MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Mahatma Gandhi Institute of Allied Health Sciences

Syllabus

Bachelor of Physician Associates (B.PA)

4 years

(3 Years + 1 Year Internship)

Program Code: BPA26

Duration- VIII Semesters (4 Years)

(B.PA)

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2026-2027

Recommended by the BOS in Allied Health Sciences at its meeting held on 8th April, 2026, the Faculty of Allied and Healthcare Professions at its meeting held on 28.7.2026 and approved by Academic Council at its meeting held on 03.08.2026

NOTICE

1. The university reserves the right to make changes in the syllabus /books/ guidelines, fee-structure or any other information at any time without prior notice the decision of the university shall be binding on all.

2. The jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

3. This syllabus is aligned with the NCAHP Curriculum dated 24.04.2025 and Corrigendum dated 08.04.2026. Any subsequent amendments, revisions or corrigenda issued by the NCAHP shall automatically apply to the Rules, Regulations and Syllabus of MGUMST, Jaipur, and implemented accordingly.

References:

- https://ncahp.abdm.gov.in/Curriculum/Physician%20Associate.pdf

- https://ncahp.abdm.gov.in/Curriculum/CurriculumCorrigendum/Corrigendum-1Physician%20Associates08Apr2026.pdf

LIST OF ABBREVIATIONS

ABC	Airway Breathing Circulation
ABG	Arterial Blood Gas
ACE	Angiotensin Converting Enzyme
ACLS	Advanced Cardiovascular Life Support
ADH	Anti Diuretic Hormone
ADL	Activities of Daily Living
ADR	Adverse Drug Reactions
AHP	Allied Health Professional
AI	Artificial Intelligence
ANOVA	Analysis of Variance
ARB	Angiotensin Receptor Blocker
ATP	Adenosine Triphosphate
AV	Atrio Ventricular
BLS	Basic Life Support
BMI	Body Mass Index
BP	Blood Pressure
B.PA	Bachelor of Physician Associate
BV	Bacterial Vaginosis
CABG	Coronary Artery Bypass Grafting
CATS	Credit Accumulation and Transfer System
CBCS	Choice-Based Credit System
CBD	Case-based discussion
CD	Compact Disc
CDSCO	Central Drugs Standard Control Organization
CEO	Chief Executive Officer
CEX	Clinical Evaluation Exercise
CNS	Central Nervous System
CO2	Carbon Dioxide
CONSORT	Consolidated Standards of Reporting Trials
COPD	Chronic Obstructive Pulmonary Disease
COTPA	Cigarettes and Other Tobacco Products Act
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
CRF	Case Report Form
CRISPR	Clustered Regularly Interspaced Short Palindromic Repeats
CT	Computed Tomography
DASH	Dietary Approaches to Stop Hypertension
DKA	Diabetic Keto-Acidosis
DNA	Deoxy Ribonucleic Acid

DNR	Do Not Resuscitate
DOP	Day Of Pregnancy
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
ECMO	Extracorporeal Membrane Oxygenator
ECTS	European Credit Transfer and Accumulation System
EDC	Electronic Data Capture
ELISA	Enzyme Linked Immunosorbent Assay
ENT	Ear Nose Throat
ERV	Expiratory Reserve Volume
FVC	Forced Vital Capacity
GFR	Glomerular Filtration Rate
GPCR	G-Protein Coupled Receptors
HDL	High Density Lipoprotein
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IPE	Inter Professional Education
IRV	Inspiratory Reserve Volume
IUCD	Intra Uterine Contraceptive Device
JCI	Joint Commission International
K+	Potassium
MD	Doctor of Medicine
MIC	Minimum Inhibitory Contraception
MMR	Measles Mumps Rubella
MOU	Memorandum of Understanding
MPA	Master of Physician Associate
MRI	Magnetic Resonance Imaging
MS	Microsoft
MTP	Medical Termination of Pregnancy
Na+	Sodium
NAAC	National Assessment and Accreditation Council
NABH	National Accreditation Board for Hospital
NCAHP	National Council for Allied and Healthcare Professionals
NCD	Non-Communicable Diseases
NEET	National Eligibility cum Entrance Test
NFHS	National Family Health Survey
NIAHS TSU	National Initiative for Allied Health Sciences – Technical Support Unit
NICU	Neonatal Intensive Care Unit
NOAEL	No Observed Adverse Effect Level
NSCLC	Non-Small Lung Cancer

NSDA	National Skill Development Agency
NSQF	National Skills Qualification Framework
NST	Nonstress Test
NTCP	National Tobacco Control Program
O2	Oxygen
OCSE	Objective Structured Clinical Examination
OGTT	Oral Glucose Tolerance Test
OPD	Outpatient Department
OSLER	Objective Structured Long Examination Record
OSPE	Objective Structured Practical Examination
PA	Physician Associate
PANCE	Physician Assistant National Certifying Exam
PCR	Polymerase Chain Reaction
PHC	Primary Health Care
PhD	Doctor of Philosophy
PNS	Peripheral Nervous System
PPE	Personal Protective Equipment
PSA	Prostate Specific Antigen
RAM	Random Access Memory
RCT	Randomized Controlled Trial
RNA	Ribonucleic Acid
SA	Sino Atrial
SCLC	Small Cell Lung Cancer
SDL	Self Directed Learning
SPSS	Statistical Package for Social Sciences
STI	Sexually Transmitted Infection
TB	Tuberculosis
TCA	Tricarboxylic Acid Cycle
TNF	Tumor Necrosis Factor
TURP	Transurethral Resection of Prostate
TV	Trans Vaginal
UGC	University Grants Commission
UNICEF	United Nations Children ‘s Fund
URL	Uniform Resource Locator
VATS	Video-Assisted Thoracic Surgery
VR	Virtual Reality
WBC	White Blood Cell

Rules and Regulations of

- **Bachelor of Physician Associates (B.PA)**

Program Code: BPA26

1. **Title of the Program** - Bachelor of Physician Associates (B.PA)

2. **Duration of the Program** – Duration shall be for a period of 4 years (VII-VIII semesters) including one year of internship.

3. **Medium of Instruction** – English

4. **Eligibility for Admissions**

   - Candidate must have passed Senior Secondary (10+2) or equivalent with Physics, Chemistry & Biology (Botany & Zoology).

   - Admission on the basis of Senior Secondary (10+2) Merit.

   - Foreign students' admission process in Under Graduate (UG):

     i. Foreign national students intending to study UG program in India, shall have to take equivalence certificate of eligibility from respective State Allied and Healthcare Council.
     ii. For Under Graduate admission of foreign national students, merit list will be based on University Entrance Exam.
     iii. Verification of Valid Visa and valid visa duration of foreign national students, to be verified by respective institution and University before enrolling students for program.

   - He/she has completed 17 years of age at the time of admission or will complete that age on or before 31 December of the year of his/her admission to the first year of the Undergraduate Allied and Healthcare Course.

   - Medical fitness certificate is mandatory to submit and it is to be endorsed by Government medical officer

   - The admission criteria shall be updated by the Commission from time to time.

   - Admission process shall be conducted by State/Union Territory/University

5. **Admission Process** – Selection shall be done by an admission board of the University/Rajasthan State Allied & Healthcare Council strictly on merit/written examination.

6. **Reservation Policy** – Reservation policy for admissions shall be as per the state/ Centre Government norms.

7. **Enrolment**[@]
    1. Every candidate who is admitted to the Bachelor of Physician Associates program in Mahatma Gandhi Institute of Allied Health Sciences shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST) after paying the prescribed eligibility and enrolment fees.

    2. A candidate shall deposit enrolment fee along with tuition fees at the time of his/her admission to the program. Such a candidate who fails to submit, to the college principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed period then after he/she shall pay late fee applicable at that time. No student will be allowed to appear in the End of Semester Examination without his/her enrolment.

8. **Introduction – "**Physician Associates are healthcare professionals trained in a medical model who practice medicine as part of a healthcare team. They are qualified and competent to provide preventive, diagnostic, and therapeutic services under the supervision of a physician."

a) Objectives / Aim of the Program

- 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.
- 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
- 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
- Able to understand how the social determinants of health impact the patient and incorporate them into care plan
- Able to engage advocacy as well as social accountability activities as they relate to patient care.

b) Programme Outcomes (POs)

Upon successful completion of the B.PA program, students will be able to:

POs	Outcome
PO1	**Apply knowledge** of anatomy, physiology, pathology, microbiology, pharmacology and clinical medicine in healthcare practice.
PO2	**Demonstrate competency** in patient assessment, history taking, physical examination, interpretation of diagnostic investigations and patient care under physician supervision.
PO3	**Perform** essential clinical, diagnostic and procedural skills safely, effectively and ethically according to healthcare protocols.
PO4	**Apply** scientific reasoning, critical thinking and evidence-based approaches in clinical decision-making and problem solving.
PO5	**Communicate effectively** with patients, families, healthcare professionals and communities using verbal, written and interpersonal communication skills.
PO6	**Demonstrate** professionalism, ethical values, accountability and respect for patient rights, privacy and legal responsibilities.
PO7	**Function effectively** as an integral member of multidisciplinary healthcare teams and provide coordinated patient-centered care.
PO8	**Apply principles** of community medicine, preventive healthcare, health promotion and disease prevention to address societal health needs.
PO9	**Demonstrate** leadership, mentorship, emergency response and healthcare management skills for quality healthcare delivery.
PO10	**Engage in** research activities, self-directed learning, healthcare technology utilization and continuous professional development for lifelong learning.

C) GRADUATE ATTRIBUTES:-

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

9. 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. Program Completion Timeline

10. Minimum Instruction/ Teaching Days – Each academic semester shall consist of minimum 120 working days, including examinations.

11. Programme Structure (Semester I, II, III, IV_____*Distribution of courses semester wise)*

B.PA FIRST SEMESTER

COURSE CODE	COURSE NAME	Lecture (hours)	Practical	Credits	Contact Hours
BPA 101	Anatomy-I	50	50	5	100
BPA 102	Physiology-I	50	60	5	110
BPA 103	Biochemistry and Molecular Biology-I	40	50	5	90
BPA 104	Introduction to Microbiology	40	50	5	90
BPA 105	Introduction to Healthcare Delivery System in India and Community Orientation-I#	50	40	4	90
BPA 106	Professionalism, Communication, and soft skills#	40	50	4	90
	Total	**270**	**300**	**28**	**570**

B.PA SECOND SEMESTER

Course Code	COURSE NAME	Lecture	Practical	Credits	Contact Hours
BPA 201	Anatomy-II	50	70	5	120
BPA 202	Physiology-II	50	70	5	120
BPA 203	Biochemistry and Molecular Biology-II	50	30	5	80
BPA 204	Medical Microbiology	60	40	5	100
BPA 205	Introduction to computers and Professionalism	40	60	5	100
BPA 206	Community orientation -II / Clinical skills#	20	30	3	50
	Total	**270**	**300**	**28**	**570**

B.PA THIRD SEMESTER

Course Code	COURSE NAME	Lecture	Practical	Credits	Contact Hours
BPA 301	Pharmacology & Toxicology-I	50	30	5	80
BPA 302	Pathology	50	60	5	110
BPA 303	General Medicine-I	50	60	5	110
BPA 304	Basics of Surgery	50	40	5	90
BPA 305	ENT, Ophthalmology & Dermatology	50	80	6	130
BPA 306	Community Orientation / Engagement	10	15	1	50
BPA 307	B.PA Clinics - I	10	15	1	50
	Total	**270**	**300**	**28**	**570**

B.PA FOURTH SEMESTER

Course Code	COURSE NAME	Lecture	Practical	Credits	Contact Hours
BPA 401	Pharmacology & Toxicology-II	40	40	4	80
BPA 402	General Medicine-II	50	60	6	110
BPA 403	Advanced Surgery	70	60	6	130
BPA 404	Psychology & Introduction to Behavioral Medicine	40	50	4	90
BPA 405	Medical Communication#	30	40	4	70
BPA 406	Community Medicine and Clinical Research – I	0	50	2	90
BPA 407	B.PA Clinics – II			2	
	Total	**270**	**300**	**28**	**570**

B.PA FIFTH SEMESTER

Course Code	COURSE NAME	Lecture	Practical	Credits	Contact Hours
BPA 501	Pediatrics	70	80	7	140
BPA 502	Emergency Medicine	80	80	7	160
BPA 503	Community Medicine and Clinical Research-II	50	60	5	110
BPA 504	Medical Law and Ethics#	40		3	40
BPA 505	Introduction to healthcare management	40	40	4	80
BPA 506	B.PA Clinics - III		40	2	40
	Total	**270**	**300**	**28**	**570**

B.PA SIXTH SEMESTER

Course Code	COURSE NAME	Lecture	Practical	Credits	Contact Hours
BPA 601	Non-Communicable Diseases	70	80	6	150
BPA 602	Geriatrics Medicine	60	70	6	130
BPA 603	Obstetrics and Gynaecology	70	80	6	150
BPA 604	Critical care Medicine	30	30	3	60
BPA 605	Community Medicine and Clinical Research-III	40	40	3	80
BPA 606	Research Project- I			2	
BPA 607	B.PA Clinical IV			2	
	Total Hours Total Credits: 28	**270**	**300**	**28**	**570**

B.PA SEVENTH & EIGHTH SEMESTER

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 institutes 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

Course Name	**Credit**	**Contact Hours**
INTERNSHIP (clinical posting/research dissertation)	20 + 20	900+900
TOTAL	**40**	**1800**

Total credits = **168** credits

Total Contact hours = **5220**

Contact hours of all semesters **= (570+ 570+570+570+570+570) + (900+900)**

Credit Details:

- Lecture: 1 credit = 15 hours
- Practical: 1 credit = 30 hours
- Clinical postings: 1 credit = 45 hours

Credit Includes: L – Lectures, T - Tutorials, P - Practical.

12. **Conduct of Continuous Assessment/ Internal Assessment –**

Theory – 25

There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in a semester. The average marks of the two tests will be calculated and reduced to 25.

Class participation/presentation	5 marks
Sessional exams	20 marks

The marks of Internal Assessment shall be communicated to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of such periodical tests. The marks of Internal Assessment must be displayed on the notice board of the respective colleges within a fortnight from the date the test is held. If a candidate is absent for any one of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test within a fortnight.

13. Dissertation/ Internship/ Project/ Clinical Postings

7th and 8th Semester: Internship (Clinical Posting / Research dissertation):

A compulsory internship (Clinical Posting / Research Dissertation) of one year—equivalent to 12 months, 52 weeks, or 1800 hours—carrying 40 credits, must be completed by each student to be eligible for the award of the **Bachelor of Physician Associates (S)** degree.

During the internship period, students shall undergo the following clinical postings:

A summary of activities undertaken:

Clinical Posting	**Duration**
General Medicine (Primary Care)	6 Months
General Surgery	3 Months
Medical / Surgical Specialty of Student's Choice	3 Months

The thesis/dissertation shall be completed and submitted at the end of the internship. Successful completion of the thesis forms an essential part of the B.PA programme.

Five days a week shall be devoted to clinical training and one day to academic activities. Students shall adhere to the rules and regulations of the host institution during the internship period.

Upon successful completion, students shall receive an Internship Certificate authenticated by the HOD/Coordinator and the Head of the Institution.

Note: The B.PA degree shall be awarded only upon successful completion of the internship and dissertation requirements.

14. Scheme of Examination –The end of semester examination for the program shall be conducted semester wise at the end of every semester.

MARKS DISTRIBUTION

B.PA FIRST SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA 101	Anatomy-I	25	50	25	100
BPA 102	Physiology-I	25	50	25	100
BPA 103	Biochemistry and Molecular Biology- I	25	50	25	100
BPA 104	Introduction to Microbiology	25	50	25	100
BPA 105	Introduction to Healthcare Delivery System in India and Community Orientation-I #	100	-	-	100
BPA 106	Professionalism, Communication, and soft skills #	100	-	-	100
Total		**300**	**200**	**100**	**600**

B.PA SECOND SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA201	Anatomy - II	25	50	25	100
BPA202	Physiology - II	25	50	25	100
BPA203	Biochemistry and Molecular Biology - II	25	50	25	100
BPA204	Medical Microbiology	25	50	25	100
BPA205	Introduction to computers and Professionalism	50	-	50	100
BPA206	Community orientation -II / Clinical skills#	100	-	-	100
	Total	**250**	**200**	**150**	**600**

B.PA THIRD SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA301	Pharmacology and toxicology -	25	50	25	100
BPA302	Pathology	25	50	25	100
BPA303	General Medicine - I	50	50	-	100
BPA304	Basics of Surgery	50	50	-	100
BPA305	ENT, Ophthalmology and Dermatology	50	50	-	100
BPA306	Community Orientation -III	50	-	50	100
BPA307	B.PA Clinics - I	50	-	50	100
	Total	**300**	**250**	**150**	**700**

B.PA FOURTH SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA401	Pharmacology and toxicology - II	25	50	25	100
BPA402	General Medicine-II	50	50	-	100
BPA403	Advanced Surgery	50	50	-	100
BPA404	Psychology and Introduction to Behavioural	50	50	-	100
BPA405	Medical Communication	100	-	-	100
BPA406	Community Medicine and Clinical Research - I	50	-	50	100
BPA407	B.PA Clinics - II	50	-	50	100
Total		**375**	**200**	**125**	**700**

B.PA FIFTH SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA501	Paediatrics	50	50	-	100
BPA502	Emergency Medicine	50	50	-	100
BPA 503	Community Medicine and Clinical Research-II	50		50	100
BPA504	Medical Law and Ethics	100	-	-	100
BPA 505	Introduction to healthcare	50	50	-	100
BPA506	B.PA Clinics - III	50	-	50	100
Total		**350**	**150**	**100**	**600**

B.PA SIXTH SEMESTER

Course Code	Course Title	Internal Assessment	External University Theory	External University Practical / Viva	Total
BPA 601	Non-Communicable Diseases	50	50	-	100
BPA 602	Geriatric Medicine	50	50	-	100
BPA 603	Obstetrics and Gynaecology	50	50	-	100
BPA 604	Critical Care Medicine	50	50	-	100
BPA 605	Community Medicine and Clinical Research-III	50	50	-	100
BPA606	Research Project- I	-	-	100	100
BPA607	B.PA Clinical IV	50	-	50	100
Total		**300**	**250**	**150**	**700**

B.PA SEVENTH & EIGHTH SEMESTER

COURSE NAME	Continuous Assessment	End Semester Examination	Total
Clinical Posting/Research Dissertation (Logbook and Viva)	90	210	300

Note: ESE* will be conducted immediate after end of the 8th semester at the institutional level.

15. Conduct of University Examination/ End of Semester Examination –

a) **Appointment of Examiners and Paper Setters (Qualification of paper Setters and Examiners):**

- All the examiners, paper setters, theory examination answer book evaluators, external and internal examiners for practical examinations shall be appointed by the respective university.
- Professor/Assoc. Professor/ Assistant Professor/Lecturer/Allied Health Professional having PG Qualification and 3 years professional /teaching experience after PG in respective fields or UG Qualification and 5 years professional industry/teaching experience after UG is eligible to act as an internal or external examiner of theory/practical examination.
- For the 1st semester to 4th semester examination- respective theory question papers shall be set by the internal examiners covering their respective areas of syllabus. For each theory question paper, there shall be a separate internal examiner. The answer books shall be evaluated by the concerned internal examiners (paper setters).
- In the Vth and VIth semester examination, 25% of the theory question papers shall be set and evaluated by external examiners. The external examiner (paper setter) shall evaluate answer books of his/her theory paper.

b) **Eligibility to appear for the Examination**:

- A student is required to have minimum 75% attendance in theory and 80% in practical's separately of each semester to make him/her eligible to appear in the university semester examination.
- Candidates failing in one or more subjects (theory/practical) of semester will require to appear in failing subjects in the next examination of same semester.

c) Theory Examinations:

- There shall be Theory papers in each semester of study.
- Each Theory paper examination shall be of 2 hours duration and a maximum of 50 marks.
- Internal assessment (IA) shall be 25 marks for each Theory paper.

- The Paper Setter shall set the questions within the prescribed course of study of the concerned paper. There will be a set pattern of question papers duly approved by the Academic Council.

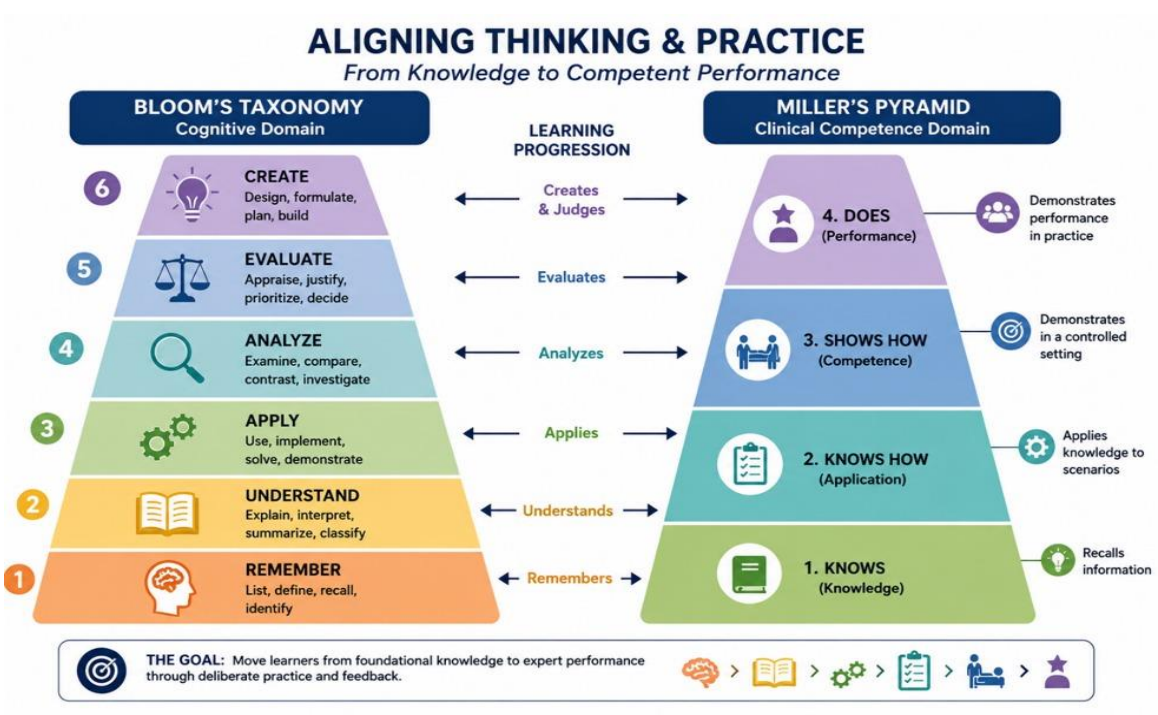
MAXIMUM MARKS = 50		
TYPE OF QUESTION	NUMBER OF QUESTION	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (to answer 2)	10
SHORT ESSAY TYPE	8 (to answer 6)	5

Passing Marks: A candidate will have to obtain at least 50% marks in each Theory paper including internal assessment to pass.

Bloom's Taxonomy: A blended approach—combining **didactic methods, experiential laboratory training, problem-solving, clinical immersion, and research exposure**—is essential in Physician Associates. When guided by educational frameworks such as **Bloom's Taxonomy,** these methodologies ensure that learners progress from acquiring foundational knowledge to demonstrating competence and ultimately practicing independently as professionals.

By weaving Bloom's Taxonomy (cognitive depth) the curriculum ensures that graduates not only master theoretical knowledge but also translate it into safe, accurate, and independent laboratory practice.

Bloom's Taxonomy



d) **Practical Examinations and Viva Voce**

- At the end of each semester there shall be the practical and viva-voce examination. It shall be conducted after the Theory examination is over. A

candidate will have to obtain at least 50% marks in the practical and viva-voce examination.

- The university shall appoint the panel of examiners in such a manner that the complete syllabus of semester is taken care of by the internal/external practical examiner(s).

e) **Results:** A candidate will have to obtain at least 50% marks separately in each Theory paper including internal assessment and a minimum of 50% marks in the practical examination for him to be declared pass.

f) Supplementary Examination (MGUSMT RULES)[@]:

Supplementary examination conducted by the University for unsuccessful candidates. Lower semester exams conducted along with current semester exams. Internal assessment can be improved before supplementary examination.

Grace Marks: The award of grace marks shall be as per the policy governed by the rules of Mahatma Gandhi University of Medical Sciences & Technology (MGUMST)

g) Revaluation/ Scrutiny (As per MGUMST Rules)

Re- Evaluation of marks is permitted only for theory papers. The University/board, on application within the stipulated time and remittance of a prescribed fee, shall permit a Re- evaluation of marks for the course/s applied. The marks obtained after re- evaluation shall be the final marks awarded.

h) **Promotion to the next Semester**:- A candidate who has appeared in the University examination of a semester and has passed it OR failed in one or more subjects shall be promoted to next semester. A candidate will be allowed to start internship only when the backlog of all subjects (theory and practical) of first semester to sixth semesters exams including elective papers (if any) is cleared. (As per MGUMST rules)

Letter Grades and Grade Points

Letter Grade	A+	A	B	C	D	E	F/I/DT
Credit value	10	9	8	7	6	5	0

F- Fail, DT - Detained/Attendance shortage, I – Incomplete

Calculation of GPA & CGPA: An example is provided

Course code	**Course**	**Credits (a)**	**Grade obtained by the student**	**Credit value (b)**	**Grade Points (a x b)**

B.PA 1	Course - 1	4	D	6	24
B.PA 2	Course - 2	4	B	8	32
B.PA 3	Course - 3	3	A+	10	30
B.PA 4	Course - 4	4	C	7	28
B.PA 5	Course - 5	5	A	9	45
TOTAL		**20**	**-**	**-**	**159**

1st Semester GPA = Total grade points / total credits

159/20 = **7.95**

Suppose in **the 2nd semester, GPA** = **8.35** with respective course credit 20

$$Then, 1^{st} YearCGPA = \frac{\sum 7.95x20 + \sum 8.35x20}{20 + 20} = 8.15$$

Credit Weightage Distribution

Item	Weightage (%)
Formative	
Class participation/presentation	5%
Assignment & quizzes	
Sessional exams	20%
Summative	
End-of-Semester University exam	50%
End-of-Semester University Practical	25%
Total	100 %

Internals Weightage (%)	End semester Exam Weightage (%)	End semester practical Exam Weightage (%)

25	50	25

16. Award of Degree@: The degree shall be awarded by the university only after receipt of course completion certificate and No Dues from the principal of the college.

17. Authority to issue transcript: The Controller of Examination of the University shall be the authority for issuing transcript after receiving the described fee from the candidate.

18. Logbooks and Clinical Records:

- A compulsory internship (Clinical posting/ Research dissertation) of one year - equivalent to 12 months, 52 weeks, or 1800 hours - carrying 40 credits, must be completed by each student to be eligible for the award of the Bachelor of Physician Associates (B.PA).

19. Any specific point/ rule/ regulation related to college/ institute- NA

20. Course wise Syllabus with Recommended Text Books

21. Model Papers- Attached

QUESTION PAPER TEMPLATE FOR B.PA SEMESTER I–IV

INSTRUCTIONS FOR PAPER SETTERS FOR B.PA SEMESTER I–IV

1. All questions must be framed in alignment with the NCAHP framework. Map each question to the relevant Course Outcome (CO) and Bloom's taxonomy.
2. Every question must carry two mandatory annotations:(a) Course Outcome (CO): e.g., CO2, CO5;(b) Highest Bloom's Level Attained: e.g., L3 – Application. These must be written in brackets after the question text.
3. The Bloom's Taxonomy ceiling for B.PA Semester I–IV is Level 3 – Application. No question in this paper shall exceed this level. The paper setter must self-audit using the Bloom's reference table provided in this template.
4. Question distribution across Bloom's levels [L1 – Knowledge; L2 – Comprehension; and L3 – Application] must be documented on the master copy. Recommended distribution for Semester I–IV:
   L1–L2: ~70–80%;
   L3: ~20–30%;
   L4–L6: ~0% (not applicable).
5. Avoid repetition of topics across questions. Q1, Q2 and Q3 should collectively cover a minimum of 6–8 different topics/competencies to ensure adequate syllabus sampling.
6. All Long Answer Questions must carry sufficient internal scope. A 10-mark Long Answer Question should have 4–5 expected response components. These expected answers must be included in the model answer key submitted alongside the paper.
7. The paper setter must submit:
   (i) Question Paper with CO + Bloom's Level annotations;
   (ii) Model Answer Key with marking scheme.
   All documents are confidential and must be submitted in a sealed envelope to the Examination Cell.

B.PA Semester I–IV: Question-Level Mapping Table (50 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 2 out of 3)	L1 – L3
Q2	Short Answer (Attempt any 6 out of 8)	L1 – L3

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Physician Associates (B.PA)

Semester
Subject Name

Time: 2 Hours
Maximum Marks: 50

Q.1. Long Answer Questions (Attempt any 2 out of 3) (2 × 10 = 20 Marks)

a). ..... (CO____, L____)

b). ..... (CO____, L____)

c). ..... (CO____, L____)

Q.2. Short Answer Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a). ..... (CO____, L____)

b). ..... (CO____, L____)

c). ..... (CO____, L____)

d). ..... (CO____, L____)

e). ..... (CO____, L____)

f). ..... (CO____, L____)

g). ..... (CO____, L____)

h). ..... (CO____, L____)

QUESTION PAPER TEMPLATE FOR B.PA SEMESTER V–VI

INSTRUCTIONS FOR PAPER SETTERS FOR B.PA SEMESTER V–VI

1. All questions must be framed in alignment with the NCAHP framework. Map each question to the relevant Course Outcome (CO) and NCAHP and Bloom's Taxonomy.
2. Every question must carry two mandatory annotations:(a) Course Outcome (CO): e.g., CO2, CO5;(b) Highest Bloom's Level Attained: e.g., L5.These must be written in brackets after the question text.
3. The Bloom's Taxonomy ceiling for B.PA Semester V–VI is Level 5 – Evaluation. No question in this paper shall exceed this level. The paper setter must self-audit using the Bloom's reference table provided in this template.
4. Question distribution across Bloom's levels [L2 – Comprehension; L3 – Application; L4 – Analysis; and L5 – Evaluation] must be documented on the master copy.
   Recommended distribution:
   L2-L3: ~70–80%;
   L4: ~10–15%;
   L5: 5-10%
5. Avoid repetition of topics across questions. Q1, Q2 and Q3 should collectively cover a minimum of 6–8 different topics/competencies to ensure adequate syllabus sampling.
6. All Long Answer Questions must carry sufficient internal scope. A 10-mark Long Answer Question should have 4–5 expected response components. Clinical scenarios or case-based questions should be included wherever appropriate. These expected answers must be included in the model answer key submitted alongside the paper.
7. The paper setter must submit:
   (i) Question Paper with CO + Bloom's Level annotations;
   (ii) Model Answer Key with marking scheme.
   All documents are confidential and must be submitted in a sealed envelope to the Examination Cell.

B.PA Semester V–VI: Question-Level Mapping Table (50 Marks)

Q. No.	Question Type	Bloom's Range
Q1	Long Answer (Attempt any 2 out of 3)	L2 – L3
Q2	Short Answer (Attempt any 6 out of 8)	L2 – L4

Question Paper Structure:

Subject Code **Subject Abb.**

Bachelor of Physician Associates (B.PA)

Semester
Subject Name

Time: 2 Hours
Maximum Marks: 50

Q.1. Long Answer Questions (Attempt any 2 out of 3) (2 × 10 = 20 Marks)

a). ..... (CO____, L____)

b). ..... (CO____, L____)

c). ..... (CO____, L____)

Q.2. Short Answer Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a). ..... (CO____, L____)

b). ..... (CO____, L____)

c). ..... (CO____, L____)

d). ..... (CO____, L____)

e). ..... (CO____, L____)

f). ..... (CO____, L____)

g). ..... (CO____, L____)

h). ..... (CO____, L____)

SEMESTER-I

Anatomy-I

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.

Theory:

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the principles of anatomy, embryology, and human development from fertilization to fetal stages.	L1 & L2
CO2	Describe anatomical nomenclature, body planes, axes, regions, and their clinical significance.	L2
CO3	Illustrate the structure and clinical relevance of the head, neck, thorax, abdomen, and pelvis.	L2
CO4	Apply anatomical knowledge of the upper and lower limbs for understanding musculoskeletal and neurovascular relationships in clinical practice.	L3
CO5	Demonstrate the identification of anatomical landmarks used in common clinical procedures such as blood sampling, catheterization, intubation, lumbar puncture, suturing, and CPR.	L3
CO6	Identify tissue types and explain the microscopic anatomy of human tissues with relevance to histology and clinical medicine.	L1 & L2

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.

Pre-requisites

Basic knowledge in biology, chemistry, and physiology.

Theory: (50 hours)

Course Content:

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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify anatomical positions, directional terms, major anatomical landmarks, and relevant laboratory equipment used in anatomy practical.	L1 & L2
CO2	Demonstrate microscopic examination and recognition of basic tissue types using histology slides.	L3

CO3	Apply dissection-based knowledge to identify muscles, bones, joints, organs, blood vessels, and nerves in different body regions.	L3
CO4	Develop anatomical correlations for clinical procedures including venipuncture, arterial puncture, intubation, lumbar puncture, central venous catheterization, CPR, and defibrillation.	L4

Course Content

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, an 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, ar 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 bloo 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-I

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.

PHYSIOLOGY-I

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.

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the basic principles of physiology, homeostasis, feedback mechanisms, cellular physiology, and tissue functions.	L1 & L2
CO2	Describe membrane transport, action potentials, cellular communication, signal transduction, and cellular metabolic processes.	L2
CO3	Explain cardiovascular physiology including cardiac cycle, conduction system, ECG, blood pressure regulation, cardiac output, and hemodynamics.	L2 & L3
CO4	Explain respiratory physiology, pulmonary ventilation, gas exchange, gas transport, regulation of respiration, and acid–base balance.	L2 & L3
CO5	Explain renal physiology, glomerular filtration, tubular functions, fluid and electrolyte regulation, and renal acid–base balance.	L2
CO6	Describe gastrointestinal physiology, digestion, absorption, motility, secretion, hormonal regulation, and metabolic functions of the liver.	L2
CO7	Explain endocrine physiology and the role of hormones in regulating growth, metabolism, reproduction, and homeostasis.	L2 & L3

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.

Pre-requisites:

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

Course Content:

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.

Course Outcomes

CO	Course Outcome	Bloom's Level
CO1	Describe the structure and functions of cells, subcellular organelles, biological membranes, membrane transport mechanisms, and the role of ion channels in cellular function.	L1 & L2

CO2	Explain the classification, chemical structure, functions, and physiological significance of major biomolecules including carbohydrates, lipids, proteins, and amino acids, along with the concept of stereoisomerism.	L3
CO3	Explain the structure–function relationships of hemoglobin, myoglobin, plasma proteins, and contractile proteins, and **relate** their biochemical functions to physiological and clinical conditions.	L3
CO4	Explain and apply the principles of enzyme nomenclature, classification, enzyme kinetics, Km, Vmax, enzyme–substrate interactions, factors affecting enzyme activity, and enzyme inhibition.	L4
CO5	Describe and relate the major metabolic pathways of carbohydrates, lipids, and amino acids, and **explain** their interrelationships in energy production and utilization.	L4

Course Content:

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 hours)	• **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.

Biochemistry and Molecular Biology- I

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.

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

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.

Prerequisites

Basic knowledge of biology, chemistry, and physics.

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the structure and functions of cells, subcellular organelles, biological membranes, and transport mechanisms.	L1 & L2
CO2	Describe the classification, structure, functions, and stereochemical properties of carbohydrates, lipids, proteins, and amino acids.	L2
CO3	Illustrate the physiological significance of hemoglobin, myoglobin, plasma proteins, and molecular mechanisms of muscle contraction.	L2
CO4	Apply the principles of enzyme classification, enzyme kinetics, enzyme inhibition, and factors affecting enzyme activity in clinical contexts.	L3
CO5	Demonstrate understanding of carbohydrate, lipid, and amino acid metabolism and their interrelationships in energy production.	L3
CO6	Identify metabolic regulation mechanisms involving liver, muscle, adipose tissue, blood glucose homeostasis, and metabolic adaptations in diabetes mellitus.	L1 & L3

Theory: (40 hours)

Course Content:

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.
4. 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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify laboratory equipment, safety procedures, and cellular structures through microscopic examination and slide preparation.	L1 & L3
CO2	Demonstrate membrane structure, permeability, diffusion, osmosis, and active transport using experimental models.	L3
CO3	Apply experimental methods to study ion channel function, enzyme kinetics, enzyme inhibition, and factors affecting enzyme activity.	L3
CO4	Develop interpretations of metabolic regulation experiments and biochemical data for understanding normal physiology and metabolic disorders.	L4

Course Content:

Unit	Topic	Content	Hours
I	Introduction to the Laboratory	• 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
II	Cell Structure & Function- Microscopic Examination	• 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.	6
III	Membrane	- Use simple models (e.g., egg membranes or cell • Study the permeability of membranes using basic materials like water, dyes and oils.	6
IV	Membrane Transport	• 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.	8
V	Ion Channels	• 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

VI	Enzyme	• 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	8
VII	Regulation of Metabolic Pathways	• 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
VIII	. Interpretation of Biochemical Data	• 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.	4
	Total		

Introduction to Microbiology

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.

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.

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.

Theory: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the history, significance, classification, and nomenclature of microorganisms in healthcare.	L1 & L2
CO2	Describe the structure, reproduction, physiology, and genetics of bacteria, viruses, fungi, protozoa, and helminths.	L2
CO3	Illustrate mechanisms of microbial pathogenicity, host–microbe interactions, and the role of normal microbiota in health and disease.	L2

CO4	Apply principles of infection transmission, infection control practices, sterilization, and disinfection in clinical settings.	L3
CO5	Demonstrate understanding of host defense mechanisms, immunization, vaccine responses, and antimicrobial therapy in infectious diseases.	L3
CO6	Identify microbiological laboratory techniques, microbial identification methods, and antimicrobial susceptibility testing used in diagnosis of infectious diseases.	L1 & L3

Course Content:

Unit	Topic	Content	Hours
I	Introduction to Microbiology	• History of microbiology and its significance in healthcare. Classification and nomenclature of microorganisms (Binomial system).	3
II	Basic Microbial Structure and Function	• 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.	6
III	Microbial Physiology	- Microbial metabolism: nutritional requirements, energy production. - Growth and reproduction: growth phases, measurement of growth. • Microbial genetics: DNA replication, transcription, translation, and mutations.	5
IV	Human Microbiota	• Normal flora: Site of colonization and importance. • Host-microbe interaction: Symbiosis, commensalism, mutualism, parasitism. • Role of microbiota in immunity and disease prevention.	4
V	Pathogenesis of Infectious Diseases	• Mechanisms of microbial pathogenicity. Virulence factors: Enzymes, exotoxins, endotoxins. Infection process: Entry, adhesion, colonization, invasion, dissemination.	5

VI	Infection Transmission and Control	• Modes of transmission: Direct, indirect, and vector- borne. Nosocomial infections: Prevention and sources. • Infection control measures: Hand hygiene, disinfection, sterilization.	5
VII	Host Defense Mechanisms	• Innate immunity: Barriers, phagocytosis, complement system. • Adaptive immunity: Humoral and cellular immunity. • Principles of vaccination, immune response to vaccines and the concept of memory immunity. • Types of vaccines.	4
VIII	Introduction to Antimicrobial Therapy	• Overview of antimicrobial agents: Antibiotics, antivirals, antifungals. • Mechanisms of action and spectrum of activity. • Antimicrobial resistance: Causes and strategies for prevention.	4
IX	Laboratory Diagnosis of infectious disease	• Basic microbiological laboratory techniques: Culture, staining, and microscopy. • Identification methods: Biochemical tests, molecular techniques. • Antimicrobial susceptibility testing: Disc diffusion, MIC.	3
	Total		**30**

Practical: (50 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify microorganisms using microscopy, Gram staining, acid-fast staining, and special staining techniques.	L1 & L3
CO2	Demonstrate bacterial cultivation, media preparation, inoculation procedures, and biochemical identification tests for common pathogens.	L3
CO3	Apply antimicrobial susceptibility testing, clinical specimen collection, handling, and transportation procedures in microbiology laboratories.	L3
CO4	Develop interpretations of microbial growth patterns, infection control practices, nosocomial infections, and clinical case scenarios related to infectious diseases.	L4

Course Content:

Unit	Topic	Content	Hours
I	Microscopy and Staining Techniques	Learn gram staining, acid-fast staining, and special stains. Examine bacterial and fungal specimens under the microscope.	7
II	Cultivation of Bacteria	Take part in the preparation of agar media and inoculation techniques. -Observe bacterial growth and use of selective/differential media.	8
III	Identification of Bacterial Species	Observe biochemical identification tests: Catalase, coagulase, oxidase. -Get familiarized with the laboratory diagnosis of common pathogens.	8
IV	Antibiotic Susceptibility Testing	Learn the Kirby-Bauer disk diffusion method. Determine the minimum inhibitory concentration.	6

V	Collection of Clinical Samples	Observe and get familiarized with techniques for obtaining clinical sample (blood, urine, sputum, wound swabs). Learn safe handling and transportation of specimens.	6
VI	Nosocomial Infections and Infection Control	Observe infection control practices in the hospital. Understand the waste management protocols in laboratories and healthcare settings.	5
VII	Microbial Pathogenesis in Disease	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.	10
	Total		**50**

Introduction to Healthcare Delivery System in India

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.

Theory: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the structure, levels, and components of the healthcare delivery system in India and compare healthcare models in developed and developing countries.	L1 & L2
CO2	Describe the role of community participation, private healthcare sector, National Health Mission, and National Health Policy in healthcare services.	L2
CO3	Illustrate the objectives, implementation strategies, achievements, and challenges of major National Health Programs in India.	L2
CO4	Identify the principles and scope of AYUSH systems of medicine and their contribution to healthcare delivery.	L1 & L2
CO5	Apply demographic concepts and vital statistics for understanding population health and healthcare planning.	L3
CO6	Demonstrate the significance of vital events, census data, and health indicators in formulating public health policies.	L3

Course Content

Unit	Topic	Content
I	Introduction to Healthcare Delivery System	• Healthcare delivery system in India at primary, secondary, and tertiary care • Community participation in healthcare delivery system • Health system examples in developing and developed countries • Private sector • National Health Mission • National Health Policy • Issues in healthcare delivery system in India.
II	National Health programs	Background, objectives, action plan, targets, operations, achievements, and constraints in various National Health programs
III	Introduction to AYUSH System of Medicine and medical pluralism	Ayurveda, Yoga and Naturopathy, Unani, Siddha Homeopathy
IV	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
V	Demography & Vital Statistics	• Demography – Concepts • Vital events of life and its impact on demography • Significance and recording of vital statistics • Census & its impact on health policy

Practical: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify the structure and functioning of different healthcare delivery systems through guided field visits.	L1 & L2
CO2	Describe the roles and practices of various AYUSH systems observed during clinical shadowing experiences.	L2
CO3	Demonstrate understanding of patient preferences and healthcare-seeking behavior in the context of medical pluralism in India.	L3
CO4	Develop observational reports integrating insights from healthcare facilities and AYUSH practice settings.	L4

Professionalism

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.

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the concepts of professional values including integrity, objectivity, empathy, professional competence, due care, and confidentiality in healthcare practice.	L1 & L2
CO2	Describe ethical and moral values and their importance in professional decision-making and patient care.	L2
CO3	Illustrate appropriate professional behaviour, management of biases, and equitable treatment of patients in healthcare settings.	L2 & L3
CO4	Apply principles of code of conduct, professional accountability, responsibility, and prevention of professional misconduct in clinical practice.	L3
CO5	Identify the differences among healthcare professions and explain the significance of interdisciplinary teamwork in patient management.	L1 & L2
CO6	Demonstrate culturally sensitive communication and professional interactions in diverse healthcare environments.	L3

Course Content:

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

Functional English and Soft Skills

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

Theory: (20 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the fundamentals of English grammar and the principles of effective reading, listening, and writing skills.	L1 & L2
CO2	Describe the techniques of sentence construction, paragraph development, and coherent written communication.	L2
CO3	Illustrate the methods of precis writing, paraphrasing, essay writing, and story development from given hints.	L2
CO4	Apply the principles of formal and informal letter writing for professional and academic communication.	L3
CO5	Demonstrate self-management, task ownership, interpersonal skills, and effective communication in healthcare settings.	L3
CO6	Identify appropriate professional behaviour, social etiquette, bedside manners, time management, and adaptability in diverse situations.	L1 & L3

Course Content:

Unit	Topic
I	Review of English grammar
II	Principles of effective reading, listening, and writing
III	Composing sentences
IV	Composing paragraphs
V	Precis Writing and paraphrasing
VI	Principles of writing essays
VII	Developing paragraphs from hints, story writing
VIII	Letter writing principles
IX	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 situation**s**

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.

Community Orientation- I

(30 hours)

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.

Theory: (20 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the concepts, principles, history, and core functions of public health and its relationship with clinical medicine.	L1 & L2
CO2	Describe the social determinants of health and their influence on health outcomes in diverse populations.	L2
CO3	Illustrate strategies for health promotion and disease prevention at primary, secondary, and tertiary levels.	L2
CO4	Apply public health approaches including vaccination, screening, and lifestyle modification in disease prevention programs.	L3
CO5	Identify key health indicators such as morbidity, mortality, life expectancy, and infant mortality used in population health assessment.	L1 & L3
CO6	Demonstrate understanding of healthcare access and behavioral health indicators for improving community health outcomes.	L3

Course Content

Unit	Topic	Content	Hours
I	**Introduction to Public Health**	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	**4**
II	**Social Determinants of Health**	• 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	**6**
III	**Health Promotion and Disease Prevention**	• Primary, Secondary, and Tertiary Prevention • Strategies for Disease Prevention (Vaccination, Screening, Lifestyle Modifications) • Health Promotion in Clinical Practice	**4**
IV	**Health Indicators**	• 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 • Behavioral health indicators: Rates of smoking, alcohol use, exercise, and nutrition	**6**

	Total		**20**

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

SEMESTER II

ANATOMY-II

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.

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the structure and functions of the musculoskeletal and nervous systems with relevant clinical conditions and imaging findings.	L1 & L2
CO2	Explain the anatomy and physiological mechanisms of the respiratory and cardiovascular systems in relation to common disorders and diagnostic imaging.	L2
CO3	Describe the organization of the gastrointestinal and urinary systems, including their clinical relevance and imaging modalities.	L2
CO4	Illustrate the anatomy and hormonal regulation of the endocrine system and its associated clinical disorders.	L2
CO5	Identify the components and functions of the lymphatic and reproductive systems in normal and disease conditions.	L1 & L2
CO6	Apply knowledge of sensory system anatomy and pathways to recognize common sensory disorders in clinical practice.	L3

Course Content:

Unit	Topic	Content
I	**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.)

II.	**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
III.	**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
IV	**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
V	**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
VI	**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
VII	**Endocrine System (4 hours)**	Endocrine Glands: Pituitary, Thyroid, Adrenal, Pancreas, Gonads; Hormones & Regulation; Clinical Relevance: Diabetes, Hyperthyroidism, Addison's Disease; Imaging: Ultrasound, CT
VIII	**Lymphatic System (2 hours)**	Anatomy: Lymph Nodes, Lymphatic Vessels, Spleen, Thymus, Tonsils; Function: Immunity, Fluid Balance, Fat Absorption; Clinical Relevance: Lymphoma, Lymphedema; Imaging: Lymphoscintigraphy, Ultrasound
IX	**Reproductive System (2 hours)**	Male & Female Reproductive System: Anatomy; Pregnancy & Development; Clinical Relevance: PCOS, Prostate Cancer, Erectile Dysfunction; Imaging: Ultrasound for Male/Female Reproductive Pathologies
X	**Sensory System (1 hour)**	Anatomy: Eyes, Ears, Skin; Sensory Pathways: Visual, Auditory, Tactile; Clinical Relevance: Sensory Deficits, Disorders

Practical: (70 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify the anatomical structures of the musculoskeletal and nervous systems through dissection and specimen study.	L1
CO2	Describe the anatomical features and clinical relevance of the respiratory, cardiovascular, and gastrointestinal systems.	L2
CO3	Demonstrate clinical examination techniques and imaging-based assessment of major body systems.	L3
CO4	Develop anatomical-clinical correlations using practical findings and diagnostic images of urinary, endocrine, lymphatic, and reproductive systems.	L4

Course Content

Unit	Topic	Content
I	**Musculoskeletal System (12 hours)**	Dissection of Bones, Joints, Muscles; Clinical Skills: Palpation, Flexibility & Strength Assessment, Sprain/Strain/Fracture/Dislocation Examination.
II.	**Nervous System (10 hours)**	Dissect Brain, Spinal Cord, Cranial/Spinal Nerves; Clinical Skills: Neurological Examination (Cranial Nerves, Motor/Sensory Function, Reflexes); Neuroimaging: CT, MRI
III.	**Respiratory System (8 hours)**	Dissect Respiratory Structures; Clinical Skills: Stethoscope Use, Chest Palpation; Imaging Skills: Chest X-ray, CT
IV	**Cardiovascular System (8 hours)**	Dissect Heart and Blood Vessels; Clinical Skills: Pulse, Auscultation, Blood Pressure Measurement, ECG; Imaging Skills: Echocardiography, Angiography
V	**Gastrointestinal System (8 hours)**	Abdominal Dissection; Clinical Skills: Abdominal Palpation, Inspection, Percussion; Imaging Skills: Abdominal Pathologies Interpretation
VI	**Urinary System (7 hours)**	Dissect Kidneys, Urinary Tract: Clinical Skills: Palpation for Kidney Enlargement/Tenderness; Imaging Skills: Renal Pathologies Interpretation

VII	**Endocrine System (4 hours)**	Study Thyroid & Parathyroid Anatomy; Clinical Skills: Palpation for Goiter/Masses; Imaging Skills: Ultrasound, CT
VIII	**Lymphatic System (3 hours)**	Dissect Lymph Nodes; Clinical Skills: Palpation for Infection/Malignancy; Imaging Skills: Lymphoscintigraphy
IX	**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

PHYSIOLOGY – II

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.

Pre-requisites:

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

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the structure and functions of the nervous system, neurons, neuroglia, and mechanisms of neural communication.	L1 & L2
CO2	Explain sensory physiology, neurotransmission, motor control mechanisms, and reflex activities in the human body.	L2
CO3	Describe the physiology of skeletal, smooth, and cardiac muscles, including muscle contraction, exercise responses, and bone–joint functions.	L2
CO4	Illustrate innate and adaptive immune responses, immunoregulation, and mechanisms of immune tolerance.	L2
CO5	Apply knowledge of reproductive physiology, hormonal regulation, fertilization, pregnancy, and lactation in healthcare contexts.	L3

CO6	Demonstrate the integration of physiological systems and identify clinical physiological parameters used in disease diagnosis and monitoring.	L3

Course Content:

Unit	Topic	Content
I	**Nervous System (14 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.
II	**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.
III	**Immune System Physiology (7 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.
IV	**Reproductive system** **Physiology (6 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.

V	**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.
VI	**Clinical Physiology (3 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.

Practical: (70 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify neural responses and sensory functions through action potential recording, reflex assessment, and sensory evaluation techniques.	L1
CO2	Explain musculoskeletal functions by performing muscle contraction studies, exercise physiology measurements, and joint range of motion assessments.	L2
CO3	Demonstrate immunological and reproductive physiology techniques using ELISA, phagocytosis observation, and hormonal assay procedures.	L3
CO4	Develop clinical interpretations from ECG recordings, blood pressure measurements, and blood gas analysis for physiological assessment.	L4

Course Content:

Unit	Topic	Content
I	**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.
II	**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.
III	**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
IV	**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.

V	**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.

Books for reference

1. Textbook of Medical Physiology by Guyton & Hall, Elsevier, 14th Edition, 2020.

2. Human Physiology: An Integrated Approach by Dee Unglaub Silverthorn, Pearson, 7th Edition, 2019.

BIOCHEMISTRY AND MOLECULAR BIOLOGY – II

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.

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the processes of digestion, absorption, metabolism, and storage of nutrients in the human body.	L1 & L2

CO2	Explain the biochemical roles of macronutrients, micronutrients, and metabolic pathways in maintaining cellular functions and health.	L2
CO3	Describe the classification, mechanisms, and regulatory functions of hormones in metabolism, homeostasis, and reproduction.	L2
CO4	Illustrate the principles of acid–base balance, buffering systems, electrolyte regulation, and their physiological significance.	L2
CO5	Apply fundamental genetic concepts, inheritance patterns, and genetic testing methods in disease diagnosis and healthcare practice.	L3
CO6	Demonstrate the structure, functions, and clinical applications of RNA in gene regulation, diagnostics, and therapeutics.	L3

Course Content:

Unit	Topic	Content
I	**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.
II	**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.

III	**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:
IV	**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.
V	**Introduction to Genetics in Medicine (5 hours)**	• Genetic Principles: Relevance in disease diagnosis and treatment. • DNA Structure and Function: Chromosomes, genetic code. o Gene Expression and Regulation: Transcription, translation, epigenetics. o Genetic Mutations and Disorders: Common genetic disorders (e.g., sickle cell anemia, cystic fibrosis). o Inheritance Patterns: Mendelian inheritance, autosomal dominant and recessive. o Genetic Testing for Diagnosis: PCR, sequencing, microarrays. • Genetic Counselling: Risk assessment and management of inherited diseases.
VI	**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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify the biochemical characteristics of gastric juice and biological fluids through collection, pH measurement, and analysis procedures.	L1
CO2	Explain acid–base balance and compensatory mechanisms by interpreting arterial blood gas results in clinical scenarios.	L2
CO3	Demonstrate the estimation of blood analytes and hormone assays using laboratory methods for clinical assessment.	L3
CO4	Develop diagnostic interpretations using genetic testing simulations, RNA isolation techniques, and RNA-based analytical applications.	L4

Course Content:

Unit	Topic	Content
I	**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.
II	**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.

III	**Interpretation of Arterial Blood Gas Results (5 hours)**	Analyze ABG data from clinical cases to diagnose acid-base disorders. Assess compensatory mechanisms.
IV	**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.
V	**Hormone Assay Simulation (4 hours)**	Simulate hormone assays (e.g., insulin, glucagon, cortisol). Understand hormonal regulation of metabolism and fluid balance.
VI	**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.
VII	**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

MEDICAL MICROBIOLOGY

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:

1. Identify the major bacterial, viral, fungal, and parasitic pathogens responsible for human diseases.
2. Understand the pathogenesis, clinical manifestations, and complications of infectious diseases.
3. Utilize laboratory techniques for accurate diagnosis of infectious diseases.
4. Recognize the principles of antimicrobial chemotherapy, resistance, and stewardship.
5. Apply infection control practices to prevent and manage healthcare-associated infections.

Theory: (60 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the role of normal microbiota, virulence factors, and mechanisms involved in bacterial pathogenesis.	L1 & L2
CO2	Explain innate and adaptive immune responses against bacterial infections and host defense mechanisms.	L2
CO3	Describe the types, mechanisms, and resistance patterns of antimicrobial agents used in infectious diseases.	L2
CO4	Illustrate the clinical features, laboratory diagnosis, and management of bacterial, viral, parasitic, and fungal infections.	L2
CO5	Apply infection control principles, sterilization, disinfection, and preventive measures in healthcare settings.	L3
CO6	Demonstrate appropriate biomedical waste management practices and identify strategies for preventing healthcare-associated infections.	L3

Course Content:

Unit	Topic	Content
I.	**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.
II.	**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.
III	**Antimicrobial Chemotherapy (6 hours)**	Types of antimicrobial agents: Antibiotics, antivirals, antifungals. Mechanisms of antimicrobial action. Antimicrobial resistance Mechanisms, epidemiology, and prevention.
IV	**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.
V	**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
VI	**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.
VII	**Fungal Infections (5 hours)**	Classification of fungi: Yeasts, molds, and dimorphic fungi. Pathogenesis and clinical features of fungal infections. Laboratory diagnosis of fungal infections.

VIII	**Infection Control and Prevention (3 hours)**	Principles of infection control: Standard precautions, transmission-based precautions. Sterilization, disinfection, and hygiene in healthcare. Surveillance and outbreak management in hospitals.
IX	**Healthcare-Associated Infections (2 hours)**	Etiology, risk factors, and prevention strategies. Infection control guidelines: NABH, JCI standards.
X	**Biomedical Waste Management (2 hours)**	Principles of biomedical waste management in healthcare. Segregation, collection, and disposal of medical waste.

Practical: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify appropriate methods for collection, transport, processing, and microbiological examination of clinical samples.	L1
CO2	Explain pathogen identification techniques and antimicrobial susceptibility testing used in clinical microbiology laboratories.	L2
CO3	Demonstrate infection control practices, biomedical waste management procedures, and compliance with healthcare safety standards.	L3
CO4	Develop diagnostic and treatment decisions through interpretation of microbiological, immunological, and vaccination-related clinical data.	L4

Course Content:

Unit	Topic	Content
I	**Collection and Processing of Clinical Samples (4 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
II	**Identification of Pathogens in Clinical Samples (6 hours)**	- Gain experience in microbiological analysis of common pathogens from clinical samples. - Learn techniques in microscopy and biochemical identification to differentiate between bacterial species.

III	**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.
IV	**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.
V	**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.
VI	**Biomedical Waste Handling and Management (2 hours)**	- Gain practical knowledge of biomedical waste management in healthcare settings. - Understand hospital protocols for managing medical waste and ensuring environmental and legal compliance.
VII	**Immunological Techniques in Clinical Diagnostics (**	- Familiarize with immunological techniques in diagnosing infections. - Observe serological tests (e.g., ELISA) to detect antibodies for specific pathogens like HIV, hepatitis, and syphilis.
VIII	**Vaccination and Immune Response in Clinical Practice**	- 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.

Suggested Readings:

- Textbook of Microbiology by R. Ananthanarayan and C.K. Jayaram Paniker, Orient Blackswan, 10th Edition, 2019.
- Medical Microbiology by Murray, P.R. Rosenthal, K.S. and Pfaller, M.A. Elsevier, 9th Edition, 2020.

INTRODUCTION TO COMPUTERS

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

Theory: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define fundamental computer concepts, hardware components, operating systems, and keyboard functions used in digital environments.	L1 & L2
CO2	Explain desktop customization, file management, folder organization, and basic troubleshooting procedures in computer systems.	L2
CO3	Describe the creation, formatting, and management of documents, spreadsheets, and presentations using MS Word, Excel, and PowerPoint.	L2
CO4	Illustrate internet concepts, email communication, online search techniques, and awareness of digital security risks.	L2
CO5	Apply cloud-based storage, file sharing, and collaborative note-taking tools for information management and communication.	L3
CO6	Demonstrate the use of professional networking and knowledge sharing platforms for academic and professional development.	L3

Course Content:

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

PROFESSIONALISM

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.

Theory: (10 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of professional values including integrity, objectivity, empathy, professional competence, and confidentiality in healthcare practice.	L1 & L2
CO2	Explain ethical and moral values, personal integrity, and their influence on professional conduct in healthcare settings.	L2
CO3	Illustrate appropriate attitudes and professional behaviour required for effective patient care and workplace interactions.	L2
CO4	Describe the code of conduct, professional accountability, and consequences of misconduct among healthcare professionals.	L2
CO5	Apply knowledge of professional roles and teamwork principles to support collaborative healthcare delivery.	L3

CO6	Demonstrate cultural competence by identifying cultural issues and adopting respectful practices in diverse healthcare environments.	L3

Course Content:

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

Practical: (10 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify professional values, ethical principles, integrity, and confidentiality in healthcare role-play scenarios.	L1
CO2	Explain ethical dilemmas, biases, and their impact on professional conduct in healthcare settings.	L2

CO3	Demonstrate ethical decision-making and impartial behaviour while managing simulated healthcare situations.	L3
CO4	Develop collaborative and culturally sensitive approaches for patient care through team-based activities and patient interactions.	L4

Course Content :

Unit	Topic	Content
I	Demonstrate professional values through role-play scenarios	Personal Values: Ethical and Moral Values
II	Discuss and analyze ethical dilemmas	Focus on decision-making frameworks and resolving ethical dilemmas in healthcare.
III	Role-play scenarios to address biases	Emphasize impartial treatment in healthcare delivery.
IV	Team-based tasks	Case reviews, care planning, and clinical decision-making to promote collaboration in healthcare teams.
V	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
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

COMMUNITY ORIENTATION -II

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.

- **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.
- **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.

Theory: (20 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the concepts of environmental health, pollution, sanitation, toxicology, and occupational health in relation to public health.	L1 & L2
CO2	Explain the health impacts of climate change, built environments, food safety, and environmental risk factors on communities.	L2
CO3	Describe the principles of epidemiology, measures of disease frequency, and types of epidemiological studies.	L2
CO4	Illustrate the epidemiology, transmission, and prevention strategies of common infectious diseases.	L2
CO5	Apply epidemiological measures and environmental health concepts to assess community health issues in practical settings.	L3
CO6	Demonstrate infection control practices and vaccination strategies for the prevention of infectious diseases in healthcare and community settings.	L3

Course Content:

Unit	Topic	Content
I	**Environmental Health (10 hours)**	- **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
II	**Basics of Epidemiology (6 hours)**	- **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
III	**Infectious Disease Control (4 hours)**	- **Epidemiology of Infectious Diseases**: HIV, Influenza, TB - **Infection Control**: Prevention in clinical practice -**Vaccination Strategies**: Community immunity

Practical: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Describe and explain environmental health, water usage, hand hygiene practices, and occupational health hazards through field observations and surveys.	L1 & L2
CO2	Apply concepts of climate change and epidemiology to observe public health problems, calculate disease frequency measures, and interpret health-related data.	L3
CO3	Analyse environmental, occupational, and infectious disease-related situations by evaluating observations, case studies, and outbreak scenarios.	L4
CO4	Demonstrate and present appropriate preventive and control measures for infectious diseases and health hazards based on practical observations and discussions.	L3 & L4

Course Content:

Practical	**30 hours**	- **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

SEMESTER III

PHARMACOLOGY AND TOXICOLOGY I

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.

Pre-requisites:

Basic understanding of human physiology and biochemistry.

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of pharmacology, toxicology, and the role of drug regulatory systems in healthcare.	L1 & L2

CO2	Explain the processes of drug absorption, distribution, metabolism, excretion, and factors influencing pharmacokinetics.	L2
CO3	Describe drug–receptor interactions, dose–response relationships, and pharmacodynamic mechanisms underlying therapeutic and toxic effects.	L2
CO4	Illustrate the general principles of drug action, therapeutic index, adverse effects, and drug interactions.	L2
CO5	Apply knowledge of autonomic nervous system pharmacology to identify the clinical uses of sympathomimetic, sympatholytic, parasympathomimetic, and parasympatholytic drugs.	L3
CO6	Demonstrate the roles of autocoids in inflammation and apply toxicological principles in the recognition and management of poisoning.	L3

Course Content:

Unit	Topic	Content
I	**Introduction to Pharmacology and Toxicology (4 hours)**	Definition, scope, historical development, basic principles of pharmacology and toxicology, drug regulatory bodies (CDSCO, India).
II	**Pharmacokinetics (10 hours)**	Absorption, distribution, metabolism, excretion, clinical considerations, drug-drug interactions.
III	**Pharmacodynamics (8 hours)**	Receptor theory, drug-receptor interactions, dose-response relationship, agonists vs. antagonists, signaling pathways, therapeutic effects and toxicity.
IV	**General Principles of Drug Action (5 hours)**	Mechanism of drug action, therapeutic index, side effects, drug interactions, toxicity.
V	**Autonomic Nervous System Pharmacology (8 hours0**	Sympathomimetics/sympatholytic, parasympathomimetic/parasympatholytic, clinical applications in hypertension, asthma, glaucoma, and cardiac arrhythmias.
VI	**Autocoids and Inflammation (5 hours)**	Prostaglandins, histamine, leukotrienes, cytokines in inflammation and their clinical uses.
VII	**Introduction to Toxicology (5 hours)**	Principles of toxicology, mechanisms of toxicity, acute vs. chronic toxicity, management of poisoning.

Practical: (30 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify factors influencing drug absorption, distribution, elimination, and pharmacokinetic variations in clinical practice.	L1
CO2	Explain the effects of cardiovascular drugs on blood pressure and heart rate through observational studies.	L2
CO3	Demonstrate the identification of drug toxicities and application of appropriate poisoning management strategies in simulated cases.	L3
CO4	Develop patient-specific medication assessments by interpreting pharmacokinetic, pharmacodynamic, and drug interaction profiles in diverse clinical conditions.	L4

Unit	Topic	Content
I	**Drug Absorption, Distribution, and Elimination (12 hours)**	Review patient case studies, drug absorption variation, delivery forms, drug-drug interactions, pharmacokinetic parameters interpretation.
II	**Blood Pressure and Heart Rate Measurement (6 hours)**	Study effects of antihypertensive drugs on blood pressure and heart rate, observation of cardiovascular drug effects.
III	**Toxicology Practical: Identifying Drug Toxicity and Management (4 hours)**	Identify poisons (e.g., pesticides, heavy metals), simulate case-based poisoning management.

IV	**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.

PATHOLOGY

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.

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the fundamental concepts of pathology, laboratory techniques, microscopy, and diagnostic procedures used in disease investigation.	L1 & L2
CO2	Explain the mechanisms of cell injury, cellular adaptations, cell death, biological aging, amyloidosis, and calcification.	L2
CO3	Describe the processes of inflammation, tissue repair, regeneration, fibrosis, and circulatory disturbances associated with disease conditions.	L2
CO4	Illustrate the pathological basis of growth disturbances, neoplasia, immunological disorders, and infectious diseases.	L2
CO5	Apply knowledge of genetic and congenital disorders to identify their pathological features and clinical manifestations.	L3

CO6	Demonstrate the principles of systemic pathology, clinical sample handling, storage, and diagnostic laboratory practices in healthcare settings.	L3

Course Content:

Unit	Topic	Content
I	**Introduction to Pathology and Techniques (3 hours)**	Evolution of pathology, basic lab techniques, microscopy, and diagnostic procedures.
II	**Cell Injury and Adaptations (5 hours)**	Causes, mechanisms, and morphology of injury, cell death (necrosis, apoptosis, gangrene), biological aging.
III	**Amyloidosis and Calcification 92 hours0**	Pathogenesis, types, and clinical features of amyloidosis and calcification (dystrophic vs. metastatic).
IV	**Inflammation, Repair, Regeneration, and Fibrosis (5 hours)**	Acute and chronic inflammation, wound and bone healing processes.
V	**Circulatory Disturbances (4 hours)**	Edema, thrombosis, embolism, infarction, shock pathophysiology, and fluid/electrolyte disturbances.
VI	**Growth Disturbances and Neoplasia (6 hours)**	Cellular adaptations (atrophy, hypertrophy, hyperplasia, metaplasia), neoplasia, tumor diagnosis.
VII	**Immunopathology (5 hours)**	Overview of the immune system, hypersensitivity reaction, immunodeficiencies, autoimmune disorders.
VIII	**Infectious Diseases (5 hours)**	Mycobacterial, bacterial, viral, fungal, parasitic infections, pathophysiology, and clinical implications.
IX	**Genetic and Congenital Disorders (3 hours)**	Autosomal and sex-linked disorders, pathogenesis, and clinical features.
X	**Systemic Pathology (6 hours)**	Cytopathology, environmental pathology (smoking, alcohol, drug abuse), nutritional pathology, physical agents' effects.
XI	**Practical Laboratory Techniques (2 hours)**	Collection, handling, and storage of clinical samples, principles of diagnostic tests.

Practical (60 hours)

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify histopathological techniques including slide preparation, tissue fixation, processing, staining, and microscopy for tissue examination.	L1
CO2	Explain the application of special stains, immunohistochemistry, and cytological methods in pathological diagnosis.	L2
CO3	Demonstrate hematological, urine analysis, and blood compatibility testing procedures using standard laboratory methods.	L3
CO4	Develop diagnostic interpretations from pathological specimens, biochemical laboratory results, and clinical sample management practices.	L4

Course Content

Unit	Topic	Content
I	**Microscopy and Slide Preparation (4 hours)**	Learn slide preparation, tissue staining, and magnification adjustments for optimal visualization.
II	**Tissue Fixation (4 hours)**	Steps of tissue fixation using common fixatives and understanding effects on cellular structure.
III	**Tissue Processing and Staining (6 hours)**	Embedding, sectioning, H&E staining for histopathological analysis.
IV	**Frozen Section Staining (4 hours)**	Rapid intraoperative diagnosis and histopathology using frozen section staining.
V	**Special Stains (PAS, Masson's Trichrome) (5 hours)**	Identifying pathological features in tissue samples using special stains.
VI	**Immunohistochemistry (5 hours)**	Applying antibody markers to identify antigens in tissue samples.

VII	**Hemoglobin Levels and Blood Smear (5 hours)**	Estimate hemoglobin levels, perform differential blood smear for microscopic examination.
VIII	**WBC Count and Bleeding/Clotting Time (5 hours)**	Perform total/differential WBC counts, measure bleeding and clotting time.
IX	**Urine Sample Collection and Analysis (5 hours)**	Microscopic and chemical analysis of urine samples for abnormalities.
X	**Blood Grouping and Cross-Matching (4 hours)**	Conduct blood grouping and cross-matching for compatibility testing.
XI	**Identification of Pathological Changes (5 hours)**	Examine tissue samples for degenerative changes like necrosis, gangrene, calcifications.
XII	**Cytology Slides Examination (5 hours)**	Identify epithelial and mesenchymal tumors using cytopathology principles.
XIII	**Biochemical Lab Results Interpretation (5 hours)**	Interpret liver/kidney function tests and their clinical implications in disease diagnosis.
XIV	**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

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.

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.

Pre-requisites

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

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the concepts of health, illness, health disparities, and patient-centered care in healthcare practice.	L1 & L2
CO2	Explain the causes and clinical significance of common signs and symptoms encountered in medical practice.	L2
CO3	Describe the systematic approach to disease diagnosis, including history taking, physical examination, and clinical reasoning.	L2

CO4	Illustrate the principles, interpretation, and limitations of laboratory tests used in patient assessment and management.	L2
CO5	Apply nutritional assessment principles to identify nutritional disorders and their impact on health and disease.	L3
CO6	Demonstrate the interpretation and management of fluid, electrolyte, and acid–base imbalances in clinical settings.	L3

Course Content:

Unit	Topic	Content
I	**Health and Illness (4 hours)**	Understanding health, health disparities, hereditary determinants, biopsychosocial model, patient-centered care, health promotion, ethics, and global health.
II	**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.
III	**Systematic Approach to Diagnosis and Management of Diseases (18 hours0**	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.
IV	**Laboratory Tests (6 hours)**	Purpose, reliability, accuracy, and interpretation of lab tests, limitations, common pitfalls, and challenges in resource-limited settings.
V	**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.
VI	**Fluid and Electrolyte Imbalance (4 hours)**	Clinical correlation and treatment protocols for fluid management in conditions like dehydration and diarrhea.
VII	**Acid-base Imbalance (3 hours)**	Review of biochemistry, interpretation of anion gap, and treatment protocols for acid-base imbalances.

Practical: (60 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify relevant clinical information through systematic history taking in routine and emergency healthcare situations.	L1
CO2	Explain physical examination findings and diagnostic approaches used in patient assessment.	L2
CO3	Demonstrate the selection and interpretation of diagnostic tests, nutritional assessments, and dietary planning for clinical conditions.	L3
CO4	Develop patient management approaches through assessment of fluid electrolyte balance, arterial blood gas analysis, and differential diagnosis formulation.	L4

Course Content:

Unit	Topic	Content	Hours
I	**History Taking (8 hours)**	Practice history taking under normal and emergency situations, focusing on cultural sensitivity and patient communication.	**8**
II	**Physical Examination Skills (10 hours)**	Hands-on training on performing general physical exams, measuring vital signs, and understanding physical findings.	**10**
III	**Diagnostic Skills (5 hours)**	Apply theoretical knowledge to formulate differential diagnoses based on clinical history and physical examination.	**5**
IV	**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.	8
V	**Nutrition and Nutritional Disorders (5 hours)**	Practice anthropometric assessments, nutritional assessment, and develop dietary plans for malnutrition, obesity, and chronic conditions.	**5**

VI	**Fluid and Electrolyte Imbalance (5 hours)**	Practice fluid and electrolyte assessments and management for dehydration, shock, and electrolyte imbalances.	5
VII	**Arterial Blood Gas Analysis (5 hours)**	Interpret ABG results, identify acid-base imbalances, and practice treatment protocols for metabolic and respiratory disorders.	5

Books for reference

1. Textbook of Clinical Medicine by Dr. S. S. Purohit, published by JaypeeBrothers Medical Publishers in 2016.
2. Essentials of Medical Physiology by Dr. K. Sembulingam and Dr. Prema Sembulingam, published by Jaypee Brothers Medical Publishers in 2019.

BASICS OF SURGERY

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.

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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of surgery, relevant surgical anatomy, physiology, and classifications of surgical procedures.	L1 & L2
CO2	Explain preoperative assessment, patient preparation, infection control measures, aseptic techniques, and the use of surgical instruments.	L2
CO3	Describe basic surgical techniques, anesthesia methods, blood transfusion practices, and nutritional management in surgical patients.	L2
CO4	Illustrate the principles of hemodynamic monitoring and the recognition and management of various types of shock during surgical care.	L2
CO5	Apply knowledge of surgical indications and management for common skin, subcutaneous conditions, and burn injuries in clinical settings.	L3
CO6	Demonstrate understanding of the indications, procedural steps, and perioperative considerations of common surgical procedures.	L3

Course Content

Unit	Topic	Content
I	**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

II	**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
III	**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
IV	**Sterility, Asepsis, and Surgical Instruments (3 hours)**	- Importance of sterility and aseptic techniques - Surgical instruments: types, uses, and handling - Sterile field preparation - Introduction to sutures and stapling devices
V	**Basic Surgical Techniques (2 hours)**	- Surgical knots and suturing - Placement/removal of drains - Bandages and splints
VI	**Anesthesia in Surgery (2 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
VII	**Blood Transfusion: Indications and Hazards (2 hours)**	- Indications for blood transfusion - Potential hazards and management
VIII	**Nutrition in Surgical Patients (4 hours)**	- Assessment of nutritional status - Energy requirements and delivery modes - Enteral and parenteral nutrition options
IX	**Hemodynamic Monitoring During Surgery (3 hours)**	- Methods of hemodynamic monitoring - Interpreting vital signs and managing changes during surgery

X	**Shock and Management of Shock (2 hours)**	- Types of shock: hypovolemic, cardiogenic, septic, etc. - Management protocols and early recognition
XI	**Common Skin and Subcutaneous Conditions Requiring Surgery (3 hours)**	- Types of conditions (e.g., abscesses, cysts, lipomas) - Surgical indications and management
XII	**Burns (3 hours)**	- Types of burns: first, second, third degree - Assessment and classification - Burn management: initial care, fluid resuscitation, wound treatment
XIII	**Common Surgical Procedures: Indications and Steps (8 hours)**	- Appendicectomy - Circumcision - Lithotripsy - Prostate biopsy and prostatectomy - Renal biopsy - Vasectomy

Practical: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify surgical instruments, sterilization methods, and aseptic practices required for maintaining a safe surgical environment.	L1
CO2	Explain preoperative assessment procedures, informed consent, anesthesia techniques, and patient monitoring during surgical care.	L2
CO3	Demonstrate basic surgical skills including knot tying, suturing, drain management, bandaging, splinting, and blood transfusion procedures.	L3
CO4	Develop management plans for simulated surgical scenarios involving shock, burns, perioperative care, and common operative procedures.	L4

Course Content:

Unit	Topic	Content
I	**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
II	**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. - Learn sterilization processes (autoclaving, chemical sterilization) and personal protective equipment (PPE) management.
III	**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.
IV	**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.
V	**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.
VI	**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.
VII	**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.
VIII	**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

ENT, OPHTHALMOLOGY & DERMATOLOGY

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 Outcomes:

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

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.

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.

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.

Theory: (50 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the anatomy, physiology, elementary optics, and examination techniques of the eye in clinical practice.	L1 & L2
CO2	Explain the etiology, clinical features, and management of common ocular diseases, eye injuries, and retinal disorders.	L2
CO3	Describe the causes, manifestations, and treatment principles of common ear, nose, throat, and laryngeal disorders, including ENT emergencies.	L2
CO4	Illustrate the impact of systemic diseases on ocular and ENT health and the role of preventive care in disease management.	L2
CO5	Apply dermatological assessment principles to identify common skin, hair, and nail disorders and their systemic associations.	L3
CO6	Demonstrate appropriate approaches for managing allergic reactions, dermatological emergencies, and preventive skin healthcare practices.	L3

Course Content

Unit	Topic	Content
I	**Ophthalmology (20 hours)** Review of eye structure and functions of the different structures (4 hours)	
II	Elementary Optics and Eye Examination (4 hours)	Basics of visual acuity testing, pupil reactions, and eye movements.

III	Common Ocular Diseases (4 hours)	Conjunctivitis, keratitis, cataracts, glaucoma (types and management).
IV	Red Eye and Eye Injuries (3 hours)	Causes and management of red eye, First aid for chemical burns and minor foreign body injuries.
V	Vitreous and Retinal Disorders (3 hours)	Retinal detachment, diabetic retinopathy, and macular degeneration.
VI	Systemic Diseases with Ocular Manifestations (3 hours)	Hypertension, diabetes, and other systemic diseases affecting the eyes.
VII	Preventive Eye Care (3 hours)	Importance of regular eye exams, eye hygiene, public health awareness.
	ENT (20 hours)	
VIII	Diseases of the Ear (4hours)	Otitis externa, otitis media (acute and chronic), otomycosis. Management of foreign bodies and ear pain.
IX	Diseases of the Nose and Paranasal Sinuses (4 hours)	Rhinosinusitis, allergic rhinitis, epistaxis, nasal polyposis. First aid for epistaxis and foreign body removal.
X	Diseases of the Throat and Larynx (4 hours)	Tonsillitis, pharyngitis, laryngitis, and vocal cord nodules.
XI	Systemic Causes of ENT Disorders (3 hours)	Thyroid disorders, autoimmune conditions affecting ENT organs.
XII	ENT Emergencies (3 hours)	Foreign body aspiration, acute airway obstruction, and anaphylaxis.
XIII	Preventive ENT Care (2 hours)	Importance of immunization, hearing screening, and managing occupational hazards.
	Skin (10 hours)	
XIV	History Taking and Dermatological Examination (2 hours)	
XV	Common Dermatological Conditions (3 hours)	Acne, eczema, psoriasis, fungal infections, warts, and fungal infections.

XVI	Skin, Hair, and Nail Manifestations of Systemic Diseases (2 hours)	Dermatological signs of diabetes, lupus, hypertension, and other systemic disorders.
XVII	Allergic Reactions and Dermatological Emergencies (2 hours)	Contact dermatitis, drug rashes, and allergic reactions (e.g., to hair dye).
XVIII	Preventive Skin Care (1 hour)	Sunscreen use, skin cancer prevention, and managing common skin infections.

Practical: (80 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Identify ophthalmic examination findings and perform basic eye assessment procedures, including visual acuity, pupil, and ocular movement testing.	L1
CO2	Explain the principles of ENT examination, otoscopy, nasal assessment, throat evaluation, and common ENT procedures.	L2
CO3	Demonstrate first aid and emergency management skills for eye injuries, ENT emergencies, and basic wound care procedures.	L3
CO4	Develop practical approaches for dermatological assessment, diagnostic procedures, biopsy assistance, and management of common skin disorders and emergencies.	L4

Course Content:

Unit	Topic	Content
	Ophthalmology Practical Skills (20 hours)	
I	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).
II	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.

III	Assist in Ocular Assessments (5 hours)	Learn how to test colour vision, visual fields, and refraction for spectacle prescription under supervision.
IV	Eye Emergencies (5 hours)	Identify and manage eye injuries such as foreign body removal, chemical burns, etc.
	ENT Practical Skills (30 hours)	
V	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.
VI	Ear Examination (5 hours)	Learn to use an otoscope to examine ear canal and tympanic membrane. Assist with ear irrigation for cerumen removal.
VII	Nasal Examination (5 hours)	Use a nasal speculum for nasal cavity inspection. Learn to perform nasal endoscopy under supervision.
VIII	Throat and Larynx Examination (5 hours)	Examine oropharynx with a tongue depressor. Assess voice quality and perform laryngeal palpation.
IX	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).
X	ENT Procedures (5 hours)	Perform ENT procedures like ear wax removal or nasal cauterization.
	Skin Practical Skills (30 hours)	
XI	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.
XII	Performing Basic Dermatological Procedures (5 hours)	Perform skin scrapings for fungal infections. Do patch testing for allergic reactions (e.g., hair dye).
XIII	Basic Wound Care and Dressing (5 hours)	Apply simple dressings to minor burns, cuts, or abrasions. Recognize and manage infections like impetigo or folliculitis.
XIV	Skin Biopsy (5 hours)	Assist in skin biopsies for diagnosing conditions like melanoma or suspicious lesions under supervision.

XV	Dermatological Emergencies (5 hours)	Manage allergic reactions, acute rashes, and other dermatological emergencies.

Books for reference:

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

COMMUNITY ORIENTATION III

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

Theory: (20 HOURS)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles and characteristics of epidemiological study designs, including cross-sectional, cohort, case-control, and randomized controlled studies.	L1 & L2
CO2	Explain measures of risk and association used in epidemiological investigations to assess exposure–outcome relationships.	L2
CO3	Describe the concepts of bias and confounding and their influence on the validity of epidemiological findings.	L2

CO4	Illustrate the purpose, components, and significance of community health assessment in identifying population health needs.	L2
CO5	Apply community health assessment methodologies, including planning, community engagement, data collection, and data analysis, in public health settings.	L3
CO6	Demonstrate the development of community health profiles, prioritization of health issues, resource mapping, action planning, implementation, and reporting for health improvement.	L3

Course Content

Unit	Topic	Content
I	**Study Designs in Epidemiology** (4 hours) Cross-sectional Study, Cohort Study, Case-Control Study, Randomized Controlled Trials (RCT)	Overview of study design; snapshot of a population at one point in time Study following a group over time to assess health outcomes Comparing individuals with a condition to those without Experimental study with random assignment of participants
II	**Measuring risk in epidemiology (4 hours)** Definition, Measures of association	Understanding risk measures How different measures like Relative Risk, Odds Ratio, Attributable Risk, and Population Attributable Risk are used to calculate associations between exposure and outcomes.
III	**Bias and Confounding** Bias, Confounding	Understanding types of biases (selection, information, etc.) that may affect study results How confounding variables can distort the perceived relationship between exposure and outcome
IV	**Introduction to Community Health Assessment** What is community health assessment? Why is community health assessment needed? Concepts and factors to consider	Definition and importance of assessing health needs at the community level Importance of data in guiding health interventions Systematic data collection, community engagement, identification of health disparities, multisector collaborations, evidence-based interventions, continuous improvement, and planning.

V	**Community Health Assessment Methodology** Preparation and Planning Community Engagement Data Collection, Data Analysis, Health Prioritization, Health Profile Development, Health Status Indicators, Key Determinants of Health, Resource and Asset Mapping, Health Disparities, Action Plan Development, Implementation and Monitoring, Reporting and Dissemination	Steps involved in planning a community health assessment Involving the community in the assessment process. Method for gathering health related data from community members. How to interpret and analyze collected data Identifying the most pressing health issues in the community Creating a comprehensive health profile for the community Using specific indicators like mortality rates, morbidity, and others to assess community health Identifying social, economic, and environmental factors that impact health Mapping resources, services, and strengths within the community Addressing inequities in health outcomes Creating a detailed plan of action for addressing health issues Carrying out the plan and tracking progress Preparing reports and sharing findings with stakeholders

Practical: (30 hours)

Course Outcomes

	Course Learning Outcomes	Bloom's Level
CO1	Describe community health issues and healthcare services through field visits, community interaction, and observation of public health practices.	L2
CO2	Apply survey and interview techniques to collect, organize, and interpret community health data for identifying health risks.	L3
CO3	Demonstrate risk assessment methods to prioritize community health problems using appropriate public health tools and indicators.	L3
CO4	Develop a community health profile, action plan, and report with recommendations for improving community health outcomes.	L4

Course Content:

Unit	Topic	Content
I	**Field Visit to Primary Health Centers and Community Engagement (6 hours)**	Observation of health issues in the community Visiting PHC, observing health issues, and interacting with health workers and residents
II	**Data Collection and Analysis (6 hours)**	Gathering and analyzing health data Conducting surveys or interviews, analyzing data to identify health risks.
III	**Risk Assessment and Prioritization (6 hours)**	Identifying and prioritizing health issues Using tools to assess and rank health risks in the community
IV	**Creating a Community Health Profile (6 hours)** Developing a health profile	Summarizing key health issues, resources, and challenges

V	**Developing an Action Plan (6 hours)**	Creating an action plan Developing steps and strategies to address identified health problems
VI	**Reporting and Presentation (3 hours)**	Preparing and presenting a report Writing a simple report and presenting findings with proposed actions for improving community health

SEMESTER IV

PHARMACOLOGY AND TOXICOLOGY II

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

Pre-requisites:

Successful completion of Pharmacology I.

Theory: (40 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of central nervous system pharmacology and explain the mechanisms and therapeutic applications of sedative-hypnotics, antidepressants, antipsychotics, anticonvulsants, analgesics, and CNS stimulants.	L1 & L2

CO2	Describe the pharmacological basis of cardiovascular drugs including antihypertensives, anti-arrhythmic, anticoagulants, antiplatelet agents, and therapies used in heart failure management.	L2
CO3	Apply the principles of antimicrobial pharmacology to identify appropriate antibiotics, antifungal, antiviral, and antiparasitic agents in clinical practice.	L3
CO4	Analyze the mechanisms, therapeutic uses, toxicities, resistance patterns, and overdose management strategies associated with chemotherapeutic and toxicological agents.	L4
CO5	Demonstrate the principles of pharmacovigilance, clinical trials, adverse drug reaction reporting, and management of drug interactions and polypharmacy.	L3
CO6	Interpret recent advances in pharmacology including precision medicine, biologics, immunotherapy, gene editing, advanced drug delivery systems, and AI-driven drug discovery.	L4

Course Content:

Unit	Topic	Sub Topics
I	**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.
II	**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.
III	**Antimicrobial Pharmacology (6 hours)**	• Antibiotics: Mechanisms of action, resistance, and side effects of various classes (penicillin's, 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.
IV	**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.
V	**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.
VI	**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)

Course Outcome

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Describe the clinical effects of CNS, cardiovascular, and antimicrobial drugs through analysis of patient case scenarios and therapeutic outcomes.	L2
CO2	Apply principles of antibiotic selection, pharmacological counselling, and medication management in diverse clinical settings.	L3
CO3	Analyze polypharmacy-related problems, drug-drug interactions, and adverse effects to optimize patient-specific medication regimens.	L4
CO4	Evaluate adverse drug reactions, pharmacovigilance reports, toxicological emergencies, and overdose management strategies for safe clinical practice.	L5

Course Content:

Unit	Topic	
I	**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.
II	**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.
III	**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 ward.
IV	**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.
V	**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.

VI	**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
VII	**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.

Suggested Readings:

- K.D. Tripathi – Essentials of Medical Pharmacology, Jaypee
- Padmaja Udaykumar – Pharmacology for Nurses
- Satoskar et al. – Pharmacology and Pharmacotherapeutics

GENERAL MEDICINE II

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.

Theory: (50 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the basic concepts, clinical features, diagnosis, and management of common cardiovascular and respiratory disorders.	L1 & L2
CO2	Describe the causes, clinical features, diagnosis, and management of gastrointestinal, renal, and urological disorders.	L2
CO3	Explain the pathophysiology, diagnosis, and management of common endocrine disorders.	L2 & L3
CO4	Apply knowledge of clinical examination and diagnostic tests in the assessment of neurological disorders.	L3

CO5	Analyze the clinical features, diagnosis, and treatment of hematological and infectious diseases.	L4
CO6	Evaluate clinical and laboratory findings for diagnosis and management of common medical disorders.	L4 & L5

Course Content:

Unit	Topic	Subtopics	Content
I	**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
II	**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
III	**Gastrointestinal Disorders (8hours)**	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
IV	**Renal and Urological Disorders (6 hours)**	Renal Physiology	Glomerular filtration, renal tubular function
		Common Condition	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
V	**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
VI	**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
VII	**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
VIII	**Infectious Diseases(2hours)**	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)

Course Outcomes

CO No.	**Course Learning Outcomes**	**Bloom's Level**
CO1	Demonstrate appropriate history taking and physical examination techniques for patients with cardiovascular, respiratory, gastrointestinal, renal, endocrine, and lymphatic disorders.	L2 & L3
CO2	Apply clinical reasoning skills to formulate differential diagnoses and select appropriate diagnostic investigations for common medical conditions.	L3
CO3	Demonstrate the management of common medical emergencies and interpret laboratory and diagnostic findings for clinical decision-making.	L3 & L4

CO4	Apply principles of pharmacological management, chronic disease management, patient education, and communication skills in healthcare practice.	L3 & L4

Course Content

Unit	Topic	Content
I	**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.
II	**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.
III	**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.
IV	**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.
V	**Pharmacological Management (8 hours)**	Understand drug dosages, indications, contraindications, side effects; practice prescribing medications for common conditions. Learn adjustments based on comorbidities.
VI	**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.

VII	**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.

Reference Books:-

a. Harrison's principles of Internal Medicine,

b. Toohey's Medicine, R Indrani.

ADVANCED SURGERY

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.

Theory: (70 hours)

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the etiology, clinical features, diagnosis, and management of common gastrointestinal and hepatobiliary surgical disorders.	L1 & L2
CO2	Describe the pathology, diagnosis, and surgical management of cardiovascular, thoracic, and urological disorders.	L2
CO3	Explain the clinical presentation, diagnosis, and management of neurosurgical and endocrine surgical disorders.	L2 & L3
CO4	Apply knowledge of trauma surgery principles in the assessment and management of blunt and penetrating injuries.	L3
CO5	Analyze the principles of surgical oncology, tumor biology, and management of common malignancies.	L4
CO6	Evaluate clinical findings, diagnostic investigations, and surgical treatment options for effective patient management in various surgical conditions.	L4 & L5

Course Content:

Unit	Topic	Content
I	**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
II	**Cardiovascular Surgery (8 hours)**	Aortic Surgery: Aneurysms (abdominal & thoracic), Aortic dissection Peripheral Vascular Surgery: Atherosclerosis, Peripheral arterial occlusive disease, Lower extremity revascularization, Venous disease (DVT, varicose veins) Cardiac Surgery: Coronary artery bypass grafting (CABG), Valve replacement, Cardiac transplantation.
III	**Thoracic Surgery (6 hours)**	Lung Cancer: NSCLC, SCLC, Lung metastases, Thoracic trauma, Pneumothorax, Lung abscess Mediastinal Tumors: Diagnosis, treatment approaches
IV	**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
V	**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, Pyronine disease, Penile cancer
VI	**Endocrine Surgery (8 hours)**	Thyroid: Thyroid cancer, Hyperthyroidism, Thyroidectomy Parathyroid: Hyperparathyroidism Adrenal Glands: Pheochromocytoma, Cushing syndrome, Adrenal insufficiency
VII	**Trauma Surgery (5 hours)**	Blunt Trauma: Abdominal, chest, head, extremity trauma Penetrating Trauma: Gunshot wounds, stab wounds, damage control surgery
VIII	**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
IX	**Pediatric Surgery (7 hours)**	Congenital Anomalies: Cleft lip/palate, Hirschsprung disease, Childhood tumors

Practical: (60 hours)

Course Outcomes

CO No.	**Course Learning Outcomes**	**Bloom's Level**
CO1	Demonstrate aseptic techniques, instrument handling, suturing, knot tying, hemostasis, tissue handling, and wound closure in surgical practice.	L2 & L3
CO2	Apply principles of preoperative assessment, intraoperative assistance, postoperative care, and clinical documentation in surgical patients.	L3
CO3	Demonstrate the management of postoperative complications and perform minor surgical procedures under appropriate supervision.	L3 & L4
CO4	Apply knowledge of advanced surgical procedures and assist in minimally invasive, trauma, vascular, oncological, pediatric, and gastrointestinal surgeries.	L3 & L4

Course Content:

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

Reference Books:-

a. Fullers Surgical Technology, Joanna Kotcher Fuller

b. Laparoscopic Surgery, R. K. Mishra

c. Surgical Technology for the surgical technologist by association of surgical technologists.

d. Essential Orthopedics, Maheshwari & Makar,

e. Orthopedic Surgical approach, Miller, Chhabra, Browne, Park, Shen.

f. Urology Instrumentation, Ravindra B Sabnis**,**

PSYCHOLOGY AND INTRODUCTION TO BEHAVIOURAL MEDICINE

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.

Pre-requisites:

Basic understanding of human physiology, and clinical medicine.

Theory: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of psychology, behavioral medicine, and the biopsychosocial model in relation to health and disease.	L1 & L2
CO2	Describe the influence of psychological stress, social determinants, coping mechanisms, and behavior change theories on health outcomes.	L2
CO3	Explain the application of the biopsychosocial approach and behavioral interventions in healthcare, including counselling and motivational strategies.	L2
CO4	Analyze psychosomatic disorders, mental health influences, and psychological factors affecting pain perception and physical illness.	L4
CO5	Apply behavioral medicine principles to enhance chronic disease management, treatment adherence, patient communication, and family support.	L3
CO6	Interpret psychological screening findings and differentiate effective communication and health promotion strategies for patient-centered care.	L4

Course Content:

Unit	Topic	Content
I	**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.
II	**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).
III	**The Biopsychosocial Model in Medicine (6 hours)**	• Definition and key principles of the biopsychosocial model. • Historical development and evolution of 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.
IV	**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
V	**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.
VI	**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.
VII	**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).

VIII	**Psychological Screening and Patient Communication (4 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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Explain the use of psychosocial assessment and psychological screening tools for identifying stress, anxiety, depression, and related behavioral health concerns.	L2
CO2	Apply effective communication, motivational interviewing, and patient interaction techniques in simulated clinical scenarios.	L3
CO3	Demonstrate behavioral interventions for stress management, health promotion, and chronic disease care using patient-centered approaches.	L3
CO4	Evaluate psychosomatic disorder cases and develop biopsychosocial care plans by integrating psychological, social, and biological factors into patient management.	L5

Course Content:

Unit	Topic	Content
I	**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.

II	**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.
III	**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.
IV	**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.
V	**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.
VI	**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.

VII	**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.
VIII	**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.

Books for reference

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

MEDICAL COMMUNICATION

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 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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles, types, qualities, and barriers of effective communication in healthcare settings.	L1 & L2
CO2	Describe patient-centered communication strategies, including rapport building, history taking, patient education, and use of interpreters.	L2
CO3	Apply ethical, professional, and culturally sensitive communication practices while addressing patient autonomy, confidentiality, and consent.	L3
CO4	Analyze approaches for managing difficult conversations, conflict resolution, breaking bad news, and communication with diverse patient groups.	L4
CO5	Demonstrate effective communication and collaboration within multidisciplinary healthcare teams, including handovers and emergency interactions.	L3
CO6	Interpret the principles of medical case presentation, documentation, report writing, referral letters, and other clinical records for accurate healthcare communication.	L4

Course Content:

Unit	Topic	Content
I	**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.
II	**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.
III	**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.
IV	**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 behavior. - Conflict resolution: Managing disagreements between patients and the healthcare team.

V	**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.
VI	**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.
VII	**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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Apply patient-centered communication skills, including history taking, patient education, and explanation of diagnoses and treatment plans in simulated clinical settings.	L3

CO2	Demonstrate effective verbal communication strategies for interacting with diverse patients, healthcare teams, and caregivers across routine and challenging situations.	L3
CO3	Evaluate communication approaches used in breaking bad news, managing emotional responses, and handling non-compliant patients through casebased scenarios.	L5
CO4	Develop accurate medical documentation, case reports, referral letters, discharge summaries, and emergency communication records following professional standards.	L4

Course Content:

Unit	Topic	Content
I	**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.
II	**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.
III	**Communication during**	- Learn and practice communication - both verbal and written during simulated emergency situations (e.g., trauma, cardiac arrest, critical care).

	Emergency Situations (8 hours)	- Learn communicating with the treating physician. - Learn communicating with healthcare teams. - Learn communicating with patients and attenders.

Book for reference:

The Medical Interview: Mastering Skills for Clinical Practice" **by** John L. Coulehan **and**

Marcia W. Block

COMMUNITY MEDICINE AND CLINICAL RESEARCH-I

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.

Public Health

Theory:

Course Outcomes:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the fundamental principles of epidemiology, including causality criteria, dose-response relationships, and public health surveillance systems.	L1 & L2
CO2	Explain the processes of epidemiological surveillance, outbreak investigation, and the application of epidemiological models in disease monitoring.	L2
CO3	Apply screening principles to identify appropriate diseases and public health strategies for designing and evaluating screening programs.	L3
CO4	Describe the scope of clinical research, ethical considerations, study designs, and their role in evidence-based healthcare.	L2

CO5	Demonstrate the selection of suitable sampling methods and classification of research data types in clinical research settings.	L3
CO6	Examine research questions, aims, and objectives using PICO(T) framework and compare their relevance for scientific investigations.	L4

Course Content:

Unit	Topic	Content
I	**Epidemiological Principles**	- Hill's Criteria for Causality: Strength, Consistency, Specificity, Temporality, Biological Plausibility – Dose-Response Relationship - Biological Gradient
II	**Epidemiological Surveillance**	- Public Health Surveillance: Introduction and types Surveillance Systems: In India, WHO, CDC etc.
III	**Outbreak Investigation**	- Overview of outbreak investigation principles and process.
IV	**Epidemiological Models**	- Epidemic Curve - SIR Model
V	**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)	
I	**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
II	**Study Designs**	- Randomized Controlled Trials (RCTs) - Cohort Studies, Case Control Studies, Cross-Sectional Studies, Ecological Studies Blinding, Randomization, Biases

III	**Sampling Methods**	- Types of Sampling: Random, Stratified, Convenience - Rationale, advantages, and limitations
IV	**Data Types**	- Quantitative (Continuous, Discrete, Binary, Ordinal) - Qualitative (Nominal, Textual) - Time-based Data (Survival)
V	**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

SEMESTER V

PAEDIATRICS

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.

Pre-requisites:

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

Theory: (70 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of pediatric growth, development, immunization, nutrition, and common nutritional disorders across different age groups.	L1 & L2
CO2	Explain the etiology, clinical features, and management of common infectious, respiratory, gastrointestinal, and neurological disorders in children.	L2
CO3	Apply clinical approaches for the assessment and management of pediatric cardiovascular, genito-urinary, endocrine, and fluid-electrolyte disorders.	L3
CO4	Analyze neonatal conditions including birth asphyxia, jaundice, infections, low birth weight, and neonatal resuscitation requirements.	L4
CO5	Demonstrate appropriate management strategies for pediatric emergencies, therapeutic interventions, and age-specific drug administration in clinical practice.	L3
CO6	Examine genetic disorders, behavioral problems, and common pediatric surgical conditions to support comprehensive pediatric care and decision-making.	L4

Course Content:

Unit	Topic	Content
I	**Growth and Development (10 hours)**	Determinants of growth and assessment, growth monitoring, anthropometry, developmental milestones, and immunization schedules.
II	**Nutrition and Disorders (10 hours)**	Age-related nutritional needs, protein-energy malnutrition, vitamin deficiencies, obesity, and nutritional anemia.
III	**Infectious Diseases (7 hours)**	Common exanthematous illnesses (measles, chickenpox, mumps), tuberculosis, parasitic infestations, and childhood AIDS.

IV	**Respiratory System (6 hours)**	Common respiratory conditions like cold, otitis media, pneumonia, bronchiolitis, and bronchial asthma.
V	**Gastrointestinal system (6 hours)**	Approach to jaundice, abdominal pain, diarrhea, dehydration, oral rehydration, and chronic diarrhea.
VI	**Central Nervous system (8 hours)**	Evaluation of milestones, convulsions, meningitis, encephalitis, cerebral malaria, epilepsy, and cerebral palsy.
VII	**Cardiovascular system (5 hours)**	Diagnosis and management of rheumatic fever, heart diseases, and congenital heart anomalies.
VIII	**Genito-Urinary system (5 hours)**	Post-streptococcal glomerulonephritis, nephrotic syndrome, urinary tract infections, renal failure, and obstructive uropathy.
IX	**Endocrinology (4 hours)**	Diagnosis and management of diabetes, hypothyroidism, hyperthyroidism, delayed and precocious puberty.
X	**Neonatology (9 hours)**	Neonatal resuscitation, birth asphyxia, jaundice, infections, low birth weight, and special care for sick newborns.
XI	**Pediatrics Emergencies (6 hours)**	Management of status epilepticus, asthma, shock, burns, hypertensive emergencies, gastrointestinal bleeds, and comatose children.
XII	**Fluid and Electrolyte Balance (3 hours)**	Principles of fluid therapy, acid-base imbalance, and management strategies.
XIII	**Genetics (2 hours)**	Inheritance disorders and genetic diagnosis, with emphasis on Down‘s Syndrome.
XIV	**Behavioral Problems (2 hours)**	Behavioral issues such as breath-holding spells, nocturnal enuresis, temper tantrums, and pica.
XV	**Pediatrics Surgical Problems (3 hours)**	Surgical management of conditions like cleft lip/palate, hypospadias, inguinal hernia, hydrocephalus, and other common surgical conditions.
XVI	**Therapeutics (2 hours)**	Pediatric doses, drug combinations, and age-specific choice of antibiotics.

Practical: (80 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Demonstrate pediatric history taking, age-appropriate physical examination, anthropometric assessment, and growth monitoring for clinical evaluation of children.	L3
CO2	Apply bedside investigations, immunization practices, neonatal resuscitation, and neonatal care procedures in routine pediatric healthcare settings.	L3
CO3	Assess pediatric emergencies, fluid and electrolyte imbalances, and formulate appropriate management strategies based on clinical findings.	L5
CO4	Develop comprehensive pediatric care plans by integrating diagnostic procedures, surgical assistance, clinical rotation experiences, and evidence-based patient management.	L6

Course Content:

Unit	Topic	Content
I	**History Taking and Physical Examination (10 hours)**	Take a detailed pediatric history, perform age-appropriate physical exams, and make clinical diagnoses.
II	**Bedside Investigations (8 hours)**	Perform common bedside procedures like urine analysis, stool examination, and blood tests.
III	**Anthropometry and Growth Monitoring (5 hours)**	Measure and assess growth of children using weight, height, head circumference, and use growth charts.
IV	**Neonatal Resuscitation (6 hours)**	Practice neonatal resuscitation on mannequins and perform newborn care, including temperature regulation and feeding.
V	**Immunization Administration (5 hours)**	Administer vaccines as per the national immunization schedule and practice cold chain management.
VI	**Basic Emergency Care (8 hours)**	Practice pediatric CPR, manage pediatric asthma attacks, status epilepticus, and other pediatric emergencies.
VII	**Fluid and Electrolyte Therapy (5 hours)**	Prepare and administer ORS, manage dehydration, and conduct fluid balance assessments.

VIII	**Diagnostic Procedures (8 hours)**	Observe and assist in procedures like lumbar puncture, bone marrow aspiration, liver biopsy, and pleural/ascitic tap.
IX	**Neonatal Care and Feeding (8 hours)**	Care for neonates including preterm infants, low birth weight, and administer nasogastric feeds.
X	**Pediatric Surgical Skills (7 hours)**	Assist with common pediatric surgeries like cleft lip/palate repair, hernia repair, and hypospadias.
XI	**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

EMERGENCY MEDICINE

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

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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level

CO1	Define the principles of emergency medical services, patient handling techniques, airway management, and initial patient assessment in emergency care.	L1 & L2
CO2	Explain the assessment, triage, documentation, communication strategies, and differential diagnosis of common emergency presentations.	L2
CO3	Apply emergency management principles for respiratory, cardiovascular, gastrointestinal, endocrine, and genitourinary emergencies in clinical settings.	L3
CO4	Analyze neurological, psychiatric, ophthalmic, ENT, allergic, and anaphylactic emergencies based on clinical signs, symptoms, and treatment approaches.	L4
CO5	Demonstrate appropriate management of poisoning, overdose, environmental emergencies, burns, drowning, bleeding, and shock during emergency care.	L3
CO6	Examine disaster response strategies, trauma management in pregnancy, and shock pathophysiology for effective emergency decision-making and patient care.	L4

Course Content:

Unit	Topic	Content
I	**Introduction to Emergency Medical Care**	Overview of emergency care and EMS system, quality improvement, and medical direction.
II	**Lifting and Moving Patients**	Principles of body mechanics, proper lifting, and techniques for moving patients using appropriate equipment.
III	**Airway Management**	Airway anatomy, methods for maintaining an open airway, use of suction equipment, oxygen delivery, and resuscitation devices.
IV	**Initial Assessment of Patient**	General impression, ABCs assessment, and prioritizing care during initial patient evaluation.
V	**Trauma Patients**	Rapid assessment methods, trauma triage principles, and management strategies for trauma patients.
VI	**Medical Patient**	Approach to assessing medical complaints, history-taking, and physical examination techniques.

VII	**Communication Techniques in Emergency**	Effective communication with patients, families, and healthcare team during emergencies.
VIII	**Documentation in Emergency Care**	Legal and ethical aspects of patient documentation, writing accurate reports, handling patient refusal.
IX	**Differential Diagnosis for Common Symptoms**	Assessment and management of common emergency symptoms like chest pain, respiratory distress, GI bleed, and trauma, with a focus on polytrauma.
X	**Respiratory Emergencies**	Management of asthma, COPD, pneumonia, and pneumothorax in emergencies.
XI	**Cardiovascular Emergencies**	Acute conditions like ACS, heart failure, pericarditis, aortic dissection, and hypertensive crises.
XII	**GI Emergencies**	Assessment and management of conditions like appendicitis, bowel obstruction, GI bleeding, and perforated viscera.
XIII	**Endocrine Emergencies**	Management of hyperkalemia, hypokalemia, thyroid storm, and other common endocrine emergencies.
XIV	**Genito-urinary Emergencies**	Assessment and management of conditions like ectopic pregnancy, testicular torsion, renal calculi, and pelvic inflammatory disease.
XV	**Neurological Emergencies**	Management of stroke, intracranial hemorrhage, meningitis, and seizures.
XVI	**Psychiatric Emergencies**	Handling psychiatric emergencies including aggression and suicidal ideation.
XVII	**Ophthalmology & ENT Emergencies**	Management of traumatic eye conditions, otitis, sinusitis, epistaxis, and foreign body obstructions.
XVIII	**Acute Allergies and Anaphylaxis**	Diagnosis and management of allergic reactions and anaphylaxis in emergency care.
XIX	**Poisoning and Overdose**	Clinical signs, symptoms, and management of poisoning and overdose.

XX	**Environmental Emergencies, Burns, and Drowning**	Emergency care for heat/cold exposure, burns, and drowning incidents.
XXI	**Bleeding and Shock**	Management of internal and external bleeding, shock recognition, and treatment protocols.
XXII	**Introduction to Mass Disaster Management**	Overview of emergency response during mass disasters, including triaging and resource allocation.
XXIII	**Trauma in Pregnancy**	Approach to managing trauma in pregnant patients, addressing unique challenges.
XXIV	**Shock**	Detailed understanding of shock pathophysiology and management in emergency settings.

Practical: (80 hours)

Course Outcomes

CO No. **No.**	Course Learning Outcomes	**Bloom's Level**
CO1	Demonstrate comprehensive patient assessment, focused history taking, physical examination, and interpretation of diagnostic investigations for emergency diagnosis and care planning.	L3 L3
CO2	Analyze clinical presentations, formulate differential diagnoses, and evaluate diagnostic findings to support decision-making in emergency situations.	L5 L5
CO3	Apply emergency procedures including cardiac monitoring, CPR, defibrillation, airway management, oxygen therapy, vascular access, and patient stabilization techniques.	L3 L3
CO4	Develop triage strategies, patient transfer plans, referral pathways, and multidisciplinary management approaches for mass casualty and emergency care scenarios.	L6 L6

Course Content:-

Unit	**Topic**	**Content**
I	**Patient Assessment and Diagnosis**	Take focused histories and perform physical examinations for rapid diagnosis in emergency situations.
II	**Differential Diagnosis and Critical Thinking**	Develop differential diagnoses based on symptoms and clinical presentations.
III	**Ordering and Interpreting Diagnostic Tests**	Learn how to order diagnostic tests quickly and interpret results under pressure.
IV	**Managing Emergency Conditions**	Administer treatments for emergencies like cardiac arrest, respiratory failure, trauma, and poisoning.
V	**Cardiac Monitoring**	Monitor and interpret cardiac rhythms, EKGs, and vital signs in emergency situations.

VI	**Cardiac Defibrillation and CPR**	Perform advanced cardiac life support, including defibrillation and CPR for adults, children, and infants.
VII	**Basic Emergency Procedures**	Placement of nasogastric tubes, Foley catheters, IV lines, and oxygen therapy management.
VIII	**Advanced Airway Management**	Practice endotracheal intubation, use of advanced airway device, and ventilation techniques.
IX	**Surgical Procedures**	Learn basic surgical procedures like wound closure, incision and drainage, and managing traumatic injuries.
X	**Cervical Spine Stabilization**	Practice proper cervical spine immobilization during patient transfer.
XI	**Patient Retrieval and Transfer**	Understand and practice the proper use of emergency medical equipment for safe patient transport.
XII	**Triage and Mass Casualty Management**	Practice triaging patients in mass casualty scenarios, prioritizing care, and understanding disaster response protocols.
XIII	**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

COMMUNITY MEDICINE AND CLINICAL RESEARCH-II

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.

Theory: (25 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define concepts of health disparities, health equity, nutrition, and social determinants influencing population health outcomes.	L1 & L2
CO2	Explain public health strategies for nutrition promotion, behavioral health improvement, and prevention of substance abuse and mental health problems.	L2
CO3	Apply principles of infectious disease control, surveillance, outbreak preparedness, and maternal-child health interventions in public health settings.	L3
CO4	Describe fundamental biostatistical concepts, data presentation methods, hypothesis testing, and measures used in clinical research.	L2
CO5	Demonstrate the application of inferential statistical techniques and interpretation of research findings in clinical and public health studies.	L3
CO6	Analyze research protocols, literature evidence, informed consent documents, and data management practices for conducting clinical research.	L4

Course Content:

Unit	Topic
I	**Health Disparities and Health Equity** Health disparities across populations (race, ethnicity, gender, socio- economic status); approaches to addressing inequities; cultural competency in public health; policy and program strategies.
II	**Nutrition and Public Health** Relationship between nutrition and health outcomes; nutritional interventions and programs; food security; global nutrition challenges (undernutrition, obesity).
III	**Social and Behavioral Health** Behavioral science in public health (health behaviors, risk factors); health promotion strategies; mental health and substance abuse; social and cultural factors affecting health.
IV	**Infectious Disease Control**

	Prevention and control of infectious diseases (vaccination, quarantine); epidemiology of diseases (HIV, tuberculosis, malaria); outbreak preparedness; surveillance and reporting.
V	**Maternal and Child Health** Reproductive health, prenatal care, maternal mortality; child health, nutrition, immunization; adolescent health; early childhood development and education.
	Clinical Research theory (25 hours)
VI	**Introduction to Biostatistics** Basic concepts in biostatistics; descriptive statistics; graphical representation; data distribution; hypothesis testing; confidence intervals; p- values; power and sample size.
VII	**Inferential Statistics for Clinical Research** 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).
VIII	**Research Documents** Research protocols and proposals; writing clinical research proposals; case report forms (CRFs); informed consent forms.
IX	**Literature Review in Clinical Research** Importance of literature review; reviewing existing research; critical appraisal; identifying gaps in current research.
X	**Data Management in Clinical Research** Data collection methods; survey design; data validation and cleaning; handling missing data; data security and governance.

Practical: (60 hours)

Course Content:

Unit	Topic
I	**Health Disparities and Health Equity** Analyze health outcomes across different populations using NFHS and state health data; propose strategies to reduce health inequities.
II	**Nutrition and Public Health** Assess nutrition-related public health issues in India (undernutrition, obesity); propose nutrition interventions based on ICMR studies and NNMB reports.

III	**Social and Behavioral Health** Conduct surveys on health behaviors (smoking, alcohol use) in local communities; design and present health promotion campaigns.
IV	**Infectious Disease Control** Participate in simulated outbreak investigations (dengue, malaria, tuberculosis); track outbreaks, develop response plans, and monitor interventions using surveillance systems.
V	**Maternal and Child Health** Evaluate maternal and child health programs (e.g., JSY); use health survey data to assess mortality rates, vaccination, and growth monitoring; propose community interventions.
VI	**Introduction to Biostatistics** Use statistical tools to analyze real clinical data; create graphs and calculate descriptive statistics (mean, median, SD).
VII	**Inferential Statistics for Clinical Research** Apply t-tests, chi-square tests, and regression analyses (linear, logistic) on simulated clinical trial data.
VIII	**Research Documents** Develop research proposals, CRFs, and informed consent forms; draft a research protocol with study objectives, methodology, and ethical considerations.
IX	**Literature Review in Clinical Research** Conduct literature review using online databases (PubMed, Google Scholar); summarize key studies and evaluate research gaps.
X	**Data Management in Clinical Research** Design a pilot survey for clinical research, structure questions, validate data, handle missing data, and learn data security compliance.

MEDICAL LAW AND ETHICS

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.

Theory: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of medical ethics, the Hippocratic Oath, and the roles, responsibilities, and limitations of the Physician Associate profession.	L1 & L2
CO2	Describe the historical evolution of medical ethics and ethical perspectives related to life, death, end-of-life care, and organ donation.	L2
CO3	Apply concepts of equity, equality, patient rights, and bias reduction in promoting ethical access to healthcare services.	L3
CO4	Analyze medical malpractice, negligence, and relevant legal frameworks governing professional accountability in healthcare practice.	L4
CO5	Illustrate the healthcare provider's responsibilities toward self, patients, and society, including professional conduct, advocacy, and ethical decisionmaking.	L2
CO6	Interpret ethical and legal considerations related to informed consent and special situations involving mental health, abortion, euthanasia, HIV, genetic testing, and organ transplantation.	L4

Course Content:

Unit	Topic
I	**The Hippocratic Oath and its Relevance to the PA Profession** History, significance, and principles of medical ethics; application in the PA profession.
II	**The PA Profession: Roles, Responsibilities, and Limitations** Scope of practice, duties, ethical obligations, and understanding the PA‘s role within the healthcare team.
III	**History of Medical Ethics** Evolution of medical ethics, key philosophies, and historical case studies (e.g., Nuremberg Code).
IV	**Understanding Life and Death** Ethical considerations on life and death, end-of-life care, organ donation, and cultural/philosophical views.
V	**Patient’s Access to Medical Care: Focus on Equity, Equality, and Bias** Addressing equity, bias, and discrimination in healthcare, global health inequities, and healthcare policies.
VI	**Medical Malpractice: Definition, Understanding, and Laws Related to Medical Malpractice** Definition, types, negligence, legal principles, and Indian laws governing malpractice.
VII	**Healthcare Provider’s Responsibility to Oneself, to the Patients, and to Society** Professional conduct, patient advocacy, maintaining boundaries, and social responsibility in healthcare.
VIII	**The Informed Consent in Medical Practice** Definition, legal framework in India, and ethical considerations of obtaining informed consent in special situations.
IX	**Ethics and Laws Governing Special Situations in Medical Care** Ethical and legal issues in mental health, abortion, euthanasia, HIV, genetic testing, and organ transplantation.

Practical: (40 hours)

Course Outcomes

Course Content:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Analyze ethical dilemmas in patient autonomy, end-of-life care, and medical malpractice through case discussions and role-play activities.	L4
CO2	Demonstrate appropriate informed consent procedures and effective communication skills in diverse healthcare scenarios.	L3
CO3	Evaluate patient privacy and confidentiality practices by examining healthcare protocols and real-life case situations.	L5
CO4	Formulate ethical and legally compliant approaches for managing special situations including mental health, abortion, euthanasia, organ donation, and surrogacy.	L6

Unit	Topic
I	**Group Discussions on Medical Ethics and Laws** Case studies, role-play on ethical dilemmas in patient autonomy, life sustaining treatments, and medical malpractice.
II	**Court Sessions on Medical Malpractice** Understanding legal processes in medical malpractice claims and appreciating healthcare professionals' duties.
III	**Simulated Informed Consent Process** Practice obtaining informed consent in various healthcare scenarios through role-play and communication skills.
IV	**Patient Privacy and Confidentiality Workshop** Discussing real cases of privacy breaches, studying privacy protocols, and understanding patient confidentiality.
V	**Workshops on Special Situations** 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

INTRODUCTION TO HEALTHCARE MANAGEMENT

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, conflict and stress management techniques
- Demonstrate understanding in change and innovation and change in management
- Demonstrate understanding of teams, groups, leadership
- Analyze financial management in healthcare, including budgeting reimbursement, and resource allocation.
- Demonstrate understanding of time management, cost and efficiency

Theory: (40 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of management and explain the functions of planning, organizing, staffing, directing, and controlling in healthcare organizations.	L1 & L2
CO2	Describe strategic management concepts, planning foundations, and planning tools used in healthcare administration.	L2
CO3	Apply decision-making approaches and stress management techniques to address workplace challenges in healthcare settings.	L3
CO4	Illustrate healthcare financing, economics, organizational behavior, human resource management, and team dynamics in healthcare services.	L2
CO5	Analyze leadership practices, change management strategies, and quality improvement initiatives for effective healthcare delivery.	L4
CO6	Interpret cost-efficiency measures, time management principles, and the role of technology in healthcare administration.	L4

Course Content:

Unit	Topic
I	Overview of Management
II	Management Process: Planning, Organizing, Staffing, Directing, and Controlling
III	Strategic Management
IV	Foundations of Planning
V	Planning Tools and Techniques
VI	Decision Making, Conflict, and Stress Management
VII	Healthcare Financing and Economics
VIII	Organizational Behavior in Healthcare
IX	Managing Change and Innovation
X	Understanding Groups and Teams
XI	Leadership
XII	Time Management
XIII	Management of Human Resources
XIV	Quality Improvement
XV	Cost and Efficiency
XVI	Technology and Healthcare Administration

Practical: (40 hours)

Course Outcomes

Course Content:

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Apply case study analysis and observations from healthcare organization visits to understand management practices in healthcare settings.	L3
CO2	Demonstrate strategic planning, decision-making, conflict resolution, and time management skills through simulated healthcare scenarios.	L3
CO3	Assess budgeting processes, financial performance, leadership approaches, and teamwork effectiveness in healthcare organizations.	L5
CO4	Develop quality improvement initiatives and healthcare technology integration plans to enhance organizational efficiency and patient care outcomes.	L6

Unit	Topic
I	Case Study Analysis
II	Healthcare Organization Visits
III	Strategic Planning Exercise
IV	Role-Playing: Decision Making & Conflict Management
V	Budgeting and Financial Analysis Workshop
VI	Time Management Simulation
VII	Leadership and Teamwork Exercises
VIII	Quality Improvement Project
IX	Healthcare Technology Integration

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

SEMESTER VI

NON-COMMUNICABLE DISEASES

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.

Theory: (70 hours)

Course Outcome

CO No.	Course Learning Outcomes	Bloom’s Level
CO1	Define the epidemiology, risk factors, pathophysiological mechanisms, and public health burden of non-communicable diseases in India.	L1 & L2
CO2	Explain the clinical features, diagnosis, management, and preventive measures of cardiovascular diseases and diabetes mellitus.	L2

CO3	Illustrate the pathophysiology, clinical presentation, and management strategies of chronic respiratory diseases and common cancers.	L2
CO4	Apply principles of assessment and management for mental health disorders and hypertension in clinical practice.	L3
CO5	Demonstrate lifestyle modification approaches, including diet, exercise, smoking cessation, and alcohol control, for NCD prevention and care.	L3
CO6	Analyze public health frameworks, national programs, and policy interventions for prevention and control of non-communicable diseases.	L4

Course Content:

Unit	Topic
I	**Introduction to Non-Communicable Diseases (NCDs)** Overview of NCDs in India, common pathophysiological mechanisms, multimorbidity, public health policies (NPCDCS), lifestyle factors (smoking, alcohol, diet).
II	**Cardiovascular Diseases** Clinical presentation of hypertension, ischemic heart disease, heart failure, stroke; pathophysiology, smoking & alcohol impact, diagnosis, pharmacological treatment, preventive measures.
III	**Diabetes Mellitus** Types (Type 1, Type 2, Gestational); pathophysiology, complications, diagnosis, lifestyle impact, management, preventive measures.
IV	**Chronic Respiratory Diseases** Common diseases (COPD, asthma, pulmonary fibrosis); pathophysiology, smoking & alcohol impact, diagnosis, management, preventive measures.
V	**Cancer Diagnosis and Management** Common cancers, pathophysiology (tumor biology, metastasis), smoking and alcohol impact, management (chemotherapy, surgery), preventive measures (screening, vaccination).
VI	**Mental Health Disorders** Overview of depression, anxiety, bipolar disorder, schizophrenia, substance use disorders; pathophysiology, smoking & alcohol impact, diagnosis & management, preventive measures.

VII	**Hypertension and Mental Health** Hypertension pathophysiology, lifestyle factors (smoking, alcohol), management, psychosocial impact, preventive measures.
VIII	**Role of Lifestyle Modifications in Managing NCDs** Role of diet and exercise, smoking cessation, alcohol control, psychosocial factors in managing NCDs.
IX	**Public Health Frameworks in NCD Management** NCD prevention and control in India, tobacco and alcohol policies (COTPA, NTCP), effectiveness in NCD prevention.

Practical: (80 hours)

CO No.	**Course Learning Outcomes**	**Bloom's Level**
CO1	Apply clinical examination techniques and diagnostic procedures for assessing cardiovascular, respiratory, and hypertensive disorders in patients with NCDs.	L3
CO2	Demonstrate patient-centered management skills for diabetes mellitus, including glucose monitoring, insulin administration, and health education.	L3
CO3	Evaluate cancer screening outcomes and mental health assessment findings using standardized tools, clinical interviews, and case-based approaches.	L5

CO4	Design lifestyle modification and public health intervention strategies for prevention and control of non-communicable diseases at individual and community levels.	L6

Course Content:

Unit	Topic
I	**Clinical Examination of Cardiovascular Diseases** History taking, physical examination (heart failure signs, pulse rate, blood pressure), ECG interpretation, lifestyle impacts.
II	**Diabetes Mellitus Management** Blood glucose testing, OGTT, patient education on monitoring blood glucose, insulin administration, mental health screening.
III	**Respiratory System Examination** Respiratory history, physical examination (signs of distress, tactile fremitus, chest expansion), spirometry, smoking cessation counseling.
IV	**Cancer Screening and Management** Clinical screening exams (breast, cervical, abdominal palpation), tumor markers (PSA, CA-125), palliative care principles.
V	**Mental Health Disorder Screening** Use standardized mental health screening tools (depression, anxiety, substance abuse), structured interviews, case studies, role play.
VI	**Hypertension Management** Accurate blood pressure measurement, hypertension diagnosis, lifestyle counseling, mental health assessments for hypertensive patients.
VII	**Role of Lifestyle Modifications in NCDs** Educating patients on diet, exercise, tobacco/alcohol cessation, providing psychosocial support for lifestyle changes.
VIII	**Public Health Frameworks in NCD Management** 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. Public Health 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

GERIATRICS MEDICINE

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.

Theory: (60 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the biological, epidemiological, immunological, and physiological changes associated with ageing, including end-of-life care concepts.	L1 & L2
CO2	Explain the clinical presentation, assessment, and management of common geriatric disorders affecting cardiovascular, endocrine, neurological, renal, and musculoskeletal systems.	L2
CO3	Apply principles of diagnosis and care for anemia, lymphomas, immunological disorders, and genitourinary conditions in elderly patients.	L3
CO4	Analyze age-related cardiovascular, endocrine, metabolic, and central nervous system changes to differentiate common geriatric health problems.	L4
CO5	Demonstrate understanding of pharmacology, polypharmacy, rehabilitation strategies, and multidisciplinary approaches in geriatric patient care.	L3
CO6	Interpret preventive, palliative, legal, ethical, and economic aspects of elderly care for improving quality of life and healthcare outcomes.	L4

Course Content:

Unit	Topic
I	**Basic Sciences in Geriatrics** 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
II	**Clinical Geriatric Medicine** 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
III	**Preventive Geriatrics** 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)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Demonstrate comprehensive geriatric history taking, physical examination, and functional status assessment for elderly patients.	L3
CO2	Apply diagnostic investigations, imaging findings, and cognitive assessment tools to identify common geriatric health conditions.	L3
CO3	Assess geriatric syndromes, chronic disease management strategies, polypharmacy issues, and urinary incontinence care in clinical settings.	L5
CO4	Develop patient-centered plans for palliative care, rehabilitation, multidisciplinary interventions, and emergency management in geriatric practice.	L6

Unit	Topic
I	History Taking and Physical Examination: Detailed history and physical examination, functional status assessment
II	Diagnostic Skills and Investigations: Blood tests, imaging, cognitive assessments
III	Management of Geriatric Syndromes: Managing chronic diseases, polypharmacy, urinary incontinence care
IV	Palliative and End-of-Life Care: Pain management, family counseling, end-of-life decision-making
V	Rehabilitation and Multidisciplinary Care: Observation of rehabilitation protocols, assistive device training
VI	Geriatric Emergency Management: Management of acute conditions, emergency interventions in geriatrics

Books for reference:

Geriatrics: A Practical Approach by Dr. B.K. Mahajan

Clinical Geriatrics by Dr. M.S. Bhatia

Geriatric Medicine: An Evidence-Based Approach by M.C.S. Khurana

OBSTETRICS AND GYNAECOLOGY

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.

Pre-requisites:

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

Theory: (70 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the anatomy of the reproductive system and explain the endocrine mechanisms regulating reproductive health and function.	L1 & L2
CO2	Describe the processes of fertilization, pregnancy, placental development, and physiological changes occurring during gestation.	L2
CO3	Illustrate the pathophysiology of reproductive organ disorders and common gynaecological conditions affecting women's health.	L2
CO4	Apply principles of labour management, obstetric care, and pharmacological interventions used in obstetrics and gynaecology.	L3
CO5	Analyze contraceptive methods, fertility regulation strategies, and their role in reproductive health management.	L4

CO6	Interpret neonatal care practices and recent advances in obstetrics and gynaecology for improving maternal and newborn outcomes.	L4

Course Content:

Unit	Topic
I	Basic Science and Anatomy of Reproductive system
II	Endocrinology and hormonal Regulation
III	Pregnancy and Placental Development
IV	Pathophysiology of Reproductive Organs
V	Pregnancy and Labour
VI	Pharmacology in Obstetrics and Gynaecology
VII	Gynaecological Disorders
VIII	Contraception and Fertility Regulation
IX	Neonatology and Recent Advances in Obstetrics and Gynaecology

Practical: (80 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Demonstrate obstetric assessment skills including history taking, antenatal examination, fetal monitoring, and essential newborn care.	L3
CO2	Apply clinical techniques in normal labour, postpartum hemorrhage management, neonatal resuscitation, and life support procedures.	L3
CO3	Assess gynecological conditions through pelvic examination, Pap smear and wet smear preparation, contraceptive procedures, and MTP-related care.	L5
CO4	Develop competency in operative obstetric and gynecological procedures, counselling, and postnatal care through supervised clinical practice.	L6

Course Content:

Unit	Topic
I	History Taking and Examination of Pregnant Women
II	Observation and Assistance in Normal Labour
III	Managing Postpartum Hemorrhage
IV	Witnessing and Assisting in Cesarean Section, Breech, Forceps, and Vacuum Deliveries
V	Essential Care of the Newborn
VI	Fetal Monitoring
VII	History Taking and Examination of Female Pelvic Organs
VIII	Pap Smear and Wet Smear Preparation
IX	Assisting in Minor Gynaecological Procedures
X	Medical Termination of Pregnancy (MTP)
XI	Insertion and Removal of Intrauterine Contraceptive Devices (IUCD)

Operative Skills:

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

Additional Skills:

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
- Textbook of Gynaecology - V.L. Bhargava

CRITICAL CARE MEDICINE

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.

Theory: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of critical care medicine and explain the pathophysiological mechanisms underlying critical illness.	L1 & L2
CO2	Describe advanced monitoring techniques and their role in assessing critically ill patients.	L2
CO3	Apply airway management and mechanical ventilation principles in the care of patients requiring critical support.	L3
CO4	Analyze the pharmacological interventions used in critical care settings for managing life-threatening conditions.	L4
CO5	Differentiate ethical issues, end-of-life care considerations, and decisionmaking processes in critical care practice.	L4
CO6	Demonstrate clinical approaches for the management of specific critical conditions using evidence-based critical care principles.	L3

Course Content:

Unit	Topic
I	Introduction to Critical Care Medicine
II	Pathophysiology of Critical Illness
III	Advanced Monitoring Techniques
IV	Ventilation and Airway Management
V	Pharmacology in Critical Care
VI	Ethical Issues and End-of-Life Care
VII	Clinical Management of Specific Critical Conditions

Practical: (30 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Demonstrate emergency resuscitation skills including Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS), shock management, and sepsis management in critical care settings.	L3
CO2	Apply airway management techniques, ventilator operation, non-invasive ventilation, and endotracheal intubation procedures for critically ill patients.	L3
CO3	Evaluate patient status using critical care monitoring systems, arterial blood gas interpretation, neurological assessments, and hemodynamic monitoring data.	L5
CO4	Formulate comprehensive critical care management approaches through performance of invasive procedures, multidisciplinary team collaboration, and ethical decision-making in palliative and intensive care scenarios.	L6

Course Content:

Unit	Practical Area	Topic
I	Airway and Ventilator Management	Endotracheal Intubation, Ventilator Settings and Management, Non-invasive Ventilation (CPAP/BiPAP)
II	Monitoring and Assessments	Monitoring Equipment (ECG, Pulse Oximeter, Invasive BP Monitoring), Arterial Blood Gas (ABG) Sampling and Interpretation, Neurological Monitoring (GCS, ICP)
III	Emergency Interventions and Resuscitation	Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS), Shock Management, Sepsis Management
IV	Critical Care Procedures	Central Line Insertion, Arterial Line Insertion, Chest Tube Insertion
V	Multidisciplinary Team Collaboration	Role of PA in Critical Care Team, Patient Management Rounds
VI	Palliative Care and Ethical Decision Making	Family Communication, Ethical Dilemmas in ICU

Books for References

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

COMMUNITY MEDICINE AND CLINICAL RESEARCH-III

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.

Theory: (20 hours)

Course Outcomes

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Define the principles of chronic disease epidemiology and explain risk factors, screening methods, and public health strategies for prevention and control of non-communicable diseases.	L1 & L2
CO2	Describe the concepts of emergency preparedness, disaster response, community resilience, and recovery measures in public health practice.	L2

CO3	Apply public health intervention approaches, health promotion strategies, and behavioral change models to address community health challenges.	L3
CO4	Analyze public health laws, ethical principles, health policies, healthcare financing, and factors influencing health policy development and management.	L4
CO5	Demonstrate the principles of clinical research data management, survey design, data validation, cleaning, governance, and visualization techniques using appropriate tools.	L3
CO6	Interpret clinical research findings through data reporting, critical appraisal, manuscript preparation, ethical reporting standards, and presentation of scientific evidence.	L4

Course Content:

Unit	Topic	Content
	Public Health (Theory 20 Hours)	
I	**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
II	**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
III	**Public Health Interventions**	Community-based public health interventions health education and promotion programs Behavioral change theories and strategies. Evaluation of public health programs and interventional.
IV	**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
V	**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

VI	**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)
	Clinical Research (Theory)	
VII	**Data 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
VIII	**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)
IX	**Reporting and Interpreting Clinical Data**	Interpreting Results (pvalues, confidence intervals) Ethical

		Reporting Clinical Trials Reporting Standards (CONSORT) Critical Appraisal of Clinical Data
X	**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

Practical: (20 hours)

CO No.	Course Learning Outcomes	Bloom's Level
CO1	Analyze epidemiological and global health data to identify disease risk factors, health disparities, and priority public health challenges affecting populations.	L4
CO2	Assess public health laws, ethical issues, and health policies through casebased evaluation of legal, social, political, and economic determinants of healthcare.	L5
CO3	Apply clinical research data management techniques by designing surveys, developing data collection tools, and performing data validation and cleaning procedures.	L3
CO4	Develop research outputs through data visualization, statistical interpretation, ethical reporting, and preparation of structured clinical research manuscripts.	L6

Course Outcomes

Course Content:

Unit	Topic	Content
Practical (Public Health)		
I	**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.
II	**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.
III	**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
IV	**Health Policy and Management**	Analyze the influence of political and economic factors on any one health policy of India.
Practical (Clinical Research)		
V	**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.
VI	**Data Visualization in Clinical Research**	Use SPSS, R, or any other software to create visualizations (e.g., histograms, bar charts, Kaplan–Meier plots) from survey data samples, focusing on selecting the appropriate visualization type for each dataset.
VII	**Reporting and Interpreting Clinical Data**	Interpret data by calculating p-values, confidence intervals, and clinical significance. Report results following ethical guidelines, ensuring transparency and accuracy.
VIII	**Manuscript Writing in Clinical Research**	Write sections of a clinical research manuscript, focusing on structure (Introduction, Methods, Results, and Discussion) and ensuring clarity, proper data presentation, and adherence to ethical standards.

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.

RECENT ADVANCES IN MEDICINE-SEMINAR TOPICS

Goal:

The goal of teaching advances in medicine to PAs is to ensure they are equipped with the latest knowledge, skills, and best practices to deliver high-quality patient care.

Recent advances in medicine will be spread out from semester III-VI and be taught by guest lectures and discussed in seminars. The topics will be placed under relevant subjects. Saturdays or any one day in a week will be allocated as needed for these topics.

Learning Objectives:

Students will be able to-

Understand the fundamentals of personalized medicine and its impact on patient care. Analyze the advancements in gene editing technologies like CRISPR and their potential in genetic disorders.

Explore the role of immunotherapy, regenerative medicine, and artificial intelligence in modern healthcare.

Gain insights into the emerging field of nanomedicine and its applications in drug delivery and disease management.

Apply knowledge of telemedicine and digital health innovations in clinical practice. Recognize the significance of microbiome research, antibiotic resistance, and the development of new vaccines.

Assess the impact of robotic-assisted surgery, chronic disease management, and pharmacology in improving healthcare outcomes.

Topics

- **Personalized Medicine**

Genetic profiling and tailored treatments Pharmacogenomics and drug efficacy Advances in biomarkers for precision medicine

- **Gene Editing and CRISPR Technology** CRISPR-Cas9 in genetic disorders Ethical considerations and regulations Gene therapy for cancer and rare diseases Genetic modifications for disease resistance

- **Immunotherapy**

Immunotherapy in cancer (CAR-T, checkpoint inhibitors) Development of cancer vaccines

Advances in autoimmune disease therapies

• Regenerative Medicine

Stem cell therapies and tissue engineering Organ regeneration and 3D bioprinting Advances in wound healing and scar management

• Artificial Intelligence in Healthcare

AI-driven diagnostics (radiology, pathology) Machine learning for personalized treatments AI in drug discovery and clinical trials

• Nanomedicine

Nanoparticles in drug delivery systems Nanosensors for disease detection Advances in cancer treatment using nanotechnology

• Telemedicine and Digital Health

Virtual healthcare services and remote monitoring AI and machine learning in telehealth

Wearable devices for chronic disease management

• Neuroscience Advances

Treatments for neurodegenerative diseases (Alzheimer‘s, Parkinson‘s) Brain-computer interfaces (BCI)

Advances in mental health treatment and neurostimulation

• Microbiome Research

Gut microbiome‘s role in health and disease

Probiotics and prebiotics in disease prevention Microbiome-based therapies for metabolic disorders

• Antibiotic Resistance and New Antibiotics

Development of novel antibiotics and alternatives Phage therapy as a solution to resistance

Global strategies to combat antimicrobial resistance

• Vaccines and Immunization

RNA vaccine technology Advances in vaccines for emerging infectious diseases Universal flu vaccine research

• Robotics and Surgery

Robotic-assisted surgeries and minimally invasive procedures Impact on recovery and precision

Innovations in robotic prosthetics

- **Chronic Disease Management**
  - Advances in diabetes management (smart insulin, artificial pancreas) New treatments for cardiovascular diseases
  - Management of chronic pain through advanced therapeutics
- **Pharmacology and Drug Development**
  - Targeted drug therapies and monoclonal antibodies Advances in

drug delivery systems (nanocarriers, liposomes)

Activities (34 hours)

Personalized Medicine Case Discussion (2 hours)

Read a simple case study about a patient with diabetes or heart disease. Discuss how genetic profiling might influence treatment choices.
Talk about how genetic differences can affect the way patients respond to medications.

Gene Editing and CRISPR Overview (2 hours)

Watch a short video or read an article about CRISPR technology. Discuss what it is and how it could potentially treat genetic disorders like sickle cell anemia.
Discuss the ethical issues surrounding gene editing.

Immunotherapy Case Review (3 hours)

Review a case of a cancer patient who received immunotherapy (like CAR-T therapy). Discuss how this treatment works and what the expected outcomes are. Talk about possible side effects and how they might be managed.

Regenerative Medicine Case Example (3 hours)

Discuss a case where stem cell therapy was used to treat a joint injury.

Talk about how regenerative medicine is changing the way chronic injuries are treated.

Artificial Intelligence in Diagnostics (3 hours)

Read about how AI is being used in radiology or neurology to diagnose diseases.
Share an example where AI could help in diagnosing a common condition like pneumonia.

Nanomedicine in Treatment (2 hours)

Watch a video or read about the use of nanoparticles in treating cancer or delivering medication.

Discuss how these tiny particles could make treatments more effective.

Telemedicine Role Play (2 hours)

In pairs, simulate a telemedicine consultation for a patient with a chronic condition (like diabetes or hypertension).
Discuss how virtual healthcare is changing the way patients are managed.

Neuroscience Advances Discussion (3 hours)

Review a simple case study of a patient with Parkinson‘s disease. Discuss how new treatments like deep brain stimulation are helping manage the condition.

Microbiome and Gut Health (2 hours)

Read about the link between gut health and diseases like IBS or obesity. Discuss the potential of probiotics and prebiotics in managing these conditions.
Share examples of how changes in the gut microbiome can affect overall health.

Antibiotic Resistance Case Study (2 hours)

Review a case where antibiotic resistance was a problem (e.g., in a TB patient). Discuss how healthcare professionals can help fight antibiotic resistance.

Vaccines and Immunization Discussion (2 hours)

Read about mRNA vaccines and their role in COVID-19. Discuss how these vaccines work and their potential for future diseases.
Discuss about the challenges of vaccinating large populations.

Robotic Surgery Video Review (2 hours)

Watch a video of a robotic-assisted surgery. Discuss how robotic surgeries are improving precision and recovery time.
Discuss about the role of a PA in supporting robotic-assisted procedures.

CRISPR and Human Enhancement Debate (2 hours)

Read about the ethical issues surrounding genetic enhancement.

Have a short debate on whether genetic modifications should be used to improve human traits, such as resistance to diseases.

Chronic Disease Management Discussion (2 hours)

Review recent advances in managing diabetes, such as smart insulin pumps. Discuss how these new tools can help improve patient care and outcomes.

Pharmacology and New Drug Therapies (2 hours)

Read about new drug therapies, such as monoclonal antibodies for cancer. Discuss how these therapies work and their potential side effects.

Semester VII & VIII

Course Code	Category	Lectures(L) Hours per week	Tutorial (T) Hours per week	Practical (P) Hours per week	Total Credits
VII Sem	Core Course		-	42	20
VIII Sem	Core			42	20

Course Rationale: The internship provides a structured transition from theoretical understanding to practical competency. It supports the development of technical skills, ethical responsibility, and professional identity, preparing students to function independently and collaboratively in clinical laboratories and research settings.

By rotating through specialized disciplines, students deepen their understanding of diagnostic procedures, automation, specimen handling, and healthcare workflows. This experience fosters critical thinking, interdisciplinary collaboration, and readiness for national/global healthcare environments.

Internship Duration: 12 months (Semester VII & VIII)
Schedule: 42 hours/week (7 hours/day, 6 days/week)

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

Cover Page of Log book

University/College logo University/ College Name

INTRENSHIP LOG BOOK

BPA (VII/VIII SEMESTER)

(YEAR)

STUDENT'S RECORD

Name **:** ……..….

Semester **:** ……...

Enrollment No. :……..….

Session **:** ……..…….

……..….. ……..……..

Signature of Principal Signature of Student

DECLARATION BY THE STUDENT

Madam/Sir,

I, Mr/Ms.....a student of ……..….. bearing Registration No. …… declare that I have completed ……..... hours of Internship duty, out of the assigned …… hours and have performed my duties in the hospital/laboratory as stated in my logbook

Students Signature

(COLLEGE/UNIVERSITY LOGO)

INSTITUTE/UNIVERSITY/ COLLEGE NAME

LOGBOOK CERTIFICATE

This is to certify that the candidate Mr/Ms…… registration number …… admitted in the academic year.....of ……college, has satisfactorily completed/ Not completed all requirements mentioned in this logbook for seventh/ eighth semester of Bachleor of Physician Associate during the period from ……to ……. in the … .....Hospital.

Signature of the Faculty in-Charge (hospital/laboratory) Name

Date

Signature of the Principal/Dean HoD (University/College)

Name

Date

MODEL PAPER

B.PA Semester-I **Bachelor of Physician Associate**
Code: BPA 101

Semester I

Anatomy-I
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Classify the joints in detail. (CO3, L2)

b) Define anatomical planes of the body. Explain flexion and extension with suitable diagrams. (CO3, L2)

c) Discuss the anatomy of the blood vessels and difference between vein and arteries. (CO4, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Describe the neurovascular structures of the pelvis. (CO1, L2)

b) Supine and prone position with example (CO2, L2)

c) Explain Identification of anatomical regions of head *(CO3, L2)*

d) Classification of muscles. (CO3, L2)

e) Composition and classification of bones. (CO3, L2)

f) Anatomical procedure and location for blood sampling. (CO2, L2)

g) What is the clinical significance of embryological development? (CO2, L2)

h) Mention any four clinical conditions related to head and neck anatomy. (CO2, L1)

MODEL PAPER

B.PA Semester-I **Bachelor of Physician Associate**
Code: BPA 102

Semester I

Physiology-I
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Describe thyroid hormones. Explain their role in metabolism and growth. (CO2, L2)
b) Explain homeostasis. Discuss its types of feedback mechanisms with examples. (CO3, L2)
c) Describe structure and function of heart. (CO2, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain membrane transport mechanism and active transport. (CO2, L2)
b) Cellular metabolism of Krebs cycle. (CO2, L2)
c) Describe glomerular filtration and tubular secretion in the kidneys. (CO5, L2)
d) Explain the regulation of water, sodium, and electrolyte balance by the kidneys. (CO5, L2)
e) Explain the effect of hyperventilation and deep breathing on lung volumes. (CO4, L2)
f) Define acid-base balance and its distribution. (CO4, L1)
g) Describe the structure and functions of the major digestive organs. (CO3, L2)
h) Explain hormonal regulation of blood glucose by insulin and glucagon. (CO3, L2)

MODEL PAPER

B.PA Semeter-I **Bachelor of Physician Associate**
Code: BPA 103

Semester I

Biochemistry and Molecular Biology-I
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Discuss the functions and clinical importance of plasma proteins. (CO3, L2)
b) Define Carbohydrate. Describe classification and functions of carbohydrates with suitable examples. (CO2, L2)
c) Explain enzyme classification and enzyme inhibition with suitable examples. (CO4, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain membrane transport mechanisms. (CO1, L2)
b) competitive and non-competitive enzyme inhibition. (CO3, L2)
c) Structure and clinical significance of hemoglobin. (CO3, L2)
d) metabolic changes during fasting and starvation. (CO5, L2)
e) Molecular mechanism of muscle contraction. (CO3, L2)
f) Glycolysis and its significance. (CO5, L2)
g) Blood glucose regulation (CO6, L2)
h) Role of adipose tissue in metabolic regulation. (CO6, L2)

MODEL PAPER

B.PA Semester- I **Bachelor of Physician Associate**
Code: BPA 104

Semester I

Introduction to Microbiology
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the classification and nomenclature of microorganisms with reference to their role in healthcare. (CO1, L2)
b) Describe the structure of bacterial cells and function of cell organelles. (CO2, L2)
c) Explain the structure, classification, and replication of viruses. (CO1, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Differentiate between prokaryotic and eukaryotic cells. (CO2, L2)
b) Discuss microbial growth phases and factors affecting microbial growth. (CO2, L2)
c) Explain microbial genetics (CO2, L2)
d) Explain binary fission in bacteria. (CO2, L2)
e) Modes of transmission of infectious diseases and their prevention. (CO4, L2)
f) Sterilization and disinfection methods used in infection control. (CO4, L2)
g) Innate and adaptive immunity with suitable examples. (CO5, L2)
h) Explain antimicrobial resistance and its prevention. (CO5, L2)

MODEL PAPER

B.PA Semester-II **Bachelor of Physician Associate**

Code: BPA 201

Semester II

Anatomy II

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the anatomy of bones and discuss their role in movement and body. (CO1, L2)

b) Explain the anatomy of the spinal cord and their clinical significance. (CO1, L2)

c) Describe the anatomy of the gastrointestinal system and discuss the clinical significance of peptic ulcer. (CO3, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Functional areas of the brain and their significance. (CO1, L2)

b) Autonomic nervous system and its functions. (CO1, L2)

c) Anatomy of the respiratory system and mechanism of breathing. (CO2, L2)

d) Conduction system of the heart. (CO2, L2)

e) Structure and function of the nephron (CO3, L2)

g) Diabetes mellitus and it's type. (CO4, L2)

h) Components and functions of the lymphatic system. (CO5, L2)

i) External part of female reproductive system (CO5, L2)

MODEL PAPER

B.PA Semester-II **Bachelor of Physician Associate**
Code: BPA 202

Semester II
Physiology-II
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Explain the structure and functions of neurons. Discuss the mechanism of synaptic transmission in the nervous system. (CO1, L2)
b) Describe the physiology of smooth and cardiac muscles. Explain the mechanism of muscle contraction. (CO3, L2)
c) Explain innate and adaptive immunity with reference to antigen-antibody reaction. (CO4, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Differentiate between the central nervous system and peripheral nervous system. (CO1, L2)
b) Functions of sensory receptors and their role in sensory physiology. (CO2, L2)
c) Differentiate between reflex action and spinal cord reflexes. (CO2, L2)
d) Physiology of the neuromuscular junction. (CO3, L2)
e) Process of bone formation and bone remodeling. (CO3, L2)
f) Role of cytokines in immunoregulation. (CO4, L2)
g) Hypothalamic-pituitary-gonadal axis. (CO5, L2)
h) Physiology of pregnancy and lactation. (CO5, L2)

MODEL PAPER

B.PA Semester-II **Bachelor of Physician Associate**

Code: BPA 203

Semester II

Biochemistry and Molecular Biology-II

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Explain the absorption and storage of carbohydrates in the human body. (CO1, L2)

b) Describe the classification of hormones and discuss their mechanisms of action and role in the regulation of homeostasis. (CO3, L2)

c) Explain acid-base balance in the human body with acidosis and alkalosis. (CO4, L2**)**

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Digestive enzymes and their role in nutrient digestion. (CO1, L2)

b) Role of vitamins in metabolism and its type. (CO2, L2)

c) Biochemical consequences of nutritional deficiencies. (CO2, L2)

d) Hormonal regulation of blood glucose levels. (CO3, L2)

e) Regulation of water and electrolyte balance by ADH and aldosterone. (CO3, L2)

f) Interpretation and clinical significance of arterial blood gas ABG analysis. (CO4, L2)

g) Mendelian inheritance and patterns of genetic inheritance. (CO5, L2)

h) Structure, types, and functions of RNA. (CO6, L2)

MODEL PAPER

B.PA Semester-II **Bachelor of Physician Associate**

Code: BPA 204

Semester II

Medical Microbiology

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the role of normal human microbiota in health and disease with virulence factor. (CO1, L2)

b) Describe innate and adaptive immune responses against bacterial infections. (CO2, L2)

c) Discuss the morphology clinical features and laboratory diagnosis of *Escherichia coli* **(**CO4, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Mechanisms of antimicrobial action and their clinical significance. (CO3, L2)

b) Define Antimicrobial resistance and its preventive strategies. (CO3, L2)

c) Virus–host interactions and pathogenesis of viral diseases. (CO4, L2)

d) Laboratory diagnosis of viral infections. (CO4, L2)

e) Clinical features and laboratory diagnosis of malaria. (CO4, L2**)**

f) Classification and pathogenesis-of fungal infections. **(**CO4, L2)

g) Sterilization and disinfection methods used in infection control. **(**CO5, L2)

h) Biomedical waste segregation and disposal in healthcare facilities. (CO6, L2)

MODEL PAPER

B.PA Semester-III **Bachelor of Physician Associate**

Code: BPA 301

Semester III

PHARMACOLOGY AND TOXICOLOGY-I

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the processes of drug absorption, distribution, metabolism, and excretion. (CO2, L2)

b) Describe drug–receptor interactions and dose–response relationships. (CO3, L2)

c) Explain the pharmacological actions and clinical uses of sympathomimetic and sympatholytic drugs. (CO5, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Define pharmacology and toxicology and explain their scope. (CO1, L2)

b) Describe the role of CDSCO in drug regulation in India. (CO1, L2)

c) Explain agonists and antagonists with suitable examples. (CO3, L2)

d) Define therapeutic index and explain its clinical significance. (CO4, L2)

e) Describe parasympathomimetic and parasympatholytic drugs with their clinical applications. (CO5, L2)

f) Explain the role of histamine and prostaglandins in inflammation. (CO6, L2)

g) Differentiate between acute and chronic toxicity. (CO6, L2)

h) Describe the general principles of management of poisoning. (CO6, L3)

MODEL PAPER

B.PA Semester-III **Bachelor of Physician Associate**

Code: BPA 302

Semester III

PATHOLOGY

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Explain the mechanisms and morphological changes in cell injury and cell death. (CO2, L2)

b) Describe acute and chronic inflammation and explain the process of tissue repair. (CO3, L2)

c) Explain the pathogenesis and classification of neoplasia and describe methods of tumor diagnosis. (CO4, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Define amyloidosis and describe its major types and clinical features. (CO2, L2)

b) Differentiate between dystrophic and metastatic calcification. (CO2, L2)

c) Explain the pathophysiology of oedema and thrombosis. (CO3, L2)

d) Describe the major types of shock and their pathological effects. (CO3, L2)

e) Explain hypersensitivity reactions and their major types. (CO4, L2)

f) Describe the pathological features of bacterial, viral, and fungal infections. (CO4, L2)

g) Explain autosomal and sex-linked genetic disorders with suitable examples. (CO5, L2)

h) Describe the collection, handling and storage of clinical samples in diagnostic laboratories. (CO6, L3)

MODEL PAPER

B.PA Semester-III **Bachelor of Physician Associate**

Code: BPA303

Semester III

GENERAL MEDICINE-I

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the causes and clinical significance of fever and dyspnea. (CO2, L2)

b) Describe the systematic approach to history taking and physical examination in diagnosis. (CO3, L2)

c) Explain the assessment and management of fluid and electrolyte imbalance in dehydration. (CO6, L3)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Define health and illness and explain the concept of health disparities. (CO1, L2)

b) Describe the important causes of chest pain encountered in clinical practice. (CO2, L2)

c) Explain the clinical approach to headache and dizziness. (CO2, L2)

d) Describe the importance of differential diagnosis and clinical reasoning in patient assessment. (CO3, L2)

e) Explain the accuracy, reliability, and limitations of laboratory tests. (CO4, L2)

f) Describe the principles of nutritional assessment and its importance in clinical practice. (CO5, L3)

g) Explain protein-energy malnutrition and obesity as nutritional disorders. (CO5, L2)

h) Describe the anion gap and its significance in the interpretation of acid–base disorders. (CO6, L3)

MODEL PAPER

B.PA Semester-III **Bachelor of Physician Associate**

Code: BPA 304

Semester III

BASICS OF SURGERY

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the principles of preoperative assessment and patient preparation. (CO2, L2)

b) Describe the types of shock and their basic management. (CO4, L2)

c) Explain the assessment and management of burn injuries. (CO5, L3)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Define elective and emergency surgery with examples. (CO1, L1)

b) Explain the importance of sterility and aseptic technique in surgery. (CO2, L2)

c) Describe the types and uses of surgical instruments. (CO2, L2)

d) Explain surgical knots, suturing, and wound closure. (CO3, L2)

e) Describe general and regional anesthesia and their basic features. (CO3, L2)

f) Explain the indications and hazards of blood transfusion. (CO3, L2)

g) Describe enteral and parenteral nutrition in surgical patients. (CO3, L2)

h) Explain the indications and basic steps of appendicectomy. (CO6, L3)

MODEL PAPER

B.PA Semester-III **Bachelor of Physician Associate**

Code: BPA305

Semester III

ENT, OPHTHALMOLOGY & DERMATOLOGY

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) **(2 × 10 = 20 Marks)**

a) Describe the common causes, clinical features, and management of glaucoma. (CO2, L2)

b) Explain the causes and management of common diseases of the nose and paranasal sinuses. (CO3, L2)

c) Describe the clinical features and management principles of common dermatological disorders. (CO5, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain visual acuity testing and pupil reactions in eye examination. (CO1, L2)
b) Describe the causes and first-aid management of red eye and minor eye injuries. (CO2, L2)
c) Explain diabetic retinopathy and retinal detachment. (CO2, L2)
d) Describe the ocular manifestations of hypertension and diabetes mellitus. (CO4, L2)
e) Explain otitis externa and otitis media with their clinical features. (CO3, L2)
f) Describe the causes and first-aid management of epistaxis. (CO3, L2)
g) Explain acute airway obstruction and anaphylaxis as ENT emergencies. (CO6, L3)
h) Describe the skin, hair, and nail manifestations of systemic diseases. (CO5, L2)

MODEL PAPER

BPA Semester-IV **Bachelor of Physician Associate**

Code: BPA 401

Semester-IV

Pharmacology & Toxicology -II

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the mechanism of action, therapeutic uses, and adverse effects of antidepressants and antipsychotic drugs. (CO1, L2)

b) Describe the major classes of antihypertensive drugs and explain their mechanisms of action. (CO2, L2)

c) Explain the principles of antimicrobial pharmacology and discuss the mechanisms of action and resistance of major antibiotic classes. (CO3, L3)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain drug-induced toxicity and mention its major types. (CO4, L4)

b) Write a short note on antidotes used in common drug overdoses. (CO4, L4)

c) Explain the importance of pharmacovigilance and adverse drug reaction reporting. (CO5, L3)

d) Describe the phases of clinical trials. (CO5, L3)

e) Explain personalized and precision medicine. (CO6, L4)

f) Write a short note on biologics and biopharmaceuticals. (CO6, L4)

g) Explain the mechanism and therapeutic uses of anticoagulant drugs. (CO2, L2)

h) Write a short note on opioid analgesics and their adverse effects. (CO1, L2)

MODEL PAPER

B.PA Semester-IV **Bachelor of Physician Associate**

Code: BPA 402

General Medicine-II

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain coronary artery disease and discuss its clinical features, diagnostic evaluation, and management. (CO1, L2)

b) Describe chronic kidney disease with reference to its causes, clinical features, diagnosis, and management. (CO2, L2)

c) Explain thyroid disorders and discuss their pathophysiology, diagnosis, and management. (CO3, l3)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain the role of cranial nerve examination in neurological assessment. (CO4, L3)

b) Write a short note on anemia and its laboratory diagnosis. (CO5, L4)

c) Explain sepsis and its basic management principles. (CO5, L4)

d) Describe the importance of echocardiography in cardiovascular disorders. (CO6, L4)

e) Explain the role of laboratory findings in the diagnosis of common medical disorders. (CO6, L4)

f) Write a short note on arrhythmias and their diagnosis by ECG. (CO1, L2)

g) Explain urinary tract infections and their diagnostic approach. (CO2, L2)

h) Write a short note on Parkinson's disease and its clinical features. (CO4, L2)

MODEL PAPER

B.PA Semester-IV **Bachelor of Physician Associate**

Code: BPA 403

Advanced Surgery

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain peptic ulcer disease and discuss its clinical features, diagnosis, and surgical management. (CO1, L2))
b) Describe abdominal aortic aneurysm with reference to its clinical features, diagnosis, and surgical management. (CO2, L2)
c) Explain intracranial tumors and discuss their diagnosis and management. (CO3, L3)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain the management of blunt abdominal trauma. (CO4, L3)
b) Describe the principles of surgical oncology. (CO5, L4)
c) Explain the role of surgical margins and adjuvant therapy in cancer treatment. (CO5, L4)
d) Write a short note on laparoscopic cholecystectomy. (CO6, L5)
e) Explain the diagnosis and management of pneumothorax. (CO2, L2)
f) Write a short note on renal stones and their surgical management. (CO2, L2)
g) Describe thyroidectomy and its indications. (CO3, L2)
h) Write a short note on cleft lip and palate. (CO6, L4)

MODEL PAPER

B.PA Semester-IV **Bachelor of Physician Associate**

Code: BPA 404

Semester-IV

Psychology and Introduction to Behavioural Medicine

Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Define psychology and behavioural medicine. Explain the importance of the biopsychosocial approach in understanding health and disease. (CO1, L2)

b) Explain the role of psychological stress, emotions, coping mechanisms, and social determinants of health in influencing physical and mental health. (CO2, L2)

c) Explain cognitive behavioural therapy, motivational interviewing, and health counselling as behavioural interventions. (CO3, CO5, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Define behavioral medicine and explain its scope in healthcare. (CO1, L1)

b) Explain the major social determinants of health and their influence on patient outcomes. (CO2, L2)

c) Describe cognitive behavioral therapy as a behavioral intervention in healthcare. (CO3, L2)

d) Explain the mind-body connection in psychosomatic disorders with suitable examples. (CO4,L2)

e) Describe the role of family support and psychoeducation for caregivers in chronic illness. (CO5, L2)

f) Explain the importance of psychological screening for anxiety and depression in clinical practice. (CO6, L2)

g) Describe any five stress-reduction techniques used for health promotion. (CO2, L2)

h) Explain the role of psychological factors in pain perception and pain management. (CO4, L2)

MODEL PAPER
Bachelor of Physician Associate

B.PA Semester-V
Code: BPA 501

Semester V
Pediatrics
Time: 3 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) 2 × 10 = 20 Marks

a) Explain growth and development in children, including growth monitoring and immunization schedules. (CO1, L2)

b) Explain Jaundice. Describe the principles of neonatal resuscitation. (CO4, L4)

c) Describe protein-energy malnutrition. Discuss its causes, clinical features and management. (CO2, L2)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Protein-energy malnutrition and its prevention in children. (CO1, l2)

b) Clinical presentation and management of chickenpox. (CO2, L2)

c) Diagnosis and management of nephrotic syndrome in children. (CO3, L3)

d) Write the management of convulsions and epilepsy in pediatric patients. (CO2, L2)

e) Fluid therapy principles in the management of dehydration and electrolyte imbalance.(CO3, L3)

f) Diagnosis and management of congenital heart diseases in children. (CO3, l3)

g) Management of pediatric emergencies with reference to status epilepticus and shock. (CO5, L3)

h) Clinical significance and diagnosis of Down syndrome in pediatric practice. (CO6, L4)

i Write a note on nutritional anemia in children. (CO1, L1)

MODEL PAPER

Bachelor of Physician Associate

B.PA Semester-V
Code: BPA502

Semester V
Emergency Medicine
Time: 2 Hours | Maximum Marks: 50

Q.1. Essay Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the principles of emergency medical services and initial patient assessment in emergency care. (CO1, L2)

b) Describe the clinical features, diagnosis and management of psychiatric emergencies encountered in emergency departments. (CO4, L4)

c) Write disaster response strategies, trauma management during pregnancy and the pathophysiology of shock in emergency settings. (CO6, L4)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Principles of lifting patients safely during emergency care. (CO1, L2)

b) Importance of triage diagnosis in emergency patient assessment. (CO2, L2)

c) What is legal and ethical aspects of documentation in emergency medicine. (CO2, L2)

d) Write emergency management principles in a patient presenting with acute severe asthma. (CO3, L3)

e) Management of acute coronary syndrome in the emergency department. (CO3, L3)

f) What do you mean by acute gastrointestinal bleeding. (CO3, L3)

g) Diagnosis and management of anaphylaxis in emergency settings. (CO4, L4)

h) Management of poisoning and drug overdose emergencies. (CO5, L3)

i) Explain the recognition and management of bleeding in emergency patients. (CO5, L3)

MODEL PAPER

B.PA Semester-V **Bachelor of Physician Associate**

Code: BPA 505

Semester V

Introduction to Healthcare Management

Time: 3 Hours | Maximum Marks: 70

Q.1. Essay Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Explain the management process and discuss its major functions. (CO1, L2)

b) Describe strategic management and explain its importance in healthcare organizations.(CO2, L2)

c) Describe decision-making and explain the management of conflict and stress. (CO5, L4)

Q.2. Short Essay Questions (Attempt any 7) **7 × 5 = 35 Marks**

a) Explain the process of managing change. (CO1, L1)

b Describe the functions of human resource management. (CO1, L2)

c) Explain decision-making techniques used to solve healthcare management problems. (CO3, L3)

d) What is controlling? Mention its major functions (CO3, L3)

e) Illustrate the principles of healthcare financing and economics in healthcare services. (CO4, L2)

f) Explain the role of technology in healthcare administration. (CO4, L2)

g) Explain the importance of teamwork and group dynamics in healthcare management. (CO4, L2)

h) Explain quality improvement in healthcare. (CO6, L4)

B.PA Semester-VI
Code: BPA 601 **MODEL PAPER**

Bachelor of Physician Associate
Semester VI
Non-Communicable Disease
Time: 2 Hours | Maximum Marks: 50

Q.1. Long Questions (Attempt any 2) **2 × 10 = 20 Marks**

a) Explain the pathophysiological mechanisms and public health burden of non-communicable diseases in India. (CO1, L2)

b) Describe the clinical features, diagnosis and preventive measures of diabetes mellitus. (CO2, L2)

c) Define multi-morbidity with its significance in NCD management. (CO1, L1)

Q.2. Short Essay Questions (Attempt any 6 out of 8) **6 × 5 = 30 Marks**

a) Clinical presentation and diagnosis of ischemic heart disease. (CO2, L2)

b) Pathophysiology and complications of hypertension. (CO2, L2)

c) Clinical features and management of chronic obstructive pulmonary disease (COPD). (CO3, L2)

d) Process of tumour metastasis and its clinical significance. (CO3, L2)

e) Principles of assessment and management of depression in a clinical setting. (CO4, L3)

f) What is smoking cessation? (CO5, L1)

g) Psychosocial impact of hypertension and its management. (CO4, L3)

h) Define heart failure. (CO2, L1)

MODEL PAPER

B.PA Semester-VI

Code: BPA602

Bachelor of Physician Associate
Semester VI

GERIATRICS MEDICINE

Time: 2 Hours | Maximum Marks: 50

Q.1. Long Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the concept of health promotion and disease prevention with suitable examples. (CO1, L2)
b) Define the disaster management cycle and write the role of healthcare professionals during different phases of a disaster. (CO2, L2)
c) What is evidence-based medicine? Explain its importance and the major steps involved in applying evidence-based practice in healthcare. (CO6, L4)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Importance of health education in disease prevention and community health. (CO1, L2)
b) Describe the role of primary healthcare services in improving community health. (CO3,L2)
c) Explain its importance of epidemiological surveillance in controlling communicable diseases. (CO2, L2)
d) Explain the ethical principles involved in clinical research. (CO4, L2)
e) What is informed consent and its importance in clinical research. (CO4, L2)
f) Explain the importance of sampling methods in clinical research. (CO5, L2)
g) What is plagiarism in research? Explain the methods used to maintain academic and research integrity. (CO6, L2)
h) Define systematic review and mention its major steps. (CO6, L1)

MODEL PAPER

B.PA Semester-VI
Code: B.PA 603

Bachelor of Physician Associate
Semester VI

Obstetrics and Gynaecology
Time: 2 Hours | Maximum Marks: 50

Q.1. Long Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain the anatomy of the female reproductive system and discuss the hormonal regulation of reproductive functions. (CO1, L2)
b) Describe the stages of pregnancy and physiological changes occurring during gestation. (CO2, L2)
c) Explain the different methods of contraception and with their advantages and disadvantages. (CO5, L4)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Structure and functions of the placenta. (CO2, L1)
b) Define the menstrual cycle and its hormonal control. (CO1, L2)
c) Define labour and mention its main stages. (CO4, L1)
d) Important of antenatal care that should be given to a pregnant woman. (CO4, L3)
e) Explain the causes and management of postpartum hemorrhage. (CO4, L3)
f) Describe common benign disorders of the female reproductive organs. (CO3, L2)
g) Differentiate between temporary and permanent methods of contraception. (CO5, L4)
h) Explain the essential care of a newborn immediately after birth. (CO6, L4)

MODEL PAPER

B.PA Semester-VI
Code:BPA 604

Bachelor of Physician Associate
Semester VI
Critical Care Medicine
Time: 2 Hours | Maximum Marks: 50

Q.1. Long Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) What is critical illness? Explain the important changes that occur in the body during critical illness. (CO1, L2)
b) Explain arterial blood gas (ABG) analysis and its significance in patient monitoring. (CO2,L2)
c) Discuss the ethical problems in critical care and explain the important principles of end-of-life care. (CO5, L4)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Scope and importance of critical care medicine. (CO1, L2)
b) What is sepsis? Explain how sepsis can lead to multiple organ dysfunction. (CO1, L2)
c) Important monitoring methods used for critically ill patients. (CO2, L2)
d) Explain the basic steps of airway management in a critically ill patient. (CO3, L3)
e) What is mechanical ventilation? and its main uses in patients with respiratory failure. (CO3, L3)
f) Explain the role of vasopressors and inotropic drugs in critically ill patients. (CO4, L4)
g) What is pulse oximetry? Mention its main use. (CO2, L1)

MODEL PAPER

B.PA Semester-VI
Code: BPA605

Bachelor of Physician Associate
Semester VI
Community Medicine and Clinical Research – III
Time: 2 Hours | Maximum Marks: 50

Q.1. Long Questions (Attempt any 2) (2 × 10 = 20 Marks)

a) Explain chronic diseases and their common risk factors, screening methods. (CO1, L2)

b) Explain the role of public health laws and healthcare financing in improving the health of the community. (CO4, L4)

c) What is clinical research reporting? Explain the main steps of report writing. (CO6, L4)

Q.2. Short Essay Questions (Attempt any 6 out of 8) (6 × 5 = 30 Marks)

a) Explain the important health measures used during natural disasters. (CO2, L2)

b) Explain how a community can recover after a public health emergency. (CO2, L2)

c) What is a research manuscript? Explain its main parts. (CO6, L2)

d) Explain the importance of confidentiality in healthcare. (CO4, L2)

e) Role of WHO and UNICEF in improving global health. (CO3, L2)

f) Explain the use of graphs and charts for presenting research data. (CO5, L2)

g) Explain the importance of confidentiality in healthcare. (CO4, L2)

h) Define CONSORT guidelines. (CO6, L1)

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