findings and simple clinico-pathological laboratory procedures on biological samples.

Theory (50 Hours)

Topic	Contents
1. Introduction to Pathology and Techniques (3 hours)	Evolution of pathology, basic lab techniques, microscopy, and diagnostic procedures.
2. Cell Injury and Adaptations (5 hours)	Causes, mechanisms, and morphology of injury, cell death (necrosis, apoptosis, gangrene), biological aging.
3. Amyloidosis and Calcification (2 hours)	Pathogenesis, types, and clinical features of amyloidosis and calcification (dystrophic vs. metastatic).
4. Inflammation, Repair, Regeneration, and Fibrosis (5 hours)	Acute and chronic inflammation, wound and bone healing processes.
5. Circulatory Disturbances (4 hours)	Edema, thrombosis, embolism, infarction, shock pathophysiology, and fluid/electrolyte disturbances.
6. Growth Disturbances and Neoplasia (6 hours)	Cellular adaptations (atrophy, hypertrophy, hyperplasia, metaplasia), neoplasia, tumor diagnosis.
7. Immunopathology (5 hours)	Overview of the immune system, hypersensitivity reactions, immunodeficiencies, autoimmune disorders.
8. Infectious Diseases (5 hours)	Mycobacterial, bacterial, viral, fungal, parasitic infections, pathophysiology, and clinical implications.
9. Genetic and Congenital Disorders (3 hours)	Autosomal and sex-linked disorders, pathogenesis, and clinical features.
10. Systemic Pathology (6 hours)	Cytopathology, environmental pathology (smoking, alcohol, drug abuse), nutritional pathology, physical agents' effects.
11. Practical Laboratory Techniques (2 hours)	Collection, handling, and storage of clinical samples, principles of diagnostic tests.

Practical (60 Hours)

Activity	Description
Microscopy and Slide Preparation (4 hours)	Learn slide preparation, tissue staining, and magnification adjustments for optimal visualization.
Tissue Fixation (4 hours)	Steps of tissue fixation using common fixatives and understanding effects on cellular structure.
Tissue Processing and Staining (6 hours)	Embedding, sectioning, H&E staining for histopathological analysis.
Frozen Section Staining (4 hours)	Rapid intraoperative diagnosis and histopathology using frozen section staining.
Special Stains (PAS, Masson's Trichrome) (5 hours)	Identifying pathological features in tissue samples using special stains.
Immunohistochemistry (5 hours)	Applying antibody markers to identify antigens in tissue samples.
Hemoglobin Levels and Blood Smear (5 hours)	Estimate hemoglobin levels, perform differential blood smear for microscopic examination.
WBC Count and Bleeding/Clotting Time (5 hours)	Perform total/differential WBC counts, measure bleeding and clotting time.
Urine Sample Collection and Analysis (5 hours)	Microscopic and chemical analysis of urine samples for abnormalities.
Blood Grouping and Cross-Matching (4 hours)	Conduct blood grouping and cross-matching for compatibility testing.
Identification of Pathological Changes (5 hours)	Examine tissue samples for degenerative changes like necrosis, gangrene, calcifications.
Cytology Slides Examination (5 hours)	Identify epithelial and mesenchymal tumors using cytopathology principles.
Biochemical Lab Results Interpretation (5 hours)	Interpret liver/kidney function tests and their clinical implications in disease diagnosis.
Sample Handling and Storage (3 hours)	Collect, label, and store clinical samples properly for lab analysis.

Books for Reference:

1. Robbin's Pathologic Basis of Disease
2. Textbook of Pathology by Harsh Mohan
3. Essentials of Pathology by Vinay Kumar

GENERAL MEDICINE L/T/P/C:3/-/2/5

Teaching Methods

- Clinical settings: Students will observe and engage in patient care in outpatient departments, emergency rooms, critical care units, and simulation labs.
- Case discussions: Students will present and discuss real or simulated cases under instructor guidance.
- Role play and simulation: Hands-on practice for history taking, physical examinations, and diagnostic decision-making.
- Multimedia tools: Use of interactive tools, such as case-based scenarios, video lectures, and quizzes.
- Group discussions: Encourage peer-to-peer learning and critical thinking.
- Each student would follow patients (at least one each in the out-patient department, emergency care, and critical care) from the first patient interaction to treatment initiation and follow-up. Students should be able to summarize the case reports and discuss the case in classroom with the discussions moderated by the clinical instructor.

Note: ***Behavioural medicine, public health, ophthalmology, and otorhinolaryngology, dermatology, are covered separately, and therefore not included in this paper.***

BPA 17. GENERAL MEDICINE-I

Goal

To equip students with the knowledge, skills, and behavioural attributes to function effectively as the first point of contact for patient care in clinical settings, enabling them to approach health and illness comprehensively, and make informed clinical decisions.

Learning objectives

By the end of this course, students should be able to:

- Understand the concepts of health and illness, including holistic health.
- Recognize manifestations of infectious and non-infectious diseases.
- Conduct thorough history taking and clinical examinations.
- Correlate clinical symptoms with provisional diagnoses and suggest relevant investigations.
- Interpret investigation results reasonably.
- Present management principles professionally and outline short-term and long-term management plans.
- Manage acute medical emergencies and refer for expert management.
- Conduct family history assessments and determine genetic inheritance modes from pedigrees.
- Recognize the importance of genetic counselling and its ethical implications.
- Understand environmental impacts on health and identify potential health risks.

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the concepts of health, illness, and holistic approaches in patient care, including recognition of disease manifestations.
2. Perform systematic history taking and clinical examination to arrive at a provisional diagnosis.
3. Correlate clinical findings with appropriate investigations and interpret results to support diagnosis and management planning.
4. Demonstrate the ability to manage acute medical conditions, recognize emergencies, refer

appropriately, and apply principles of genetics, counselling, and environmental health in clinical practice.

Pre-requisites

Knowledge of anatomy, physiology, microbiology, pathology, and pharmacology (will be taught concurrently).

Theory (50 Hours)

Topic (Hours)	Description
1. Health and Illness (4 hours)	Understanding health, health disparities, hereditary determinants, biopsychosocial model, patient-centered care, health promotion, ethics, and global health.
2. Common Signs and Symptoms Encountered in Clinical Practice (8 hours)	Discuss common causes of fever, dyspnea, chest pain, headache, cough, abdominal pain, dizziness, weight gain/loss, skin rash, constipation, etc.
3. Systematic Approach to Diagnosis and Management of Diseases (18 hours)	Includes history taking, physical exam, diagnostic testing, differential diagnosis, clinical reasoning, patient involvement, cultural sensitivity, decision-making frameworks, risk assessment, evidence-based medicine, and follow-up.
4. Laboratory Tests (6 hours)	Purpose, reliability, accuracy, and interpretation of lab tests, limitations, common pitfalls, and challenges in resource-limited settings.
5. Nutrition and Nutritional Disorders (8 hours)	Nutritional assessment, dietary patterns, protein energy malnutrition, obesity, vitamin/mineral deficiencies, and the role of nutrition in chronic diseases.
6. Fluid and Electrolyte Imbalance (4 hours)	Clinical correlation and treatment protocols for fluid management in conditions like dehydration and diarrhea.
7. Acid-base Imbalance (3 hours)	Review of biochemistry, interpretation of anion gap, and treatment protocols for acid-base imbalances.

Practical (60 Hours)

Activity (Hours)	Description
1. History Taking (8 hours)	Practice history taking under normal and emergency situations, focusing on cultural sensitivity and patient communication.
2. Physical Examination Skills (10 hours)	Hands-on training on performing general physical exams, measuring vital signs, and understanding physical findings.
3. Diagnostic Skills (5 hours)	Apply theoretical knowledge to formulate differential diagnoses based on clinical history and physical examination.
4. Use of Diagnostic Tests (8 hours)	Learn test selection, calculation of sensitivity/specificity, and interpretation of lab tests; also learn diagnostic strategies in resource-limited settings.
5. Nutrition and Nutritional Disorders (5 hours)	Practice anthropometric assessments, nutritional assessment, and develop dietary plans for malnutrition, obesity, and chronic conditions.
6. Fluid and Electrolyte Imbalance (5 hours)	Practice fluid and electrolyte assessments and management for dehydration, shock, and electrolyte imbalances.
7. Arterial Blood Gas Analysis (5 hours)	Interpret ABG results, identify acid-base imbalances, and practice treatment protocols for metabolic and respiratory disorders.

BPA 18. PHARMACOLOGY AND TOXICOLOGY I L/T/P/C:3/-/1/4

Goal:

This course introduces students to the basic principles of pharmacology and toxicology, focusing on the mechanisms of drug action, pharmacokinetics, pharmacodynamics, and the toxic effects of drugs. Students will develop an understanding of the therapeutic uses of drugs, their adverse effects, and the fundamentals of clinical pharmacology.

Learning Objectives:

By the end of the course, students should be able to:

- Understand the basic principles of pharmacology and toxicology.
- Describe the pharmacokinetics of drugs
- Explain pharmacodynamic mechanisms such as receptor binding, signal transduction, and drug-receptor interactions.
- Identify various drug classes and their therapeutic uses.
- Recognize adverse drug reactions, drug toxicity, and drug interactions.
- Understand the toxicity mechanisms and management of poisoning.
- Discuss the clinical implications of pharmacology and toxicology in healthcare settings.

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the basic principles of pharmacology and toxicology, including pharmacokinetics and pharmacodynamics.
2. Identify major drug classes and describe their therapeutic uses in clinical practice.
3. Recognize, explain, and manage adverse drug reactions, drug interactions, and drug toxicity.
4. Apply pharmacological and toxicological knowledge to understand clinical drug use and poisoning management in healthcare settings.

Pre-requisites:

Basic understanding of human physiology and biochemistry.

Theory: 50 hours

Topic and Duration	Content
1. Introduction to Pharmacology and Toxicology (4 hours)	Definition, scope, historical development, basic principles of pharmacology and toxicology, drug regulatory bodies (CDSCO, India).
2. Pharmacokinetics (10 hours)	Absorption, distribution, metabolism, excretion, clinical considerations, drug-drug interactions.
3. Pharmacodynamics (8 hours)	Receptor theory, drug-receptor interactions, dose-response relationship, agonists vs. antagonists, signaling pathways, therapeutic effects and toxicity.
4. General Principles of Drug Action (5 hours)	Mechanism of drug action, therapeutic index, side effects, drug interactions, toxicity.
5. Autonomic Nervous System Pharmacology (8 hours)	Sympathomimetics/sympatholytics, parasympathomimetics/parasympatholytics, clinical applications in hypertension, asthma, glaucoma, and cardiac arrhythmias.
6. Autocoids and Inflammation (5 hours)	Prostaglandins, histamine, leukotrienes, cytokines in inflammation and their clinical uses.
7. Introduction to Toxicology (5 hours)	Principles of toxicology, mechanisms of toxicity, acute vs. chronic toxicity, management of poisoning.
Practical (30 hours)	
1. Drug Absorption, Distribution, and Elimination (12 hours)	Review patient case studies, drug absorption variation, delivery forms, drug-drug interactions, pharmacokinetic parameters interpretation.
2. Blood Pressure and Heart Rate Measurement (6 hours)	Study effects of antihypertensive drugs on blood pressure and heart rate, observation of cardiovascular drug effects.
3. Toxicology Practical: Identifying Drug Toxicity and Management (4 hours)	Identify poisons (e.g., pesticides, heavy metals), simulate case-based poisoning management.
4. General Learning (8 hours)	Analyze medications in patients (pregnant, lactating, ischemic heart disease, elderly, ICU) focusing on pharmacodynamics, pharmacokinetics, interactions, patient advice.

Books for reference

1. **"**Goodman & Gilman's: The Pharmacological Basis of Therapeutics**"** by Laurence **L. Brunton, Bruce A. Chabner, Bjorn C. Knollmann, Publisher: McGraw-Hill, Year: 2017.**
2. "Clinical Pharmacology" by Dr. R.S. Satoskar, Dr. S.D. Bhandarkar, Publisher: Popular Prakashan, Year: 2011.

BPA 19. OPHTHALMOLOGY, ENT & DERMATOLOGY L/T/P/C:3/-/3/4

Goal:

The goal of this course is to enable students to acquire the skills necessary to independently identify and manage common emergencies related to ophthalmic and ENT conditions at primary healthcare settings, assist specialists with non-emergent cases, and recognize and manage common skin, hair, and nail conditions.

Settings and learning methodology:

Students will have clinical rotations in respective outpatient clinics and surgical rooms, primary healthcare centres. Students will learn from through lectures, supervised clinical learnings, simulated case scenarios, case studies etc.,

Learning Objectives (Ophthalmology, ENT, Dermatology)

By the end of this course, students will be able to:

1. Understand the basic principles of clinical examination in ophthalmology, ENT, and dermatology, including inspection, palpation, and functional assessment.
2. Identify and describe common disorders and emergencies affecting the eye, ear, nose, throat, skin, hair, and nails.
3. Recognize systemic diseases that present with ophthalmic, ENT, and dermatological manifestations.
4. Understand basic principles of first aid, initial management, and referral protocols for ophthalmic, ENT, and dermatological conditions.

Learning Outcomes:

By the end of this course, students should be able to:

Ophthalmology:

- Demonstrate proficiency in performing basic eye examination techniques, including visual acuity testing and pupil reactions.
- Independently identify and manage common ophthalmic emergencies, including red eye and eye injuries, under supervision.
- Provide first aid for eye injuries and refer to specialists when necessary.
- Recognize systemic diseases with ocular manifestations and understand their management.

ENT:

- Demonstrate proficiency in basic examination techniques for the ear, nose, throat, and neck.
- Identify and manage common ENT emergencies, such as foreign body aspiration and acute airway obstruction.
- Provide first aid for ENT conditions, including epistaxis and throat emergencies, and refer to specialists as required.
- Recognize systemic causes of ENT disorders and their management.

Dermatology:

- Demonstrate proficiency in performing basic dermatological examination techniques, including skin inspection and palpation.
- Understand preventive skin care measures and the importance of early detection of skin conditions.
- Recognize skin, hair, and nail manifestations of systemic diseases and manage common dermatological issues at the primary care level.
- Provide first aid for allergic reactions and dermatological emergencies.

Duration & Topic	Subtopics
Ophthalmology (20 hours)	
4 hours: Review of eye structure and functions of the different structures	
4 hours: Elementary Optics and Eye Examination	Basics of visual acuity testing, pupil reactions, and eye movements.
4 hours: Common Ocular Diseases	Conjunctivitis, keratitis, cataracts, glaucoma (types and management).
3 hours: Red Eye and Eye Injuries	Causes and management of red eye, First aid for chemical burns and minor foreign body injuries.
3 hours: Vitreous and Retinal Disorders	Retinal detachment, diabetic retinopathy, and macular degeneration.
3 hours: Systemic Diseases with Ocular Manifestations	Hypertension, diabetes, and other systemic diseases affecting the eyes.
3 hours: Preventive Eye Care	Importance of regular eye exams, eye hygiene, public health awareness.

ENT (20 hours)	

4 hours: Diseases of the Ear	Otitis externa, otitis media (acute and chronic), otomycosis. Management of foreign bodies and ear pain.
4 hours: Diseases of the Nose and Paranasal Sinuses	Rhinosinusitis, allergic rhinitis, epistaxis, nasal polyposis. First aid for epistaxis and foreign body removal.
4 hours: Diseases of the Throat and Larynx	Tonsillitis, pharyngitis, laryngitis, and vocal cord nodules.
3 hours: Systemic Causes of ENT Disorders	Thyroid disorders, autoimmune conditions affecting ENT organs.
3 hours: ENT Emergencies	Foreign body aspiration, acute airway obstruction, and anaphylaxis.
2 hours: Preventive ENT Care	Importance of immunization, hearing screening, and managing occupational hazards.
Skin (10 hours)	
2 hours: History Taking and Dermatological Examination	
3 hours: Common Dermatological Conditions	Acne, eczema, psoriasis, fungal infections, warts, and fungal infections.
2 hours: Skin, Hair, and Nail Manifestations of Systemic Diseases	Dermatological signs of diabetes, lupus, hypertension, and other systemic disorders.
2 hours: Allergic Reactions and Dermatological Emergencies	Contact dermatitis, drug rashes, and allergic reactions (e.g., to hair dye).
1 hour: Preventive Skin Care	Sunscreen use, skin cancer prevention, and managing common skin infections.

Practical (80 hours)

Topic	Content
Ophthalmology Practical Skills (20 hours)	
History Taking and Eye Examination (5 hours)	Perform a focused history for common eye complaints (pain, visual disturbances, discharge). Test visual acuity using Snellen chart. Pupil examination (swinging flashlight test). Test for eye movements and alignment (cover-uncover test).
First Aid for Eye Injuries (5 hours)	Irrigate the eye for chemical burns using saline or water. Assist in minor foreign body removal under supervision.
Assist in Ocular Assessments (5 hours)	Learn how to test colour vision, visual fields, and refraction for spectacle prescription under supervision.
Eye Emergencies (5 hours)	Identify and manage eye injuries such as foreign body removal, chemical burns, etc.
ENT Practical Skills (30 hours)	
History Taking and ENT Examination (5 hours)	Perform focused history for ear, nose, throat, and neck symptoms. Perform head and neck examination, including inspection, palpation, and auscultation.
Ear Examination (5 hours)	Learn to use an otoscope to examine ear canal and tympanic membrane. Assist with ear irrigation for cerumen removal.
Nasal Examination (5 hours)	Use a nasal speculum for nasal cavity inspection. Learn to perform nasal endoscopy under supervision.
Throat and Larynx Examination (5 hours)	Examine oropharynx with a tongue depressor. Assess voice quality and perform laryngeal palpation.
First Aid for ENT Emergencies (5 hours)	Manage epistaxis using anterior nasal packing. Assist with foreign body removal in ear or nose. Provide first aid for throat emergencies (choking or airway obstruction).
ENT Procedures (5 hours)	Perform ENT procedures like ear wax removal or nasal cauterization.
Skin Practical Skills (30 hours)	

History Taking and Dermatological Examination (5 hours)	Perform focused dermatological history (rashes, itching, hair loss). Inspect and palpate skin lesions, identifying conditions like acne, eczema, fungal infections.
Performing Basic Dermatological Procedures (5 hours)	Perform skin scrapings for fungal infections. Do patch testing for allergic reactions (e.g., hair dye).
Basic Wound Care and Dressing (5 hours)	Apply simple dressings to minor burns, cuts, or abrasions. Recognize and manage infections like impetigo or folliculitis.
Skin Biopsy (5 hours)	Assist in skin biopsies for diagnosing conditions like melanoma or suspicious lesions under supervision.
Dermatological Emergencies (5 hours)	Manage allergic reactions, acute rashes, and other dermatological emergencies.

Books for reference

"Parson's Diseases of the Eye," Author: Rohit Shetty, Publisher: Elsevier, Year: 2018 "Textbook of Ear, Nose and Throat Diseases,"Author: P. L. Dhingra, Publisher: Elsevier, Year: 2017

BPA 20. BASICS OF SURGERY L/T/P/C:3/-/1/4

Goals:

The goal of this subject is to equip students with essential knowledge and practical skills in surgical principles, techniques, and patient management. This foundation supports their role in primary care, where they can manage minor surgical conditions, including wound care, suturing, and emergency burn care, within the broader healthcare system. It also prepares them to be valuable assistants in the operating room and post-operative care, laying the groundwork for an advanced role in the next semester.

Learning objectives

At the end of the course, the student should be able to do the following:

- Define surgery and its scope, understand the history and principles of surgery, and differentiate between elective, emergency, minor, and major surgeries.
- Understand wound healing, inflammation, and tissue repair processes, and learn about fluid and electrolyte balance in surgical patients.
- Conduct a preoperative assessment and prepare patients, interpret lab tests and diagnostic tools, and understand informed consent, antibiotic prophylaxis, and HIV/Hepatitis precautions.
- Understand aseptic techniques and sterility, identify and handle basic surgical instruments, set up a sterile field, and use sutures/staples appropriately.
- Master surgical knots, suturing, and drain placement, and learn how to apply bandages and splints.
- Assess anesthesia suitability and understand anesthetic agents, learn anesthetic techniques, monitor anesthesia, manage intraoperative complications, and provide postoperative care, including pain management.
- Understand indications for blood transfusion and potential risks, and learn blood matching and safe transfusion practices.
- Assess nutritional needs and calculate energy requirements, and understand methods of nutrition delivery (oral, enteral, parenteral).
- Monitor and interpret vital signs and hemodynamic parameters, and manage changes in hemodynamics during surgery.
- Understand different types of shock and their management, and learn fluid resuscitation and vasopressor use in shock.

- Classify burns and assess severity, and manage burn wounds, fluid resuscitation, and pain.
- Identify conditions like abscesses, cysts, and lipomas requiring surgery, and understand excision techniques and post-operative care.
- Understand the indications and steps for common surgical procedures (e.g., appendicectomy, prostatectomy, vasectomy), and learn post-operative care and potential complications.

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the basic principles of surgery, including types of surgery, wound healing, inflammation, and tissue repair processes.
2. Perform and demonstrate essential surgical skills such as aseptic techniques, instrument handling, suturing, knot tying, and sterile field preparation.
3. Conduct preoperative, intraoperative, and postoperative patient care, including assessment, anesthesia monitoring, and complication management.
4. Apply surgical knowledge in clinical practice for managing wounds, trauma, burns, shock, fluid balance, transfusion, and common surgical conditions with appropriate referral when required.

Pre-requisites

Knowledge on human anatomy, physiology, pathophysiology, microbiology, pharmacology, basic biochemistry, basics of nutrition, clinical skills of observation, history taking, and physical assessment.

Theory: 50 hours

Topic	Subtopics
1. Introduction to Surgery and Surgical Practice (2 hours)	- Definition and scope of surgery - History of surgery - Principles of surgery - Types of surgery: elective vs. emergency, minor vs. major
2. Anatomy and Physiology Relevant to Surgery (3 hours)	- Review of human anatomy (abdomen, thoracic, musculoskeletal) - Physiology of wound healing and inflammation - Fluid and electrolyte balance in surgical patients
3. Preoperative Care (4 hours)	- Preoperative assessment and preparation - Laboratory investigations (blood tests, imaging) - Patient education and informed consent - Antibiotic prophylaxis and other preoperative medications - HIV and Hepatitis precautions
4. Sterility, Asepsis, and Surgical Instruments (3 hours)	- Importance of sterility and aseptic techniques - Surgical instruments: types, usage, and handling - Sterile field preparation - Introduction to sutures and stapling devices
5. Basic Surgical Techniques (2 hours)	- Surgical knots and suturing - Placement/removal of drains - Bandages and splints
6. Anesthesia in Surgery (8 hours)	- Preoperative assessment for anesthesia - Anesthetic techniques: general, regional (spinal/epidural) - Anesthesia equipment: machines, monitoring devices - Intraoperative management: vital signs, adjustments - Postoperative care: recovery, pain management - Special considerations: pediatric, obstetric, robotic/laser surgeries
7. Blood Transfusion: Indications and Hazards (2 hours)	- Indications for blood transfusion - Potential hazards and management
8. Nutrition in Surgical Patients (4 hours)	- Assessment of nutritional status - Energy requirements and delivery modes - Enteral and parenteral nutrition options
9. Hemodynamic Monitoring During Surgery (3 hours)	- Methods of hemodynamic monitoring - Interpreting vital signs and managing changes during surgery

10. Shock and Management of Shock (2 hours)	- Types of shock: hypovolemic, cardiogenic, septic, etc. - Management protocols and early recognition
11. Common Skin and Subcutaneous Conditions Requiring Surgery (3 hours)	- Types of conditions (e.g., abscesses, cysts, lipomas) - Surgical indications and management
12. Burns (3 hours)	- Types of burns: first, second, third degree - Assessment and classification - Burn management: initial care, fluid resuscitation, wound treatment
13. Common Surgical Procedures: Indications and Steps (8 hours)	- Appendicectomy - Circumcision - Lithotripsy - Prostate biopsy and prostatectomy - Renal biopsy - Vasectomy
Practical: 40 hours	
1. Basic Surgical Skills (6 hours)	- Surgical knots - Suturing techniques - Placement and removal of drains - Bandages and splints Hands-on training with suture pads and artificial models. Practice tying knots and suturing on simulated tissue and application of bandages and splints in different clinical scenarios.
2. Aseptic Technique and Sterility (4 hours)	- Preparation of sterile field: Proper sterilization techniques, draping, and maintaining a sterile environment. - Learn correct usage and handling of surgical instruments (scalpels, forceps, scissors, needle holders, etc.) - Practice instrument handling in a controlled environment. - Learn how to maintain sterility in simulated surgical scenarios where students maintain sterility. -

Topic	Subtopics
	Learn sterilization processes (autoclaving, chemical sterilization) and personal protective equipment (PPE) management.
3. Patient Preoperative Assessment (4 hours)	- Conducting patient interviews and performing physical examinations. - Reviewing and interpreting diagnostic reports (e.g., blood work, imaging). - Role-play scenarios to practice obtaining informed consent.
4. Anesthesia Techniques and Monitoring (6 hours)	- Hands-on practice with administering local anesthesia - Familiarization with anesthesia machines and monitoring equipment. - Simulated anesthetic induction, maintenance, and recovery phases. - Observe induction, maintenance, and recovery phases in a real setting of surgery.
5. Blood Transfusion Procedures (4 hours)	- Simulated blood transfusion setup and administration. - Monitoring of patients during transfusions, observing for signs of transfusion reactions. - Discussion and case studies on transfusion indications and complications.
6. Management of Shock and Hemodynamic Monitoring (4 hours)	- Simulated shock scenarios, where students use monitoring devices and manage resuscitation. - Observe fluid management, medication administration, and monitoring in shock cases.
7. Management of Burns (4 hours)	- Practice burn assessment using burn charts and classification systems. - Simulated burn wound care with the application of dressings. - Practice fluid resuscitation.
8. Common Surgical Procedures (8 hours)	- Observe real surgeries in the operating theatre - Help with basic tasks (sterile field prep, passing instruments, monitoring patients) - Engage in basic postoperative monitoring and wound management.

Books for reference

1. General Surgery: A Competency-Based Approach by Dr. S. P. Bansal – Publisher: Elsevier, Year: 2019
2. Textbook of Surgery by Dr. P. S. Ramachandran – Publisher: Jaypee Brothers Medical Publishers, Year: 2017
3. The Essentials of General Surgery by Peter F. Lawrence – Publisher: Lippincott Williams & Wilkins, Year: 2003

BPA 21. COMMUNITY MEDICINE-III L/T/P/C:1/-/1/2

Goals

The goal of this course is to equip students with foundational knowledge and skills in epidemiology and community health assessment, preparing them to identify and address public health issues in communities.

Learning Methodology and Settings:

The course will combine lectures, case studies, group discussions, field visits, and hands- on activities to provide both theoretical knowledge and practical skills. Students will engage with local communities and health centers to observe real-world health issues and practice epidemiological data collection and analysis. Online resources, interactive sessions, and multimedia will be integrated to enhance learning.

Learning Objectives:

Upon completion of this course, students will be able to:

- Understand Epidemiological Study Designs
- Measure and Interpret Risks in Epidemiology
- Identify and Manage Bias and Confounding
- Conduct Community Health Assessments
- Design Action Plans for Health Improvement
- Apply Public Health Knowledge in Real-World Settings

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain different epidemiological study designs and their applications in public health research.
2. Calculate and interpret measures of risk and association in epidemiological studies.
3. Identify bias and confounding factors and describe methods to minimize them in study design and analysis.
4. Conduct community health assessments and develop evidence-based action plans for health improvement in real-world settings.

Theory 20 hours

Theory (20 hours)	Topics	Content
1. Study Designs in Epidemiology (4 hours)	Cross-sectional Study	Overview of study design; snapshot of a population at one point in time
	Cohort Study	Study following a group over time to assess health outcomes
	Case-Control Study	Comparing individuals with a condition to those without
	Randomized Controlled Trials (RCT)	Experimental study with random assignment of participants
2. Measuring risk in epidemiology (4 hours)	Definition	Understanding risk measures
	Measures of association	How different measures like Relative Risk, Odds Ratio, Attributable Risk, and Population Attributable Risk are used to calculate associations between exposure and outcomes
3. Bias and Confounding (4 hours)	Bias	Understanding types of biases (selection, information, etc.) that may affect study results
	Confounding	How confounding variables can distort the perceived relationship between exposure and outcome
4. Introduction to Community Health Assessment (4 hours)	What is community health assessment?	Definition and importance of assessing health needs at the community level

Theory (20 hours)	Topics	Content
	Why is community health assessment needed?	Importance of data in guiding health interventions
	Concepts and factors to consider	Systematic data collection, community engagement, identification of health disparities, multisector
		collaborations, evidence-based interventions, continuous improvement, and planning
5. Community Health Assessment Methodology (4 hours)	Preparation and Planning	Steps involved in planning a community health assessment
	Community Engagement	Involving the community in the assessment process
	Data Collection	Methods for gathering health-related data from community members
	Data Analysis	How to interpret and analyze collected data
	Health Prioritization	Identifying the most pressing health issues in the community
	Health Profile Development	Creating a comprehensive health profile for the community
	Health Status Indicators	Using specific indicators like mortality rates, morbidity, and others to assess community health

	Key Determinants of Health	Identifying social, economic, and environmental factors that impact health
	Resource and Asset Mapping	Mapping resources, services, and strengths within the community
	Health Disparities	Addressing inequities in health outcomes
	Action Plan Development	Creating a detailed plan of action for addressing health issues
	Implementation and Monitoring	Carrying out the plan and tracking progress
	Reporting and Dissemination	Preparing reports and sharing findings with stakeholders

Practical (30 hours)

1. Field Visit to Primary Health Centres and Community Engagement (6 hours)	Observation of health issues in the community	Visiting PHC, observing health issues, and interacting with health workers and residents
2. Data Collection and Analysis (6 hours)	Gathering and analyzing health data	Conducting surveys or interviews, analyzing data to identify health risks
3. Risk Assessment and Prioritization (6 hours)	Identifying and prioritizing health issues	Using tools to assess and rank health risks in the community
4. Creating a Community Health Profile (6 hours)	Developing a health profile	Summarizing key health issues, resources, and challenges
5. Developing an Action Plan (6 hours)	Creating an action plan	Developing steps and strategies to address identified health problems
6. Reporting and Presentation (3 hours)	Preparing and presenting a report	Writing a simple report and presenting findings with proposed actions for improving community health

YEAR II-SEMESTER IV

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
22	**General Medicine-II**	50	60	110
23	**Advanced Surgery**	70	60	130
24	**Pharmacology & Toxicology-II**	40	40	70
25	**Psychology & Introduction to Behavioral Medicine**	40	50	80
26	**Medical Communication**	30	40	70
27	**Community Medicine and Clinical Research - I**	40	50	80
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

BPA 22. GENERAL MEDICINE II L/T/P/C:3/-/2/5

Goal:

To build upon the foundational knowledge and skills acquired in Semester III, enabling the students to manage and assist in the management of a broad range of medical conditions in both acute and chronic settings.

Learning Objectives:

By the end of this course, students should be able to:

- Demonstrate a systematic approach to diagnosis and management in a wide variety of medical conditions, including chronic diseases.
- Apply clinical reasoning to interpret complex cases and select appropriate diagnostic and therapeutic interventions.
- Manage common medical emergencies in a timely and evidence-based manner.
- Understand the principles of organ-specific management (cardiology, respiratory, gastrointestinal, endocrine, etc.) and provide holistic patient care.
- Recognize the ethical and cultural issues in medical management.
- Assist in multi-disciplinary team care for complex patients, including providing patient education and support for long-term management.

Learning Outcomes:

By the end of this course, students will be able to:

1. Apply a systematic approach to diagnose and manage a wide range of acute and chronic medical conditions using clinical reasoning.
2. Interpret complex clinical cases and select appropriate diagnostic tests and evidence-based therapeutic interventions.
3. Manage common medical emergencies promptly and effectively following standard treatment protocols.
4. Demonstrate holistic patient care by integrating organ-specific management, ethical considerations, and multidisciplinary teamwork in clinical practice.

Theory: 50 Hours

Topic	Subtopics	Details
1. Cardiovascular Disorders (10 hours)	Basic Principles	Understanding heart anatomy, physiology, and pathophysiology
	Common Conditions	Hypertension, coronary artery disease, heart failure, arrhythmias
	Clinical Evaluation	History and physical examination for cardiovascular conditions
	Diagnostic Tests	ECG, echocardiography, stress testing, blood tests
	Management Strategies	Pharmacological management, lifestyle modifications, catheter-based interventions, surgical interventions
	Chronic Disease Management	Long-term management of hypertension, coronary artery disease, and heart failure
2. Respiratory Disorders (8 hours)	Basic Respiratory Physiology	Pulmonary function and gas exchange
	Common Respiratory Diseases	Asthma, COPD, pneumonia, tuberculosis, interstitial lung disease
	Diagnostic Approaches	Pulmonary function tests, chest X-ray, CT scan, arterial blood gases
	Management Protocols	Pharmacological treatment, oxygen therapy, mechanical ventilation
	Acute Emergencies	Acute exacerbations of asthma, COPD, pneumonia

Topic	Subtopics	Details
3. Gastrointestinal Disorders (8 hours)	Basic Gastrointestinal Physiology	Digestion, absorption, motility
	Common GI Disorders	Peptic ulcer disease, inflammatory bowel disease, irritable bowel syndrome, liver cirrhosis, pancreatitis, gall bladder stones
	Clinical Evaluation	Abdominal examination, stool analysis, endoscopy, liver function tests
	Management	Pharmacological treatment, nutritional support, surgery
	Chronic Disease Management	Long-term care for chronic liver disease, inflammatory bowel disease, gastrointestinal cancers
4. Renal and Urological Disorders (6 hours)	Renal Physiology	Glomerular filtration, renal tubular function
	Common Conditions	Acute and chronic kidney disease, nephrotic syndrome, renal failure, urinary tract infections, kidney stones
	Clinical Diagnosis	Urine analysis, renal function tests, imaging studies
	Management	Dialysis, diuretics, antibiotics, kidney transplantation
	Acute Management	Hyperkalemia, renal failure, electrolyte imbalances
5. Endocrine Disorders (6 hours)	Basic Endocrine Physiology	Hormone regulation and feedback systems
	Common Endocrine Diseases	Diabetes mellitus, thyroid disorders, adrenal insufficiency, pituitary disorders
	Diagnostic Approaches	Blood glucose, thyroid function tests, imaging of endocrine glands

	Management	Insulin therapy, thyroid hormone replacement, corticosteroid therapy
	Chronic Disease Management	Diabetes and thyroid disorder management, prevention of complications
6. Neurological Disorders (6 hours)	Basic Neurophysiology	Central nervous system structure, function, pathophysiology
	Common Neurological Conditions	Stroke, epilepsy, Parkinson‘s disease, multiple sclerosis, headache syndromes
	Clinical Examination	Neurological assessment, cranial nerve examination, Glasgow Coma Scale
	Diagnostic Testing	CT scan, MRI, lumbar puncture, EEG
	Management	Pharmacological treatment, physical therapy, rehabilitation strategies
7. Hematological Disorders (4 hours)	Basic Hematology	Blood cell production, clotting, immune response, role of lymph nodes, spleen, and lymphatic system in cancer metastasis
	Common Hematologic Diseases	Anemia, leukemias, lymphomas, clotting disorders
	Diagnostic Approach	Complete Blood Count, bone marrow biopsy, coagulation studies
	Management	Blood transfusions, iron therapy, chemotherapy, anticoagulants
8. Infectious Diseases (2 hours)	Principles of Infection Control	Prevention, vaccination, antimicrobial stewardship
	Common Infections	Tuberculosis, HIV/AIDS, sepsis, viral hepatitis, influenza
	Diagnostic Approach	Cultures, PCR, serology
	Treatment Protocols	Antibiotics, antivirals, antifungals, vaccines
	Emergent Infections	Sepsis management, septic shock management, lymphatic system in infection and immunity

Practical (60 hours)

Topic	Details
1. History Taking and Physical Examination (12 hours)	Refine history taking and physical examination with emphasis on cardiovascular, respiratory, GI, renal, and endocrine disorders. Learn to examine lymph nodes.
2. Clinical Decision-Making and Diagnostic Skills (12 hours)	Develop differential diagnoses using clinical reasoning frameworks; select and interpret diagnostic tests (ECG, X-ray, blood tests). Formulate management plans based on findings.
3. Management of Common Medical Emergencies (8 hours)	Responding to acute emergencies (Asthma Attacks, Strokes, Sepsis, Cardiac Arrest, Diabetic Ketoacidosis); administer emergency medications, practice basic life support and advanced cardiac life support in simulated settings.
4. Interpreting and Managing Lab Results (8 hours)	Practice interpreting common laboratory tests (CBC, liver function tests, renal function tests, ABG). Use results to guide clinical decisions.
5. Pharmacological Management (8 hours)	Understand drug dosages, indications, contraindications, side effects; practice prescribing medications for common conditions. Learn adjustments based on comorbidities.
6. Chronic Disease Management and Preventive Medicine (6 hours)	Develop long-term management plans for chronic diseases (diabetes, hypertension, COPD). Learn to counsel on lifestyle changes, medication adherence, and prevention.
7. Patient Education and Communication Skills (4 hours)	Learn how to counsel patients on diagnoses, treatments, preventive strategies; address cultural and ethical issues in patient care.

BPA 23. ADVANCED SURGERY L/T/P/C:4/-/2/6

Goal:

To deepen the understanding of surgical principles, enhance clinical skills, and foster critical thinking for Physician Associate students. This course focuses on advanced surgical knowledge, skills, and patient management in diverse surgical specialties.

Learning Objectives:

- Gain knowledge of the pathophysiology of surgical diseases, surgical anatomy, and physiology.
- Understand and apply principles of wound healing, infection control, hemostasis, and blood transfusion.
- Develop advanced clinical skills including assisting in complex surgeries, performing clinical assessments, and managing postoperative complications.
- Enhance decision-making abilities by analyzing patient data and identifying surgical risks.
- Improve communication and teamwork within the surgical team.

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain the pathophysiology of surgical diseases along with relevant surgical anatomy and physiology.
2. Apply principles of wound healing, infection control, hemostasis, and safe blood transfusion in surgical practice.
3. Demonstrate advanced clinical skills in patient assessment, assisting surgeries, and managing postoperative complications.
4. Analyze clinical data to identify surgical risks and demonstrate effective communication and teamwork within the surgical team.

Theory: 70 Hours

Topic	Content
1. Gastrointestinal Surgery (9 Hours)	Esophagus: Esophageal cancer, Achalasia, Hiatal hernia, Esophageal varices, Zenker diverticulum
	Stomach: Peptic ulcer disease, Gastric cancer, Gastric polyps, Gastric outlet obstruction, Gastrectomy
	Small Intestine: Crohn disease, Ulcerative colitis, Small bowel obstruction
	Colon & Rectum: Diverticular disease, Appendicitis, Colon cancer, Rectal cancer, Inflammatory bowel disease, Hemorrhoids, Anal fissures
	Liver: Cirrhosis, Hepatocellular carcinoma, Liver transplantation
	Pancreas: Pancreatitis, Pancreatic cancer, Whipple procedure
	Biliary Tract: Cholelithiasis, Cholecystitis, Choledocholithiasis, Laparoscopic cholecystectomy
2. Cardiovascular Surgery (8 Hours)	Aortic Surgery: Aneurysms (abdominal & thoracic), Aortic dissection
	Peripheral Vascular Surgery: Atherosclerosis, Peripheral arterial occlusive disease, Lower extremity revascularization, Venous diseases (DVT, varicose veins)
	Cardiac Surgery: Coronary artery bypass grafting (CABG), Valve replacement, Cardiac transplantation
3. Thoracic Surgery (6 Hours)	Lung Cancer: NSCLC, SCLC, Lung metastases, Thoracic trauma, Pneumothorax, Lung abscess
	Mediastinal Tumors: Diagnosis, treatment approaches
4. Neurosurgery (8 Hours)	Cranial Trauma: Concussion, contusion, subdural hematoma, skull fractures
	Intracranial Tumors: Gliomas, meningiomas, pituitary tumors
	Spinal Disorders: Spinal cord injury, stenosis, herniated discs, spinal tumors

5. Urology (8 Hours)	Kidney: Renal cell carcinoma, Wilms tumor, Renal stones, Nephrectomy
	Ureter: Ureteral stones, strictures
	Bladder: Bladder cancer, Interstitial cystitis, Neurogenic bladder, Cystolithiasis
	Prostate: BPH, Prostate cancer, TURP
	Testes & Penis: Testicular cancer, Testicular torsion, Peyronie disease, Penile cancer
6. Endocrine Surgery (8 Hours)	Thyroid: Thyroid cancer, Hyperthyroidism, Thyroidectomy
	Parathyroid: Hyperparathyroidism
	Adrenal Glands: Pheochromocytoma, Cushing syndrome, Adrenal insufficiency
7. Trauma Surgery (5 Hours)	Blunt Trauma: Abdominal, chest, head, extremity trauma
	Penetrating Trauma: Gunshot wounds, stab wounds, damage control surgery
8. Surgical Oncology (7 Hours)	Principles of Cancer Surgery: Tumor biology, surgical margins, adjuvant therapy
	Common Cancers: Breast, colorectal, lung, pancreatic, gastric, head & neck, genitourinary cancers
9. Pediatric Surgery (7 Hours)	Congenital Anomalies: Cleft lip/palate, Hirschsprung disease, Childhood tumors

Practical (60 Hours)

Topic	Details
Core Surgical Skills	Continuous development of aseptic technique, instrument handling, suturing & knot tying, hemostasis, tissue handling, and wound closure.
Clinical Skills	Preoperative assessment, intraoperative assistance, postoperative care, clinical documentation.
Advanced Surgical Skills	Minimally invasive surgery, surgical oncology, trauma surgery, pediatric surgery, GI surgery, breast surgery, vascular surgery.
Postoperative Management	Managing postoperative complications such as infections, bleeding, pain management, and wound care.
Independent Procedures	Minor procedures such as incision and drainage, simple wound closures, foreign body removal under local anesthesia.
Advanced Techniques (Assisting)	Assisting with trauma & damage control surgery, vascular surgery (angioplasties, stents), laparoscopic surgery.

BPA 24. PHARMACOLOGY AND TOXICOLOGY II L/T/P/C:2/-/1/3

Goal:

This course builds on the knowledge gained in Pharmacology I, focusing on advanced pharmacological principles, clinical pharmacology, and the toxicology of specific drug classes. Students will also gain a deeper understanding of pharmacological management of diseases, the toxicity of drugs, and pharmacovigilance.

Learning Objectives:

By the end of the course, students should be able to:

- Describe advanced mechanisms of drug action in various body systems.
- Understand the clinical pharmacology of drugs used in treating specific diseases (e.g., cardiovascular, CNS, antimicrobial agents).
- Identify drug interactions, side effects, and mechanisms of drug resistance.
- Understand the toxicology of drug overdose, including specific antidotes and treatment strategies.
- Apply clinical pharmacology in therapeutic drug management.
- Understand principles of pharmacovigilance and the prevention of drug toxicity.
- Understand the recent advancements in drug interventions

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain advanced mechanisms of drug action across different body systems and therapeutic categories.
2. Apply knowledge of clinical pharmacology in the management of diseases using appropriate drug therapy.
3. Identify, analyze, and manage drug interactions, adverse effects, drug resistance, and toxicities.
4. Demonstrate understanding of pharmacovigilance principles and recent advancements in drug therapy for safe and effective clinical practice.

Pre-requisites:

Successful completion of Pharmacology I.

Theory: 40 hours

Topic	Subtopics
1. Central Nervous System Pharmacology (8 Hours)	• Sedative-hypnotic drugs: Benzodiazepines, barbiturates, and their mechanism of action.
	• Antidepressants and Antipsychotics: SSRIs, tricyclics, antipsychotic agents (dopamine antagonists).
	• Anticonvulsants: Mechanisms of action of common drugs used in epilepsy management.
	• Analgesics: Opioids, NSAIDs, and their effects on pain pathways.
	• CNS stimulants: Mechanisms of caffeine, amphetamines, and their therapeutic use.
2. Cardiovascular Pharmacology (8 Hours)	• Anti-hypertensive drugs: Mechanisms of action of ACE inhibitors, ARBs, calcium channel blockers.
	• Anti-arrhythmic drugs: Class I-IV antiarrhythmic drugs.
	• Anti-coagulants and anti-platelet drugs: Mechanism of warfarin, heparin, aspirin.
	• Congestive heart failure management: Use of diuretics, vasodilators, and inotropic agents.
3. Antimicrobial Pharmacology (6 Hours)	• Antibiotics: Mechanisms of action, resistance, and side effects of various classes (penicillins, cephalosporins, quinolones, tetracyclines).
	• Antifungal agents: Mechanisms and therapeutic use.
	• Antiviral drugs: Mechanisms of action and clinical applications (e.g., antiretrovirals, antivirals for hepatitis).
	• Antiparasitic drugs: Drugs used in the treatment of malaria, helminthiasis, and protozoal infections.

4. Chemotherapy and Toxicology (8 Hours)	• Chemotherapeutic agents: Mechanisms of action, clinical applications, and resistance (e.g., cytotoxic drugs).
	• Drug-induced toxicity: Cytotoxicity, carcinogenicity, teratogenicity.
	• Organ-specific toxicity: Hepatic, renal, and neurological toxicities associated with chemotherapy.
	• Drug overdose management: Antidotes for common toxic drug overdoses.
5. Pharmacovigilance and Drug Safety (8 Hours)	• Pharmacovigilance: Reporting adverse drug reactions (ADRs), role of WHO in global monitoring.
	• Clinical trials: Phase I-IV, ethics, and safety protocols.
	• Drug interactions: Identifying and managing drug-drug interactions in clinical practice, polypharmacy.
	• Herbal and alternative medicines: Safety, efficacy, and regulatory challenges.
6. Advances in Pharmacology (2 Hours)	• Personalized and Precision Medicine
	• Biologics and Biopharmaceuticals
	• Immunotherapy
	• mRNA Technology
	• Artificial Intelligence (AI) in Drug Discovery
	• Stem Cell Therapy
	• Drug Repurposing
	• Microbiome-Based Therapies
	• Advanced Drug Delivery Systems
	• CRISPR and Gene Editing
	• Sustainable and Green Chemistry

Practical: 30 Hours

Topic	Content
1. CNS Drug Effects (4 Hours)	• Review and analyze case studies involving CNS drug effects (e.g., CNS depressants, antidepressants, opioids).
	• Discuss the clinical implications of these drugs on behavior, mental status, and patient care.
	Settings: inpatient wards, or mental health settings.
2. Cardiovascular Drug Effects (4 Hours)	• Study patient case scenarios involving antihypertensive agents, anti- arrhythmic drugs, and diuretics.
	• Identify the effects of these drugs on blood pressure, heart rate, and cardiac rhythm, and discuss their role in clinical management.
	Settings: Primary care, cardiology clinics, or inpatient care settings.
3. Antibiotic Sensitivity and Management (4 Hours)	• Analyze case studies of bacterial infections and antibiotic therapies.
	• Discuss strategies for selecting appropriate antibiotics based on sensitivity testing and patient factors (e.g., allergies, renal function).
	Settings: outpatient department or hospital wards.
4. Polypharmacy Evaluation and Management (6 Hours)	• Review patient case studies with multiple chronic conditions to identify polypharmacy issues.
	• Evaluate the risks of drug-drug interactions, inappropriate prescribing, and adverse effects in patients. Propose adjustments to optimize medication regimens.
	• **Setting**: Primary care clinics, geriatric care units, or outpatient consultations.
5. Pharmacovigilance and ADR Reporting (4 Hours)	• Analyze real-world case studies involving adverse drug reactions (ADRs) and drug interactions.
	• Simulate ADR management scenarios and participate in a pharmacovigilance reporting exercise to monitor and report drug safety concerns.
	Settings: Hospital settings, clinical pharmacology units, or outpatient departments.

6. Toxicology and Overdose Management (4 Hours)	• Review and discuss case studies of drug overdoses and toxicological emergencies.
	• Discuss management strategies for poisoning, including the use of antidotes, supportive care, and clinical monitoring.
	Setting: Emergency departments
7. Drug-Drug Interaction Case Studies (4 Hours)	• Evaluate patient scenarios with polypharmacy to identify potential drug- drug interactions.
	• Discuss the clinical significance of these interactions and strategies to minimize risks.
	Setting: Primary care settings, hospital outpatient clinics, or multidisciplinary care teams.
	• Practice pharmacological counselling on patients with chronic diseases.

BPA 25. PSYCHOLOGY AND INTRODUCTION TO BEHAVIOURAL MEDICINE

L/T/P/C:2/-/2/4

The course uses a blend of lectures, workshops, case studies, and clinical simulations, with hands-on practice in skills labs and clinical placements in settings like primary care clinics and mental health services. Students will engage in group work, role-playing, and online learning to apply theory to practice.

Goal:

This course introduces students to the foundational concepts of behavioral medicine, highlighting the role of psychological, social, and biological factors in health and disease. It aims to help students understand how behavioral and emotional aspects influence patient care, treatment adherence, and health outcomes. The course will also explore strategies and interventions to promote wellness.

Learning Objectives:

By the end of the course, students should be able to:

- Define behavioral medicine and its connection to health and illness.
- Recognize psychosocial factors (e.g., stress, coping) that influence health.
- Understand the impact of psychological and social factors on chronic diseases like hypertension and diabetes.
- Apply the biopsychosocial model in clinical practice.
- Identify and manage psychosomatic disorders.
- Develop skills in patient communication, motivational interviewing, and behavioral interventions.
- Understand the importance of psychological screening in clinical settings.

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain the concepts of behavioral medicine and its relationship to health and illness.
2. Identify psychosocial factors such as stress and coping mechanisms that influence health and chronic diseases.
3. Apply the biopsychosocial model in the assessment and management of patients in clinical practice.
4. Demonstrate effective patient communication skills, including motivational interviewing and basic behavioral intervention techniques.

Pre-requisites:

Basic understanding of human physiology, and clinical medicine.

Theory 40 hours

Topic	Content
1. Introduction to Psychology and Behavioral Medicine (4 Hours)	Overview of psychology and behavioral medicine in health.
	• The biopsychosocial model: integrating biological, psychological, and social factors.
2. Psychological and Social Factors in Health (8 Hours)	• Role of stress, emotions, and coping in health.
	• Impact of psychological stress on physical health (e.g., heart disease, diabetes).
	• Social determinants of health: poverty, family, and community influences.
	• Psychological theories of behavior change (e.g., cognitive- behavioral, stress management).
3. The Biopsychosocial Model in Medicine (6 Hours)	• Definition and key principles of the biopsychosocial model.
	• Historical development and evolution of the biopsychosocial model.
	• How the biopsychosocial model differs from the biomedical model.
	• Importance of integrating biological, psychological, and social factors in healthcare.
	• The interaction of biological, psychological, and social factors with health and disease.
	• Integrating psychological theories into medical practice.
4. Behavioral Interventions in Healthcare (4 Hours)	• Health behavior change
	• Cognitive behavioral therapy
	• Motivational interviewing
	• Health education & counselling
	• Behavioral activation
	• Contingency management
	• Stress reduction techniques
	• Social & environmental support
	• Psychoeducation for caregivers

5. Psychosomatic Disorders and Mental Health (6 Hours)	• Understanding psychosomatic disorders: the mind-body connection.
	• Diagnosis and management of mental health influences on physical health (e.g., IBS, fibromyalgia).
	• Behavioral interventions in psychosomatic conditions.
	• Psychological factors in pain perception and management.
6. Behavioral Medicine in Chronic Disease Management (6 Hours)	• Applying behavioral medicine to manage chronic diseases (e.g., hypertension, diabetes).
	• Psychological support and interventions to enhance treatment adherence.
	• Communication strategies and family therapy in chronic illness care.
	• Addressing mental health in patients with chronic conditions.
7. Stress Management and Health Promotion (4 Hours)	• Psychological techniques for stress reduction (e.g., relaxation, deep breathing).
	• The role of physical activity, nutrition, and sleep hygiene in promoting health.
	• Health promotion strategies: preventive health behaviors. • Psychological principles in wellness and mind-body approaches (e.g., yoga, meditation).
8. Psychological Screening and Patient Communication (6 Hours)	• Psychological screening in routine clinical practice.
	• Identifying patients at risk for mental health issues (e.g., anxiety, depression).
	• Effective communication strategies: handling difficult patients, fostering trust.
	• Behavioral and emotional management in patient care.

Practical: 30 Hours

Topic	Activities
1. Psychosocial Assessment Tools (4 Hours)	• Understand and apply key psychosocial assessment tools (e.g., stress scales, depression inventories).
	• Overview of psychosocial assessment tools used in clinical practice.
	• Gain experience with stress scales, depression inventories, and other tools through supervised hands-on experience.
	• Analyze results, interpret findings, and explore their clinical implications for patient care.
2. Communication Skills and Motivational Interviewing (4 Hours)	• Learn the core principles and techniques in motivational interviewing (e.g., open-ended questions, reflective listening).
	• Practice motivational interviewing and active listening with fellow students in simulated clinical scenarios.
	• Conduct role-plays to refine communication techniques, focusing on empathy, trust-building, and non-verbal cues.
3. Behavioral Interventions for Stress Management (4 Hours)	• Relaxation Techniques-Practice progressive muscle relaxation, deep breathing, and guided imagery.
	• Mindfulness and Biofeedback: Use mindfulness exercises and biofeedback tools to manage stress.
	• Stress Management: Discuss how to integrate these techniques into comprehensive patient care plans.
4. Case Studies in Psychosomatic Disorders (4 Hours)	• Case study analysis: Review real-world case studies of psychosomatic disorders.
	• Treatment plan development: Develop comprehensive care plans that incorporate behavioral interventions.
	• Role-playing diagnosis and Intervention: practice diagnosis and intervention strategies through role-playing exercises.

5. Practical Application of the Biopsychosocial Model (4 Hours)	• Work in groups to analyze case studies, identifying biological, psychological, and social factors in patient health.
	• Develop holistic, patient-centered treatment plans based on the biopsychosocial model.
	• Conduct mock interviews to explore psychosocial factors impacting patient care, integrating findings into treatment strategies.
6. Behavioral Medicine in Chronic Disease (4 Hours)	• Conduct mock interviews and patient interviews focusing on psychosocial aspects of chronic disease management.
	• Use motivational interviewing techniques to encourage adherence to treatment plans.
	• Discuss psychosocial strategies for managing chronic disease, including family involvement, stress management, and lifestyle changes.
7. Stress and Health Promotion Workshop (3 Hours)	• Promote healthy behaviors (exercise, nutrition, and smoking cessation) in patients.
	• Practice delivering stress management techniques, including relaxation and mindfulness exercises.
	• Engage in interactive activities, such as role-playing to teach patients how to manage stress and adopt healthier habits.
8. Psychological Screening for Mental Health (5 Hours)	• Learn and practice psychological assessments (e.g., anxiety, depression inventories).
	• Engage in role-play scenarios to practice discussing mental health concerns and treatment options with patients.
	• Learn how to refer patients to mental health professionals and integrate psychological assessments into comprehensive treatment plans.

1. Introduction to Clinical Psychology: An Evidence-Based Practice Perspective by Geoffrey P. Kramer, Douglas A. Bernstein, and Vicky Phares
2. Behavioral Medicine: A Handbook for Psychologists, Editor: Jerry M. Suls and Richard L. Wallston

BPA 26. MEDICAL COMMUNICATION L/T/P/C:2/-/1/3

Rationale and goals:

Effective communication in medicine is vital for patient safety, treatment success, and fostering a positive patient-care provider relationship. Poor communication can jeopardize patient safety and lead to misunderstandings, delayed treatments, or even adverse outcomes. This course equips students with the necessary communication skills, focusing on both verbal and non-verbal techniques, written documentation, and communication during emergencies. The course also emphasizes professional behaviour, patient counselling, and medical ethics to ensure a holistic approach to communication in healthcare settings.

Settings and learning methodologies:

Interactive lectures and discussions will lay the foundation for theory. Role-playing, case simulations, and peer reviews will be used to refine practical communication skills.Supervised clinical exposure will help students apply theory to real-world healthcare communication challenges.

Learning Objectives:

By the end of this course, PA students will be able to:

1. Understand the principles of effective communication with patients, families, and healthcare professionals.
2. Recognize the importance of verbal, non-verbal, and written communication in clinical practice.
3. Identify strategies for handling difficult communication situations such as breaking bad news and managing non-compliant patients.
4. Understand the use of medical documentation and communication technologies to ensure accurate, clear, and inclusive healthcare communication.

Learning Outcomes:

By the end of this course, PA students should be able to:

- Understand and apply the principles of effective communication with patients, families, and healthcare teams.
- Demonstrate proficiency in oral and written medical communication.
- Manage difficult communication scenarios such as breaking bad news or dealing with non-compliant patients.

- Write medical reports, case histories, surgical notes, discharge summaries, and other essential documentation effectively.
- Utilize communication technologies (e.g., emails, telemedicine, and language interpreters) to ensure clarity and inclusivity.

Theory: 30 Hours

Topic & Hours	Content
Introduction to Medical Communication (4 hours)	- Importance of communication in healthcare. - Types of communication: verbal, non-verbal, and written. - Key qualities of effective communication: Clarity, empathy, active listening, and assertiveness. - Identifying barriers to communication: Language barriers, emotional states, cultural differences, environmental factors, and technological issues.
Communication with Patients (6 hours)	- Building rapport and trust with patients. - History-taking techniques: Open-ended questions, active listening, and empathy. - Patient education: Explaining medical conditions, treatment plans, medications, and procedures clearly and in a patient- friendly manner. - Respecting patient autonomy and addressing patient concerns. - Using language interpreters: Bridging communication gaps in multilingual contexts. - Communicating through email and other digital tools.
Ethics, Etiquette, and Professional Behavior (4 hours)	- Medical ethics in communication: Confidentiality, consent, and professionalism. - Patient respect: Maintaining dignity, cultural sensitivity, and avoiding judgment. - Professional etiquette: Proper conduct in patient interactions, maintaining a compassionate and respectful demeanor, managing time efficiently. - Non-verbal communication: Body language, eye contact, and tone of voice in building rapport.
Managing Difficult Communications (5 hours)	- Gender and age issues: Adapting communication strategies based on patient demographics. - Approaching sensitive topics such as sexual health history, mental health, and other personal matters with respect. - Breaking bad news: Techniques to deliver unpleasant diagnoses, such as terminal illness, in a compassionate yet clear manner. - Dealing with difficult patients: Addressing emotional, angry, or non-compliant behaviour. - Conflict resolution: Managing disagreements between patients and the healthcare team.

Communication within the Medical and Non- Medical Teams (4 hours)	- Team communication: Clear, concise, and professional communication with doctors, nurses, and allied health professionals. - Interdisciplinary collaboration: Ensuring effective communication between clinical teams, administrative staff, and non-medical professionals. - Reporting and handover techniques: Communicating patient status during shift changes, emergency situations, or transfers.
Presenting Cases and Written Communication (5 hours)	- Presenting a case: Key components of a medical case presentation, including history, examination, differential diagnosis, and management plan. - Written communication: Writing clear and concise medical documentation for clinical settings, medical records, and patient follow-up. - Telephonic communication: Effective communication in telemedicine, phone consultations, and emergency calls. - Communicating during emergency situations: Keeping calm and clear under pressure, triaging information quickly.
Medical Documentation and Reports (6 hours)	- Writing medical reports: The purpose and structure of medical reports. - Case history and presentation: Recording medical histories, presenting patient conditions, and communicating interpretation of tests. - Writing orders: Clear and actionable medical orders (e.g., lab tests, treatments, medication). - Recording progress: Documenting patient progress and response to treatment, and preparing case summaries. - Writing surgical notes, discharge summaries, death summaries, and referral letters: Essential components and dos and don‘ts for each.

Practical (40 hours)

Topics	Activities
Oral Communication in Various Scenarios (20 hours)	- Practice history taking in medical scenarios through role plays: History-taking, delivering patient education, and explaining diagnoses and treatment options. - Communicate with patients from diverse backgrounds: Adapting language, tone, and approach based on age, culture, and language. - Practice in simulated case scenarios on how to handle difficult communication scenarios: Breaking bad news, addressing a patient's emotional responses, and managing non-compliant patients. Observe how this is done in real-world settings, and critically evaluate how it is done. - Practice communication with the medical team: Presenting cases, discussing patient progress, and conveying urgent information.
Written Communication Exercises (12 hours)	- Write medical case reports: Drafting history-taking notes, presenting clinical findings, and formulating differential diagnoses and treatment plans. - Write discharge summaries and surgical notes: Structure, clarity, and concise documentation. - Compose referral letters, death summaries, and progress notes: Essential components and dos and don'ts. - Telemedicine practice: Practice drafting clear and professional emails and messages to patients or other medical professionals.
Communication during Emergency Situations (8 hours)	- Learn and practice communication - both verbal and written during simulated emergency situations (e.g., trauma, cardiac arrest, critical care). - Learn communicating with the treating physician. - Learn communicating with healthcare teams. - Learn communicating with patients and attenders.

BPA 27. COMMUNITY MEDICINE AND CLINICAL RESEARCH-I L/T/P/C:2/-/2/4

Goals

This course will equip students with essential public health and clinical research knowledge. They will learn epidemiological principles, outbreak investigation methods, and screening practices, along with the design and evaluation of clinical research studies. Students will develop the skills to apply evidence-based practices and research methodologies in real-world public health and clinical settings.

Learning methodologies and settings

Students will engage in both theoretical learning and hands-on applications, using real-world scenarios to better understand epidemiological principles, clinical research methods, and public health interventions. Class activities, group work, and field visits will encourage collaborative learning and practical skill development. Online resources, research articles, community outreach and simulation exercises for real-time application will be used for practical experience.

Learning Objectives

By the end of this course, students will be able to:

1. Understand key epidemiological principles, surveillance systems, and models used in public health practice.
2. Describe the process of outbreak investigation and apply basic steps in identifying and controlling disease outbreaks.
3. Explain the concepts, principles, and applications of screening programs in disease prevention and early detection.
4. Understand the fundamentals of clinical research, including study designs, sampling methods, and types of data used in medical research.

Learning Outcomes

By the end of this course, students will be able to:

1. Apply epidemiological principles such as causality, surveillance, epidemic curves, and SIR models in public health practice.
2. Demonstrate understanding of outbreak investigation methods and interpret basic

surveillance data in real-world situations.

3. Evaluate screening programs and identify appropriate diseases for screening in public health settings.
4. Develop basic research questions using PICO format and distinguish between different clinical research designs, sampling methods, and data types.

Public Health

Theory (20 hours)

Theory (Total: 20 hours)	**Topics**
1. Epidemiological Principles	- Hill's Criteria for Causality: Strength, Consistency, Specificity, Temporality, Biological Plausibility - Dose-Response Relationship - Biological Gradient
2. Epidemiological Surveillance	- Public Health Surveillance: Introduction and types - Surveillance Systems: In India, WHO, CDC etc.
3. Outbreak Investigation	- Overview of outbreak investigation principles and process.
4. Epidemiological Models	- Epidemic Curve - SIR Model
5. Screening in Public Health Practice	- Define screening and describe its role in public health - Determine diseases for which it is appropriate to screen - Design and evaluate screening programs

Introduction to Clinical Research (Total: 20 hours)	
1. Introduction	- Definition, scope, types of clinical research: Basic vs. Applied Research, Clinical Trials (Phase I, II, III, IV), Observational Studies - Importance of evidence-based medicine - Ethical considerations in clinical research
2. Study Designs	- Randomized Controlled Trials (RCTs) - Cohort Studies, Case-Control Studies, Cross-Sectional Studies, Ecological Studies - Blinding, Randomization, Biases

3. Sampling Methods	- Types of Sampling: Random, Stratified, Convenience - Rationale, advantages, and limitations
4. Data Types	- Quantitative (Continuous, Discrete, Binary, Ordinal) - Qualitative (Nominal, Textual) - Time-based Data (Survival)
5. Research Question, Aims, and Objectives	- Framing Research Questions using PICO(T) - Crafting Aims and Objectives (Specific, Measurable, Achievable, Relevant, Time-bound)

Books for reference

1. Principles of Epidemiology in Public Health Practice: An Introduction to Applied Epidemiology and Biostatistics by Ray M. Merrill
2. Public Health Surveillance: A Tool for Targeting and Monitoring Interventions by Jennifer L. C. D. McFarland
3. Outbreak Investigation: A Practical Guide by William R. D. O'Neill
4. Public Health Screening by M. J. S. Green and J. M. Elliott
5. Clinical Research: A Practical Guide for Physicians by Robert B. Talley and Simon O'Connor

YEAR-III-SEMESTER V

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
28	**Emergency Medicine**	80	80	160
29	**Paediatrics**	70	80	140
30	**Introduction to healthcare management**	30	40	45
31	**Medical Ethics and Law**	40	40	35
32	**Introduction to healthcare management**	50	60	50
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

BPA 28. EMERGENCY MEDICINE L/T/P/C:5/-/3/8

Goal:

To provide care in an emergency, without any faults or lack of confidence and independent of the location of the emergency. To equip the students with self-confidence to be able to manage clinical decision-making under pressure of time when it is essential to save lives.

Learning Objectives

At the end of the course the student will have knowledge of the following:

- Have basic science knowledge and application of knowledge to emergency medicine and the assessment and immediate treatment of emergencies.
- Develop and improve existing clinical and examination skills and apply them in clinical practice to develop comprehensive differential diagnoses and management plans.
- Analyze clinical findings and develop and modify the differential diagnosis to a full range of clinical circumstances
- Competency in commonly used procedural skills, including all forms of resuscitation, life support, airway management, and commonly used emergency procedural skills in both adults and children
- Acquire specialized communication and interpersonal skills required for

outstanding communication with patients, families, other providers, and administrative staff in emergency situations

Learning Outcomes:

By the end of this course, students will be able to:

1. Apply basic science knowledge to the assessment, stabilization, and immediate management of medical and surgical emergencies.
2. Perform clinical examination, interpret findings, and develop appropriate differential diagnoses and management plans in emergency settings.
3. Demonstrate competency in essential emergency procedural skills, including resuscitation, life support, airway management, and other life-saving interventions in adults and children.
4. Communicate effectively with patients, families, and healthcare teams during emergency situations, ensuring clear, accurate, and timely information exchange.

Pre-requisites

Thorough knowledge of anatomy, physiology, biochemistry, microbiology, pharmacology disease conditions and possess basic surgical skills and handling of bio- medical equipment

Theory: 80 Hours

Topic	Content
1. Introduction to Emergency Medical Care (4 hours)	Overview of emergency care and EMS system, quality improvement, and medical direction.
2. Lifting and Moving Patients (4 hours)	Principles of body mechanics, proper lifting, and techniques for moving patients using appropriate equipment.
3. Airway Management (6 hours)	Airway anatomy, methods for maintaining an open airway, use of suction equipment, oxygen delivery, and resuscitation devices.
4. Initial Assessment of Patient (6 hours)	General impression, ABCs assessment, and prioritizing care during initial patient evaluation.
5. Trauma Patients (5 hours)	Rapid assessment methods, trauma triage principles, and management strategies for trauma patients.
6. Medical Patients (5 hours)	Approach to assessing medical complaints, history-taking, and physical examination techniques.
7. Communication Techniques in Emergency Care (4 hours)	Effective communication with patients, families, and healthcare team during emergencies.
8. Documentation in Emergency Care (5 hours)	Legal and ethical aspects of patient documentation, writing accurate reports, handling patient refusal.
9. Differential Diagnosis for Common Symptoms (5 hours)	Assessment and management of common emergency symptoms like chest pain, respiratory distress, GI bleed, and trauma, with a focus on polytrauma.
10. Respiratory Emergencies (4 hours)	Management of asthma, COPD, pneumonia, and pneumothorax in emergencies.
11. Cardiovascular Emergencies (6 hours)	Acute conditions like ACS, heart failure, pericarditis, aortic dissection, and hypertensive crises.
12. GI Emergencies (5 hours)	Assessment and management of conditions like appendicitis, bowel obstruction, GI bleeding, and perforated viscera.
13. Endocrine Emergencies (4 hours)	Management of hyperkalemia, hypokalemia, thyroid storm, and other common endocrine emergencies.
14. Genito-urinary Emergencies (5 hours)	Assessment and management of conditions like ectopic pregnancy, testicular torsion, renal calculi, and pelvic inflammatory disease.

15. Neurological Emergencies (5 hours)	Management of stroke, intracranial hemorrhage, meningitis, and seizures.
16. Psychiatric Emergencies (4 hours)	Handling psychiatric emergencies including aggression and suicidal ideation.
17. Ophthalmology & ENT Emergencies (5 hours)	Management of traumatic eye conditions, otitis, sinusitis, epistaxis, and foreign body obstructions.
18. Acute Allergies and Anaphylaxis (5 hours)	Diagnosis and management of allergic reactions and anaphylaxis in emergency care.
19. Poisoning and Overdose (5 hours)	Clinical signs, symptoms, and management of poisoning and overdose.
20. Environmental Emergencies, Burns, and Drowning (5 hours)	Emergency care for heat/cold exposure, burns, and drowning incidents.
21. Bleeding and Shock (5 hours)	Management of internal and external bleeding, shock recognition, and treatment protocols.
22. Introduction to Mass Disaster Management (4 hours)	Overview of emergency response during mass disasters, including triaging and resource allocation.
23. Trauma in Pregnancy (4 hours)	Approach to managing trauma in pregnant patients, addressing unique challenges.
24. Shock (5 hours)	Detailed understanding of shock pathophysiology and management in emergency settings.

Practical (80 hours)

Practical Skills	Activities
1. Patient Assessment and Diagnosis	Take focused histories and perform physical examinations for rapid diagnosis in emergency situations.
2. Differential Diagnosis and Critical Thinking	Develop differential diagnoses based on symptoms and clinical presentations.
3. Ordering and Interpreting Diagnostic Tests	Learn how to order diagnostic tests quickly and interpret results under pressure.
4. Managing Emergency Conditions	Administer treatments for emergencies like cardiac arrest, respiratory failure, trauma, and poisoning.
5. Cardiac Monitoring	Monitor and interpret cardiac rhythms, EKGs, and vital signs in emergency situations.
6. Cardiac Defibrillation and CPR	Perform advanced cardiac life support, including defibrillation and CPR for adults, children, and infants.
7. Basic Emergency Procedures	Placement of nasogastric tubes, Foley catheters, IV lines, and oxygen therapy management.
8. Advanced Airway Management	Practice endotracheal intubation, use of advanced airway devices, and ventilation techniques.
9. Surgical Procedures	Learn basic surgical procedures like wound closure, incision and drainage, and managing traumatic injuries.
10. Cervical Spine Stabilization	Practice proper cervical spine immobilization during patient transfer.
11. Patient Retrieval and Transfer	Understand and practice the proper use of emergency medical equipment for safe patient transport.
12. Triage and Mass Casualty Management	Practice triaging patients in mass casualty scenarios, prioritizing care, and understanding disaster response protocols.
13. Referral and Collaboration	Learn when and how to refer patients to specialists and collaborate with healthcare providers.

Books for Reference:

- Medical Emergencies: Treatment and Management by Robinson
- Manual of Emergency Medicine by Richard Braen

BPA 29. PAEDIATRICS L/T/P/C:4/-/3/7

Goal

To impart adequate knowledge and appropriate skill for optimally dealing with major health problems of children to ensure their optimal growth and development.

Learning Objectives

- Diagnose and appropriately treat common pediatric and neonatal illnesses.
- Describe the common pediatric disorders and emergencies in terms of epidemiology,
- etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation
- Identify pediatric and neonatal illnesses and problems that require secondary and tertiary
- care and refer them appropriately.
- Advise and interpret relevant investigations.
- Counsel and guide patient‘s parents and relatives regarding the illness, the appropriate
- care, the possible complications and the prognosis.
- Provide emergency cardiopulmonary resuscitation to new-born and children.
- Describe preventive strategies for common infectious disorders, malnutrition, genetic and
- metabolic disorders, poisonings, accidents and child abuse.
- Participate in the National Health Programmes effectively.
- Diagnose and effectively treat acute pediatric and neonatal emergencies.
- Discharge medico-legal and ethical responsibilities.
- Perform routine investigative and therapeutic procedures, as applicable to children
- including neonates.
- Describe the normal growth and development during fetal life, neonatal period,
- childhood and adolescence and outline deviations thereof.

- Describe the common pediatric disorders and emergencies in terms of epidemiology,
- etiopathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation.
- State age related requirements of calories, fluids, nutrients, drugs etc. in health and disease.
- Describe preventive strategies for common infectious disorders, malnutrition, genetic and
- metabolic disorders, poisoning, accidents and child abuse.

Learning Outcomes:

By the end of this course, students will be able to:

1. Diagnose and manage common pediatric and neonatal illnesses and emergencies using appropriate clinical, laboratory, and therapeutic approaches.
2. Describe the epidemiology, etiopathogenesis, clinical features, diagnosis, treatment, and rehabilitation of common pediatric disorders.
3. Perform neonatal and pediatric emergency care including CPR, life support, and basic therapeutic and procedural interventions.
4. Provide comprehensive care including counseling of parents, interpretation of investigations, referral to higher centers, and application of preventive and ethical principles in child health.

Pre-requisites:

Knowledge on general anatomy, physiology, pathology, microbiology, pharmacology, genetics and basics of emergency medicine.

Theory: 70 hours

Topic	Content
1. Growth and Development (10 hours)	Determinants of growth and assessment, growth monitoring, anthropometry, developmental milestones, and immunization schedules.
2. Nutrition and Disorders (10 hours)	Age-related nutritional needs, protein-energy malnutrition, vitamin deficiencies, obesity, and nutritional anemia.
3. Infectious Diseases (7 hours)	Common exanthematous illnesses (measles, chickenpox, mumps), tuberculosis, parasitic infestations, and childhood AIDS.
4. Respiratory System (6 hours)	Common respiratory conditions like cold, otitis media, pneumonia, bronchiolitis, and bronchial asthma.

5. Gastrointestinal System (6 hours)	Approach to jaundice, abdominal pain, diarrhea, dehydration, oral rehydration, and chronic diarrhea.
6. Central Nervous System (8 hours)	Evaluation of milestones, convulsions, meningitis, encephalitis, cerebral malaria, epilepsy, and cerebral palsy.
7. Cardiovascular System (5 hours)	Diagnosis and management of rheumatic fever, heart diseases, and congenital heart anomalies.
8. Genito-Urinary System (5 hours)	Post-streptococcal glomerulonephritis, nephrotic syndrome, urinary tract infections, renal failure, and obstructive uropathy.

9. Endocrinology (4 hours)	Diagnosis and management of diabetes, hypothyroidism, hyperthyroidism, delayed and precocious puberty.
10. Neonatology (9 hours)	Neonatal resuscitation, birth asphyxia, jaundice, infections, low birth weight, and special care for sick newborns.
11. Pediatrics Emergencies (6 hours)	Management of status epilepticus, asthma, shock, burns, hypertensive emergencies, gastrointestinal bleeds, and comatose children.
12. Fluid and Electrolyte Balance (3 hours)	Principles of fluid therapy, acid-base imbalance, and management strategies.
13. Genetics (2 hours)	Inheritance disorders and genetic diagnosis, with emphasis on Down's Syndrome.
14. Behavioral Problems (2 hours)	Behavioral issues such as breath-holding spells, nocturnal enuresis, temper tantrums, and pica.
15. Pediatrics Surgical Problems (3 hours)	Surgical management of conditions like cleft lip/palate, hypospadias, inguinal hernia, hydrocephalus, and other common surgical conditions.
16. Therapeutics (2 hours)	Pediatric doses, drug combinations, and age-specific choice of antibiotics.

Practical (80 Hours)

Practical Skills	Activities
1. History Taking and Physical Examination (10 hours)	Take a detailed pediatric history, perform age-appropriate physical exams, and make clinical diagnoses.
2. Bedside Investigations (8 hours)	Perform common bedside procedures like urine analysis, stool examination, and blood tests.
3. Anthropometry and Growth Monitoring (5 hours)	Measure and assess growth of children using weight, height, head circumference, and use growth charts.
4. Neonatal Resuscitation (6 hours)	Practice neonatal resuscitation on mannequins and perform newborn care, including temperature regulation and feeding.
5. Immunization Administration (5 hours)	Administer vaccines as per the national immunization schedule and practice cold chain management.
6. Basic Emergency Care (8 hours)	Practice pediatric CPR, manage pediatric asthma attacks, status epilepticus, and other pediatric emergencies.
7. Fluid and Electrolyte Therapy (5 hours)	Prepare and administer ORS, manage dehydration, and conduct fluid balance assessments.
8. Diagnostic Procedures (8 hours)	Observe and assist in procedures like lumbar puncture, bone marrow aspiration, liver biopsy, and pleural/ascitic tap.
9. Neonatal Care and Feeding (8 hours)	Care for neonates including preterm infants, low birth weight, and administer nasogastric feeds.
10. Pediatric Surgical Skills (7 hours)	Assist with common pediatric surgeries like cleft lip/palate repair, hernia repair, and hypospadias.
11. Clinical Rotations (10 hours)	Participate in pediatric wards, OPD, and critical care units, gaining hands-on experience with managing pediatric cases.

Books for references

- Emergency Medicine: A Comprehensive Review by Kevin J. Knoop, Jennifer **R. S. Bragg, and Jeremy R. D. Brown**
- Manual of Emergency Medicine by David S. Cline and Peter A. L. Chamberlain

BPA 30. INTRODUCTION TO HEALTHCARE MANAGEMENT L/T/P/C:2/-/13

Goal:

To provide an overview of management principles

Learning Objectives:

At the end of the course, the student will be able to:

- Understand the role of healthcare administration within the broader context of healthcare delivery systems
- Identify the organizational structure of healthcare facilities, including hospitals, outpatient centers, and long-term care facilities.
- Describe effective strategic management
- Demonstrate understanding of decision making, conflictand stress management techniques
- Demonstrate understanding in change and innovation and change in management
- Demonstrate understanding of teams, groups, leadership

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain the role of healthcare administration within healthcare delivery systems and organizational structures.
2. Describe the organizational setup and functions of different healthcare facilities, including hospitals, outpatient, and long-term care centers.
3. Apply principles of strategic management, decision-making, conflict resolution, and stress management in healthcare settings.
4. Demonstrate understanding of leadership, teamwork, change management, and innovation in healthcare organizations.

Theory (40 hours)

Topic	Hours
1. Overview of Management	3 hours
2. Management Process: Planning, Organizing, Staffing, Directing, and Controlling	3 hours
3. Strategic Management	3 hours
4. Foundations of Planning	3 hours
5. Planning Tools and Techniques	3 hours
6. Decision Making, Conflict, and Stress Management	3 hours
7. Healthcare Financing and Economics	4 hours
8. Organizational Behavior in Healthcare	3 hours
9. Managing Change and Innovation	3 hours
10. Understanding Groups and Teams	2 hours
11. Leadership	3 hours
12. Time Management	2 hours
13. Management of Human Resources	2 hours
14. Quality Improvement	3 hours
15. Cost and Efficiency	2 hours
16. Technology and Healthcare Administration	3 hours
Practical (40 hours)	
Case Study Analysis	5 hours
Healthcare Organization Visits	5 hours
Strategic Planning Exercise	5 hours
Role-Playing: Decision Making & Conflict Management	5 hours
Budgeting and Financial Analysis Workshop	5 hours
Time Management Simulation	5 hours
Leadership and Teamwork Exercises	5 hours
Quality Improvement Project	5 hours
Healthcare Technology Integration	5 hours

Books for references

1. Introduction to Health Care Management by Sharon B. Buchbinder and Nancy H. Shanks
2. Healthcare Management: Principles and Practices" by C. P. Mathew

BPA 31. MEDICAL ETHICS AND LAW L/T/P/C:2/-/1/3

Goal:

To impart knowledge on ethical conduct during practice and research, the laws governing medicine in India, the provider-patient relationship, and the etiquettes and principles to be followed in the profession.

Learning Objectives:

By the end of the course, students should be able to:

- Distinguish between correct and incorrect medical practice.
- Understand patient-provider rights and responsibilities.
- Be aware of the ethics and laws involved in medical care for special populations and special situations (e.g., Abortion, euthanasia).
- Understand patient privacy and confidentiality.
- Navigate medical practice in compliance with relevant legal and ethical guidelines.

Learning Outcomes:

By the end of this course, students will be able to:

1. Differentiate between appropriate and inappropriate medical practices based on ethical and legal standards.
2. Explain patient rights, provider responsibilities, and the principles of informed consent and confidentiality.
3. Apply ethical and legal guidelines in managing special situations such as abortion, euthanasia, and care of vulnerable populations.
4. Demonstrate compliance with medical laws and ethical principles while maintaining patient privacy and professional conduct in clinical practice.

Theory (40 hours)

Topics	Duration
1. The Hippocratic Oath and its Relevance to the PA Profession	4 hours
History, significance, and principles of medical ethics; application in the PA profession.	
2. The PA Profession: Roles, Responsibilities, and Limitations	4 hours

Scope of practice, duties, ethical obligations, and understanding the PA‘s role within the healthcare team.	
3. History of Medical Ethics	4 hours
Evolution of medical ethics, key philosophies, and historical case studies (e.g., Nuremberg Code).	
4. Understanding Life and Death	5 hours
Ethical considerations on life and death, end-of-life care, organ donation, and cultural/philosophical views.	
5. Patient’s Access to Medical Care: Focus on Equity, Equality, and Bias	5 hours
Addressing equity, bias, and discrimination in healthcare, global health inequities, and healthcare policies.	

6. Medical Malpractice: Definition, Understanding, and Laws Related to Medical Malpractice	4 hours
Definition, types, negligence, legal principles, and Indian laws governing malpractice.	
7. Healthcare Provider’s Responsibility to Oneself, to the Patients, and to Society	4 hours
Professional conduct, patient advocacy, maintaining boundaries, and social responsibility in healthcare.	
8. The Informed Consent in Medical Practice	5 hours
Definition, legal framework in India, and ethical considerations of obtaining informed consent in special situations.	
9. Ethics and Laws Governing Special Situations in Medical Care	5 hours
Ethical and legal issues in mental health, abortion, euthanasia, HIV, genetic testing, and organ transplantation.	
Practical (40 hours)	**Duration**
1. Group Discussions on Medical Ethics and Laws	15 hours
Case studies, role-play on ethical dilemmas in patient autonomy, life-sustaining treatments, and medical malpractice.	
2. Court Sessions on Medical Malpractice	5 hours
Understanding legal processes in medical malpractice claims and appreciating healthcare professionals' duties.	
3. Simulated Informed Consent Process	5 hours
Practice obtaining informed consent in various healthcare scenarios through role-play and communication skills.	
4. Patient Privacy and Confidentiality Workshop	5 hours
Discussing real cases of privacy breaches, studying privacy protocols, and understanding patient confidentiality.	

5. Workshops on Special Situations	10 hours
Ethical dilemmas related to mental health, abortion, euthanasia, organ donation, and surrogacy through role-play and case discussions.	

Books for reference:

1. Medical Ethics: Principles, Persons, and Problems by Edmund D. Pellegrino
2. Textbook of Medical Jurisprudence and Toxicology by C.K. Kuriakose

BPA 32. COMMUNITY MEDICINE AND CLINICAL RESEARCH (II) L/T/P/C:3/-/2/5

Goals:

This course provides students with a strong understanding of public health issues, including health disparities, nutrition, infectious disease control, and maternal health. In clinical research, students will learn biostatistics, research documentation, literature review, and data management. It equips students with the skills needed to address public health challenges and conduct clinical research.

Learning Methodology and Settings:

The course will use a combination of lectures, case studies, interactive discussions, hands-on exercises, and real-world applications. Students will engage in group activities, review current public health reports, and conduct mock clinical research using hospital or community-based data. In-person or online resources, simulations, and field visits will support the learning process, preparing students for real-world public health practice and clinical research.

Learning Objectives:

- Understand the impact of social determinants like race, ethnicity, and socio-economic status on health disparities.
- Apply knowledge of nutrition and public health to develop effective nutrition interventions and programs.
- Evaluate social and behavioral health factors and design health promotion strategies.
- Learn methods for controlling infectious diseases and improving maternal and child health outcomes.
- Grasp basic and inferential statistical methods to analyze clinical research data.
- Develop research protocols, proposals, and case report forms (CRFs) for clinical studies.
- Conduct literature reviews and critically appraise clinical research.
- Apply data management practices, including survey design and data validation, in clinical research.

Learning Outcomes

By the end of this course, students will be able to:

1. Explain the impact of social determinants of health, nutrition, and behavioral factors on health disparities and population health outcomes.
2. Design and evaluate health promotion, nutrition, and infectious disease control strategies to improve community health, including maternal and child health.
3. Apply basic statistical methods to analyze and interpret clinical research data.
4. Develop research proposals, perform literature reviews, and apply data management techniques including survey design and data validation in clinical research.

Public Health Theory 25 hours

Topics	Duration
1. Health Disparities and Health Equity	5 hours
Health disparities across populations (race, ethnicity, gender, socio-economic status); approaches to addressing inequities; cultural competency in public health; policy and program strategies.	
2. Nutrition and Public Health	5 hours
Relationship between nutrition and health outcomes; nutritional interventions and programs; food security; global nutrition challenges (undernutrition, obesity).	
3. Social and Behavioral Health	5 hours
Behavioral science in public health (health behaviors, risk factors); health promotion strategies; mental health and substance abuse; social and cultural factors affecting health.	
4. Infectious Disease Control	5 hours
Prevention and control of infectious diseases (vaccination, quarantine); epidemiology of diseases (HIV, tuberculosis, malaria); outbreak preparedness; surveillance and reporting.	
5. Maternal and Child Health	5 hours
Reproductive health, prenatal care, maternal mortality; child health, nutrition, immunization; adolescent health; early childhood development and education.	
Clinical Research theory (25 hours)	**Duration**
1. Introduction to Biostatistics	5 hours
Basic concepts in biostatistics; descriptive statistics; graphical representation; data distribution; hypothesis testing; confidence intervals; p-values; power and sample size.	
2. Inferential Statistics for Clinical Research	5 hours
Comparison of means (t-test, ANOVA); comparison of proportions (chi-square test); correlation and regression (Pearson‘s, linear, logistic); survival analysis (Kaplan-Meier, Cox model).	
3. Research Documents	5 hours
Research protocols and proposals; writing clinical research proposals; case report forms (CRFs); informed consent forms.	

4. Literature Review in Clinical Research	5 hours
Importance of literature review; reviewing existing research; critical appraisal; identifying gaps in current research.	
5. Data Management in Clinical Research	5 hours
Data collection methods; survey design; data validation and cleaning; handling missing data; data security and governance.	
Practical (60 hours)	**Duration**
1. Health Disparities and Health Equity	4 hours
Analyze health outcomes across different populations using NFHS and state health data; propose strategies to reduce health inequities.	
2. Nutrition and Public Health	6 hours
Assess nutrition-related public health issues in India (undernutrition, obesity); propose nutrition interventions based on ICMR studies and NNMB reports.	
3. Social and Behavioral Health	5 hours
Conduct surveys on health behaviors (smoking, alcohol use) in local communities; design and present health promotion campaigns.	
4. Infectious Disease Control	10 hours
Participate in simulated outbreak investigations (dengue, malaria, tuberculosis); track outbreaks, develop response plans, and monitor interventions using surveillance systems.	
5. Maternal and Child Health	5 hours
Evaluate maternal and child health programs (e.g., JSY); use health survey data to assess mortality rates, vaccination, and growth monitoring; propose community interventions.	
6. Introduction to Biostatistics	5 hours
Use statistical tools to analyze real clinical data; create graphs and calculate descriptive statistics (mean, median, SD).	
7. Inferential Statistics for Clinical Research	5 hours
Apply t-tests, chi-square tests, and regression analyses (linear, logistic) on simulated clinical trial data.	

8. Research Documents	8 hours
Develop research proposals, CRFs, and informed consent forms; draft a research protocol with study objectives, methodology, and ethical considerations.	
9. Literature Review in Clinical Research	6 hours
Conduct literature review using online databases (PubMed, Google Scholar); summarize key studies and evaluate research gaps.	
10. Data Management in Clinical Research	6 hours
Design a pilot survey for clinical research, structure questions, validate data, handle missing data, and learn data security compliance.	

SEMESTER VI

		Hours		
Code	**Subjects**	**Theory**	**Practical**	**Total**
33	**Non-Communicable Diseases**	70	80	150
34	**Geriatrics**	60	70	150
35	**Obstetrics and Gynaecology**	70	80	150
36	**Critical care**	30	30	60
37	**Community Medicine and Clinical Research-III**	40	40	60
	Total Hours **Total Credits: 28**	**270**	**300**	**570**

BPA 33. NON-COMMUNICABLE DISEASES L/T/P/C:4/-/3/7

Goal:

The course is designed to provide students with a clinical understanding of Non-Communicable Diseases (NCDs), emphasizing the diagnosis, management, treatment, and prevention of these diseases in the Indian context. The course will focus on cardiovascular diseases, diabetes, chronic respiratory diseases, cancer, mental health disorders, and the role of smoking, alcohol, and public health policies in managing these conditions. Students will also gain insight into the psychosocial impact of NCDs and the importance of public health interventions.

Learning Objectives:

By the end of the course, students will:

- Diagnose and manage common NCDs (Cardiovascular diseases, diabetes, chronic respiratory diseases, cancer, and mental health), considering the impact of lifestyle factors like smoking and alcohol.
- Understand India‘s public health policies related to NCDs, including the control of smoking and alcohol.
- Recognize the role of public health interventions, including tobacco and alcohol control programs, in preventing and managing NCDs.
- Learn how smoking, alcohol consumption, and other lifestyle factors contribute to the development and progression of NCDs.
- Integrate clinical management with an understanding of psychosocial factors in chronic disease care.

Learning Outcomes:

By the end of this course, students will be able to:

1. Identify and manage common non-communicable diseases including cardiovascular diseases, diabetes, chronic respiratory diseases, cancer, and mental health conditions.
2. Explain the role of lifestyle factors such as smoking, alcohol consumption, diet, and physical activity in the development and progression of NCDs.
3. Describe national public health policies and programs in India related to NCD prevention and control, including tobacco and alcohol control measures.
4. Integrate clinical management with psychosocial and public health approaches to provide comprehensive care for patients with chronic diseases.

Theory (70 hours)

Topics	Duration
1. Introduction to Non-Communicable Diseases (NCDs)	5 hours
Overview of NCDs in India, common pathophysiological mechanisms, multimorbidity, public health policies (NPCDCS), lifestyle factors (smoking, alcohol, diet).	
2. Cardiovascular Diseases	12 hours
Clinical presentation of hypertension, ischemic heart disease, heart failure, stroke; pathophysiology, smoking & alcohol impact, diagnosis, pharmacological treatment, preventive measures.	
3. Diabetes Mellitus	10 hours
Types (Type 1, Type 2, Gestational); pathophysiology, complications, diagnosis, lifestyle impact, management, preventive measures.	
4. Chronic Respiratory Diseases	7 hours
Common diseases (COPD, asthma, pulmonary fibrosis); pathophysiology, smoking & alcohol impact, diagnosis, management, preventive measures.	
5. Cancer Diagnosis and Management	8 hours
Common cancers, pathophysiology (tumor biology, metastasis), smoking & alcohol impact, management (chemotherapy, surgery), preventive measures (screening, vaccination).	
6. Mental Health Disorders	8 hours
Overview of depression, anxiety, bipolar disorder, schizophrenia, substance use disorders; pathophysiology, smoking & alcohol impact, diagnosis & management, preventive measures.	
7. Hypertension and Mental Health	5 hours
Hypertension pathophysiology, lifestyle factors (smoking, alcohol), management, psychosocial impact, preventive measures.	
8. Role of Lifestyle Modifications in Managing NCDs	7 hours
Role of diet and exercise, smoking cessation, alcohol control, psychosocial factors in managing NCDs.	
9. Public Health Frameworks in NCD Management	3 hours
NCD prevention and control in India, tobacco and alcohol policies (COTPA, NTCP), effectiveness in NCD prevention.	

Practical (80 hours)	Duration
1. Clinical Examination of Cardiovascular Diseases	8 hours
History taking, physical examination (heart failure signs, pulse rate, blood pressure), ECG interpretation, lifestyle impacts.	
2. Diabetes Mellitus Management	8 hours
Practical (80 hours)	Duration
Blood glucose testing, OGTT, patient education on monitoring blood glucose, insulin administration, mental health screening.	
3. Respiratory System Examination	8 hours
Respiratory history, physical examination (signs of distress, tactile fremitus, chest expansion), spirometry, smoking cessation counseling.	
4. Cancer Screening and Management	8 hours
Clinical screening exams (breast, cervical, abdominal palpation), tumor markers (PSA, CA-125), palliative care principles.	
5. Mental Health Disorder Screening	12 hours
Use standardized mental health screening tools (depression, anxiety, substance abuse), structured interviews, case studies, role play.	
6. Hypertension Management	8 hours
Accurate blood pressure measurement, hypertension diagnosis, lifestyle counseling, mental health assessments for hypertensive patients.	
7. Role of Lifestyle Modifications in NCDs	10 hours
Educating patients on diet, exercise, tobacco/alcohol cessation, providing psychosocial support for lifestyle changes.	
8. Public Health Frameworks in NCD Management	7 hours
Discussing public health education strategies, developing interventions for smoking cessation and alcohol control.	

Books for reference

1. Textbook of Preventive and Social Medicine by K. Park
2. Non-Communicable Diseases in India: Burden, Strategies, and Policy by R.K. Goel & S.K. Bansal
3. PublicHealth in India: The Role of Non-Communicable Diseases by K. Srinath Reddy & Rishad R. M.
4. Principles of Preventive Medicine by S. N. Bansal & R. K. Gupta
5. Chronic Disease Epidemiology and Control by M. L. K. Rao

BPA 34. GERIATRIC MEDICINE L/T/P/C:4/-/3/7

Goal

To equip PA students with the knowledge, skills, and attitudes to diagnose, manage, and rehabilitate older patients across various settings (in-patient, home, community, and day hospitals). Students will also learn to provide care that includes multi-disciplinary team collaboration, ethical decision-making, and effective communication in the context of

geriatrics.

Learning Objectives:

- Understand the biological, physiological, and psychosocial aspects of ageing.
- Learn how to assess, diagnose, and manage common geriatric conditions in multiple clinical settings.
- Develop skills in preventive care, rehabilitation, and palliative care for older adults.
- Gain knowledge of legal, ethical, and economic issues relevant to elderly patients

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain the biological, physiological, and psychosocial changes associated with ageing.
2. Assess, diagnose, and manage common geriatric conditions across different clinical settings.
3. Apply principles of preventive care, rehabilitation, and palliative care in the management of elderly patients.
4. Demonstrate understanding of legal, ethical, and economic issues involved in the care of older adults.

Theory: 60 Hours

Topic
1. Basic Sciences in Geriatrics (10 hours)
1.1 Biology of Human Ageing (2 hours): Theories of ageing, molecular/cellular mechanisms, telomeres, mitochondrial dysfunction
1.2 Epidemiology of Human Ageing (2 hours): Demographics of aging, common health challenges, epidemiological approaches
1.3 Immunology of Ageing (3 hours): Changes in immune function, immunosenescence, inflammation in ageing
1.4 Effects of Ageing on Organs (3 hours): Cardiovascular, respiratory, renal, musculoskeletal, nervous systems impact
1.5 Death and End-of-Life Care (1 hour): Physiological changes leading to death, ethical/legal considerations, palliative care
2. Clinical Geriatric Medicine (25 hours)
2.1 Geriatric Medicine Overview (3 hours): Clinical presentation, history taking, and multidisciplinary team roles
2.2 Common Patterns of Disease (5 hours): Cardiovascular, endocrine, neurological, renal/genitourinary disorders
2.3 Anemia and Lymphomas in Elderly (3 hours): Causes, diagnosis, and management of anemia and lymphomas
2.4 Immunological Disorders in Elderly (2 hours): Autoimmune diseases, rheumatoid arthritis, lupus
2.5 Cardiovascular System in Ageing (4 hours): Pathophysiology of cardiovascular diseases, management of hypertension, DVT
2.6 Endocrine and Metabolic Disorders (4 hours): Age-related endocrine changes, diabetes, electrolyte disturbances
2.7 Central Nervous System (3 hours): Structural and functional changes in the brain, dementia, Parkinson's
2.8 Musculoskeletal System (3 hours): Osteoarthritis, osteoporosis, myositis, and fractures
2.9 Genitourinary System and Disorders (2 hours): Renal failure, urinary incontinence, prostate disease, gynecological issues
2.10 Pharmacology and Polypharmacy (3 hours): Pharmacokinetics, drug interactions, polypharmacy risks

3. Preventive Geriatrics (10 hours)
3.1 Rehabilitation of Older Patients (4 hours): Physiotherapy, multidisciplinary rehabilitation, functional status assessment
3.2 End-of-Life and Palliative Care (3 hours): Symptom management, ethical decision-making, hospice care
3.3 Legal, Ethical, and Economic Aspects (3 hours): Elder abuse, legal rights, economic implications of elderly care
Practical (70 hours)
Topic
1. History Taking and Physical Examination (15 hours): Detailed history and physical examination, functional status assessment
2. Diagnostic Skills and Investigations (15 hours): Blood tests, imaging, cognitive assessments
3. Management of Geriatric Syndromes (15 hours): Managing chronic diseases, polypharmacy, urinary incontinence care
4. Palliative and End-of-Life Care (10 hours): Pain management, family counseling, end-of-life decision- making
5. Rehabilitation and Multidisciplinary Care (10 hours): Observation of rehabilitation protocols, assistive device training
6. Geriatric Emergency Management (5 hours): Management of acute conditions, emergency interventions in geriatrics

Books for reference

1. Geriatrics: A Practical Approach by Dr. B.K. Mahajan
2. Clinical Geriatrics by Dr. M. S. Bhatia
3. Geriatric Medicine: An Evidence-Based Approach by M. C. S. Khurana

BPA 35. OBSTETRICS AND GYNAECOLOGY L/T/P/C:4/-/3/7

Goals:

Equip students with the necessary knowledge, skills, and attitudes to manage obstetric and gynaecological emergencies, diagnose common conditions, and provide fertility regulation care, especially in resource-limited settings.

Learning Objectives:

- Diagnose and manage normal and abnormal pregnancy (antenatal, intranatal, and postnatal care).
- Address common gynaecological problems and emergencies.
- Counsel patients on fertility regulation methods.
- Gain knowledge on methods of pregnancy termination.
- Apply obstetrics and gynaecology knowledge to rural and community health programs.
- Develop communication and interpersonal skills.

Learning Outcomes:

By the end of this course, students will be able to:

1. Diagnose and manage normal and abnormal pregnancy across antenatal, intranatal, and postnatal periods.
2. Identify and manage common gynaecological conditions and emergencies using appropriate clinical approaches.
3. Counsel patients effectively on fertility regulation methods and reproductive health options.
4. Apply obstetrics and gynaecology knowledge in community and rural health programs while demonstrating effective communication and interpersonal skills.

Pre-requisites:

Basic knowledge of anatomy, physiology, microbiology, pathology, pharmacology, and basic surgical skills.

Theory Hours: 70

Section	Topic	Hours

1	Basic Sciences and Anatomy of Reproductive System	10
2	Endocrinology and Hormonal Regulation	10
3	Pregnancy and Placental Development	10
4	Pathophysiology of Reproductive Organs	10
5	Pregnancy and Labour	10
6	Pharmacology in Obstetrics and Gynaecology	5
7	Gynaecological Disorders	10
8	Contraception and Fertility Regulation	5
9	Neonatology and Recent Advances in Obstetrics and Gynaecology	10

Practical: 80 Hours

Practical Area	Topic	Hours
Obstetrics	History Taking and Examination of Pregnant Women	10
Obstetrics	Observation and Assistance in Normal Labour	10
Obstetrics	Managing Postpartum Hemorrhage	10
Obstetrics	Witnessing and Assisting in Cesarean Section, Breech, Forceps, and Vacuum Deliveries	10
Obstetrics	Essential Care of the Newborn	10
Obstetrics	Fetal Monitoring	10
Gynaecology	History Taking and Examination of Female Pelvic Organs	5
Gynaecology	Pap Smear and Wet Smear Preparation	5
Gynaecology	Assisting in Minor Gynaecological Procedures	5
Gynaecology	Medical Termination of Pregnancy (MTP)	5
Gynaecology	Insertion and Removal of Intrauterine Contraceptive Devices (IUCD)	5

Topic	Hours
Conducting a Normal Delivery	5
Episiotomy and Perineal Repair	5
Insertion and Removal of Intrauterine Devices (IUCD)	5
Minor Gynecological Surgeries	5
Minilaparotomy for Sterilization (Minilap Tubectomy)	5

Neonatology and Postnatal Care:

Topic	Hours
Neonatal Resuscitation and Care	5
Neonatal Assessment and Management	5

Topic	Hours
Basic Life Support and Neonatal Life Support	5
Counselling Skills	5

Books for references

- Textbook of Obstetrics for Undergraduates - V.L. Bhargava
- Manual of Practical Obstetrics - Holland & Brews
- Shaw‘s Textbook of Gynaecology

BPA 36. CRITICAL CARE MEDICINE L/T/P/C:2/-/1/3

Goal

The goal of this module is to provide PA students with comprehensive knowledge, skills, and clinical experience to manage critically ill patients in various healthcare settings. The program focuses on understanding the pathophysiology of critical illness, advanced monitoring techniques, and interventions, as well as the development of decision-making abilities in high- pressure environments.

Learning Objectives:

- Understand the basic and advanced concepts of critical care medicine.
- Learn the management of common critical care conditions such as respiratory failure, shock, sepsis, and multi-organ failure.
- Develop skills in the use of monitoring equipment and emergency interventions.
- Understand the ethical and legal aspects of critical care, including end-of-life care and communication with families.
- Gain hands-on experience in managing critically ill patients in real-world settings.

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain basic and advanced concepts of critical care medicine and patient monitoring.
2. Identify and manage common critical care conditions such as respiratory failure, shock, sepsis, and multi-organ failure.
3. Demonstrate appropriate use of critical care equipment and emergency interventions in clinical settings.
4. Apply ethical, legal, and communication principles in end-of-life care and management of critically ill patients.

Theory: 30 Hours

Section	Topic	Hours
1	Introduction to Critical Care Medicine	4
2	Pathophysiology of Critical Illness	6

3	Advanced Monitoring Techniques	4
4	Ventilation and Airway Management	6
5	Pharmacology in Critical Care	4
6	Ethical Issues and End-of-Life Care	4
7	Clinical Management of Specific Critical Conditions	2

Practical (30 Hours)

Practical Area	Topic	Hours
Airway and Ventilator Management	Endotracheal Intubation, Ventilator Settings and Management, Non- invasive Ventilation (CPAP/BiPAP)	8
Monitoring and Assessments	Monitoring Equipment (ECG, pulse oximeter, invasive BP monitoring), Arterial Blood Gas (ABG) Sampling and Interpretation, Neurological Monitoring (GCS, ICP)	6
Emergency Interventions and Resuscitation	Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS), Shock Management, Sepsis Management	6
Critical Care Procedures	Central Line Insertion, Arterial Line Insertion, Chest Tube Insertion	5
Multidisciplinary Team Collaboration	Role of PA in Critical Care Team, Patient Management Rounds	3
Palliative Care and Ethical Decision Making	Family Communication, Ethical Dilemmas in ICU	2

Books for references:

1. Textbook of Critical Care by Jean-Louis Vincent, Edward Abraham, Frederick A. Moore, and Ronald D. D. Walzer
2. The ICU Book by Paul L. Marino

BPA 37. COMMUNITY MEDICINE AND CLINICAL RESEARCH-III L/T/P/C:2/-/1/3

Goals:

This course aims to provide students with a comprehensive understanding of public health topics such as chronic disease epidemiology, emergency preparedness, health interventions, global health, public health law and ethics, and health policy. In clinical research, students will gain essential skills in data management, visualization, reporting, and manuscript writing. The course prepares students to address public health challenges and contribute to clinical research with practical skills and knowledge.

Learning Methods and Settings:

The course will be delivered through a blend of lectures, case studies, group discussions, practical activities, and assignments. Students will engage with real-world data, participate in role-play scenarios, and use statistical software to analyze and visualize clinical research data.

Learning Objectives:

- Understand the epidemiology and prevention of chronic diseases.
- Develop strategies for emergency preparedness and response.
- Design and evaluate public health interventions.
- Explore global health issues and initiatives.
- Apply ethical principles in public health and clinical research.
- Analyze health policy and its impact on public health outcomes.
- Master clinical data management and visualization techniques.
- Write clear, ethical research manuscripts and reports.

Learning Outcomes:

By the end of this course, students will be able to:

1. Explain the epidemiology, prevention, and control of chronic diseases and global health issues.
2. Design, implement, and evaluate public health interventions, including emergency preparedness and response strategies.
3. Analyze health policies and apply ethical principles in public health practice and clinical research.
4. Manage clinical data effectively and produce clear, ethical research manuscripts, reports, and visualizations.

Public Health (Theory 20 hours)

Topic	Content	Hours
Chronic Disease Epidemiology	Prevention and control of chronic diseases (heart disease, diabetes, cancer, etc.) Risk factors for chronic diseases (lifestyle, genetics, environment) Screening and early detection Public health interventions and policy strategies for chronic disease prevention	6
Emergency Preparedness and Response	Public health response to natural disasters and pandemics Emergency preparedness plans and crisis management Public health roles in disaster relief and recovery Community resilience and recovery strategies	6
Public Health Interventions	Community-based public health interventions Health education and promotion programs Behavioral change theories and strategies Evaluation of public health programs and interventions	6
Global Health	Global health challenges (infectious diseases, non-communicable diseases, etc.) Global health initiatives and organizations (WHO, UNICEF, etc.) International health regulations and frameworks Health disparities in low- and middle-income countries	6
Public Health Law and Ethics	Legal principles in public health (quarantine, vaccination laws, etc.) Ethical considerations in public health research and practice Confidentiality and informed consent The balance between individual rights and public health goals	6

Health Policy and Management	Public health systems and organizations (local, national, global) Factors influencing health policy Government structure and ideology Political party platforms and priorities Lobbying and political advocacy Legislative process International politics Healthcare funding and budget Economic growth Healthcare market and private sector Cost of healthcare Inequalities in economic status Demographics Public health needs Health literacy and public awareness Cultural and social norms Advances in medical technology Health information technology Pharmaceutical innovation Evidence-based medicine Public health research and surveillance Laws and regulations Regulatory agencies Climate change and environmental health Global health issues Public opinion Advocacy and social movements Health policy development and analysis Health economics and financing (insurance, cost-effectiveness)	6
Clinical Research (Theory)		20
Topic	**Content**	**Hours**
ata Management in Clinical Research	Data Collection Electronic Data Capture (EDC) Case Report Forms (CRFs) Surveys Survey Design Designing Survey Forms Data Validation and Cleaning Handling Missing Data Data Security Data Governance	5
Data Visualization in Clinical Research	Importance of Data Visualization Types of Visualizations (Histograms, Bar charts, Box plots, Scatter plots, Kaplan-Meier plots) Visualizing Data by Type (Continuous, Categorical, Survival) Using Statistical Software (R, SPSS)	5

Reporting and Interpreting Clinical Data	Interpreting Results (p-values, confidence intervals) Ethical Reporting Clinical Trials Reporting Standards (CONSORT) Critical Appraisal of Clinical Data	5
Manuscript Writing in Clinical Research	Structure of a Research Manuscript Writing a clear introduction, methods, results, discussion, and conclusion Proper data presentation: Tables, Figures, Graphs Ethical Considerations	5
Practical (Public Health)		20
Chronic Disease Epidemiology	Analyze publicly available epidemiological data on chronic diseases like diabetes and heart disease. Identify risk factors (lifestyle, genetics) and design a screening program for early detection of one condition.	5
Global Health	Review global health challenges (e.g., infectious diseases, health disparities) and propose solutions to improve health outcomes in low-income countries. Analyze data from international organizations like WHO and UNICEF.	5
Public Health Law and Ethics	Engage in case studies on public health law topics such as quarantine, vaccination mandates, and informed consent. Debate ethical dilemmas in public health practice, including balancing individual rights with public health goals.	5
Health Policy and Management	Analyze the influence of political and economic factors on any one health policy of India.	5

Practical (Clinical Research)		20
Data Management in Clinical Research	Design a short survey for clinical data collection, focusing on case report forms and electronic data capture tools. Practice data cleaning and validation techniques.	5
Data Visualization in Clinical Research	Use SPSS or R or any other software to create visualizations (e.g., histograms, bar charts, Kaplan-Meier plots) from your survey data sample, focusing on selecting the appropriate visualization type for each data set.	5
Reporting and Interpreting Clinical Data	Interpret the data by calculating p-values, confidence intervals, and clinical significance. Report results following ethical guidelines, ensuring transparency and accuracy.	5
Manuscript Writing in Clinical Research	Write sections of a clinical research manuscript, focusing on structure (introduction, methods, results, discussion) and ensuring clarity, proper data presentation, and adherence to ethical standards.	5

Books for references

1. Emergency Public Health: Preparedness and Response by Linda Y. Lee and Sara E. Raskin
2. Disaster Medicine by Richard P. W. Haines and M. C. Biddinger
3. Indian Health Policy: The Challenges and the Way Forward by R. S. Sood
4. Health Systems in India: Principles, Functions, and Challenges by N. R. Bhatia and B. K. Vaidya

Semesters VII and VIII-Clinical Year/Internship

Students will be posted six months in general medicine with a focus in primary care and six months in surgery-3 months in general surgery and 3 months in any specialty medicine of their choice (medical or surgical). The thesis worked over the preceding semesters will be completed and submitted by the interns at the end of Semester VI and subjected to scrutiny. Successful completion of the thesis to the satisfaction of the reviewers forms an essential part of the PA programme. Five days a week will be devoted to clinical training and one day would be dedicated to activities for academic advancements. The interns should be provided adequate living expenses as stipend during the internship period. If the teaching institute does not have adequate clinical facilities, they should arrange for an internship in an external site. It is the teaching institute ‘s responsibility to provide stipend, and arrange for mentors at the external site. An intern should not do clinical work for more than 10 hours in a day. In case if the duty hours overshoots, the intern should be financially compensated for the overtime.

Year IV Semester VII

Course Code	Course Title	Credits/Week			Hours/Semester			Assesments		Total
		L	P	C	L	T/P	Total	INT	EXT	
	Internship	2	20	22	30	900	930	-	100	100
	Project work		06	06		270	270		100	100
Total		**2**	**26**	**28**	**30**	**1170**	**1200**	**-**	**200**	**200**

Year IV Semester VIII

Course Code	Course Title	Credits/Week			Hours/Semester			Assesments		Total
		L	P	C	L	T/P	Total	INT	EXT	
	Internship	2	20	22	30	900	930	-	100	100
	Project work		06	06		270	270		100	100
Total		**2**	**26**	**28**	**30**	**1170**	**1200**	**-**	**200**	**200**