Pharm.D.

PROGRAMME HANDBOOK 2026

For students admitted in academic year 2026-27

Pharmacy Council of India - Pharm.D. Regulations 2008

Doctor of Pharmacy - Six-Year Programme (Five Years of Study + One Year Internship)

6 YEARS	**2** PHASES	**48** SUBJECTS
30 INTAKE / YEAR	**200** WORKING DAYS / YEAR	**12** MONTHS INTERNSHIP

PROGRAMME HIGHLIGHTS

- Phase I: five academic years of study; Phase II: internship / residency in the sixth year
- Internship: 6 months General Medicine + 2 months each in three speciality departments
- Fifth Year: Clerkship with daily ward rounds and a six-month Project Work
- Admission: 10+2 (Physics, Chemistry with Mathematics/Biology) or D.Pharm; minimum age 17 years
- Pharm.D. (Post Baccalaureate): 3 years (2 years study + 1 year internship) after B.Pharm; intake of 10

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(DEEMED TO BE UNIVERSITY)

Y26: Pharm. D

Program Handbook

Program Educational Objectives (PEOs)

PEOs

PEO	PEO Description
1	Pharmaceutical Education: To showcase comprehensive knowledge across key pharmaceutical sciences to support affordable drug discovery and develop effective herbal or synthetic therapies for human welfare.
2	Research: To assess the latest research developments for innovative drug discovery and patient care, while promoting health, wellness, and disease prevention through updated drug information and collaborative healthcare practice.
3	Attitude: To demonstrate a productive and supportive environment that encourages professional skills, ethical values, and a positive attitude in students.

Program Outcomes & Program Specific Outcomes (PO & PSO)

PO & PSO

PO/PSO	PO/PSO Description
PO1	Pharmacy Knowledge: Apply the knowledge of science, pharmacy fundamentals, clinical pharmacy and Pharmacotherapeutics to the solution of problem directed study.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex clinical and therapeutic problems reaching substantiated conclusions using first principles of basic sciences, and pharmaceutical sciences.
PO3	Design/development of solutions: Design solutions for complex pharmaceutical problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex pharmaceutical activities with an understanding of the limitations.
PO6	The Clinical Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Pharmacy practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Pharmacy practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex pharmaceutical activities with the health care community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the clinical management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Program Rules & Regulations

Admission Eligibility Criteria

- 10+2 examination with Physics and Chemistry as compulsory subjects along with one of the following subjects: Mathematics or Biology.
- A pass in D. Pharm course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.
- Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

Provided that a student should complete the age of 17 years on or before 31st December of the year of admission to the course.

Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.

Program Structure and Curriculum

For each academic program, the curriculum serves as a framework that specifies, course category, codes, titles, and delivery methods (Lectures, Tutorials, Practice, Skills, Projects, Self-Study, etc.,). The curriculum is designed, implemented and assessed following the **Outcome-Based Education (OBE)** framework. In designing the curriculum, we ensure the integration of key contemporary and traditional values by embedding Indian Knowledge Systems (IKS), Sustainable Development Goals (SDGs), and Design Thinking principles into courses at their inception.

- This is a yearly course and hence the entire academic year is conducted in a year.
- Each course has a **Lecture-Tutorial-Practice-Skill (L-T-P-S)** component.

Course Precedence:

The following are the guidelines for registering into courses with pre-requisites.

- A course may have one or more of its preceding course(s) as pre- requisite(s).
- To register for a course, the student must successfully be promoted in these course(s) earmarked as pre-requisite(s) for that course.

Registration Process

Key Guidelines:

- **Course Availability:** Students are permitted to register only for courses offered in the specific semester of enrollment.
- **Prerequisites:** Any prerequisite courses must be successfully completed before registering for subsequent courses.
- **Timely Registration:** Students must register on the designated registration day. KLEF reserves the right to deny late registrations.
- **Add/Drop/Change Period:** Students have a one-week window from the start of classes to add a course and two-weeks to drop or change courses.
- **Re-registration:** If a student wants to improve their grade in a course, they can re-register for it with approval from the Dean of Academics.
- **Registration Cancellation:** KLEF can cancel a student's registration for disciplinary reasons or plagiarism.
- **Timetable Clashes:** Students are responsible for resolving any timetable conflicts. They should contact their Department Year Coordinator immediately if any clashes arise.
- **Irregularities:** If any irregularities are found in a student's registration later on, KLEF may cancel their registration for a course or even the entire semester.

Registration Flexibilities:

- **Choice of faculty:** Students have the flexibility to choose their preferred faculty members for certain courses, depending on departmental policies and course availability.

Course Categories

- **Basic Science Courses (BSC):** The Basic Science category covers key courses in subjects like Mathematics, Physics, and Chemistry, providing a strong scientific foundation for undergraduate students. This category includes Mathematics Electives and Science Electives, offering students the flexibility to choose courses that align with their interests. These courses help develop essential problem-solving and analytical skills, which are critical for understanding advanced concepts in their field. Basic Science courses also play a vital role in applying scientific principles to real-world engineering and research challenge.

- **Professional Core Courses (PCC):** Professional Core Courses (PCC) are essential courses within each engineering discipline that provide foundational knowledge and skills critical to the field. These courses are integral to the curriculum and ensure that students acquire the core competencies necessary for their professional practice.

- **Project Research and Internship (PRI):** Project Research and Internship courses provide students with real-world experience by engaging them in research projects and internships in industry or academia. These courses are essential for developing practical problem-solving skills, fostering innovation, and giving students the opportunity to apply the theoretical knowledge gained in the classroom to real-life scenarios. Through internships and research projects, students can gain industry exposure, improve their technical skills, and prepare themselves for professional careers or advanced studies.

- **Value-Added Courses (VAC):** Value-Added Courses are designed to enhance employability by providing students with training that leads to globally recognized certifications or specialized skills. These courses focus on industry-relevant knowledge and practical applications, ensuring students are well-prepared for current job market demands. By offering advanced skills and certifications, Value-Added Courses give students a competitive edge in their careers.

- **Audit Courses (AUC):** Audit courses are courses that students can attend without receiving a formal grade or credit towards their degree. These courses are often chosen by students who want to learn a subject for personal enrichment or to gain knowledge in areas outside of their major.

Requirements for the award of Degree

To be eligible for the award of a Pharm.D. degree, a student must successfully fulfill the following criteria:

- **Marks Requirements:** A student shall not be declared to have passed examination unless he or she secures at least 50% marks in each of the subjects separately in the theory examinations, including sessional marks and at least 50% marks in each of the practical examinations including sessional marks for all the courses outlined in the program structure.

- **Focused Training:** Successfully undertake specific training in focused areas that enable students to be successful in their chosen career tracks. The focused areas are: (a) Employment in MNCs, (b) Civil Services (c) Higher Studies (d) Research and (e) Entrepreneurship.

- **Certifications:** Successfully complete at least three global certifications or value-added courses in the chosen discipline.

- **Internships:** Successfully complete a clinical Internship.

- **Audit Courses:** Successfully complete all audit courses outlined in the program structure.

- **Extra Courses:** Students with extra courses having 'DT' or 'F' grades can still graduate if they meet all other requirements. However, these courses will be factored into the CGPA calculation.

- **Time Limit:** Complete all requirements within:
  - A minimum of 6 regular years (excluding summer terms)
  - A maximum of 12 years.

Academic Bank of Credits

- ABC helps the students to digitally store their academic credits from any higher education institute registered under ABC in order to award Certificate/Diploma/Degree/Honors based on the credits earned by the student.
- All the credits acquired by the students are stored digitally by registering into Academic Bank of Credits (ABC) portal. It also supports retaining the credits for a shelf period and continue their program study with multiple breakovers.
- Students may exit from their current program of study due to any unforeseen reasons or to focus on their chosen career path. In such cases, the student may break for a period of time (preferably not in the middle of an academic year) and may continue with the program of study at a later stage.
- Students must be able to complete their program by not exceeding the maximum duration of the program. If not, they may be issued with a Certificate, diploma, degree or honors based on the credits acquired over the period of time for all the programs approved by UGC.

Award of Class

A student having cleared all the courses and met all the requirements for the award of degree with:

- Minimum of 50% in each subject is considered as Pass category for a student.
- Student securing 60% marks or above in aggregate in all subjects in a single attempt shall be declared to have passed in first class.
- Student securing 75% marks or above in aggregate in all subjects in a single attempt shall be declared to have passed in Distinction.
- Student fails in theory or practical examination of a subject he/she must re-appear in both theory and practical of the same subject.

Award of Medals

KLEF awards Gold and Silver medals to the top two candidates in each program after successful completion of their study. The medals are awarded based on their CGPA during the Annual Convocation with the following constraints:

- The grade obtained through betterment/ supplementary will not be considered for this award.
- He/She must have obtained first class with distinction for the award of Gold or Silver-medal.

Attendance calculation in a course

- **Attendance calculation for LTPS:** Attendance of a student on a course is calculated based on the credit-weighted average of the student's attendance in each of the LTPS components of the course.

- **Attendance start date:** Attendance is counted from the class commencement date. However, for transferred or newly admitted students, attendance in their admitted semester is counted from the date of admission.

Attendance requirements leading to promotion

- **Minimum Attendance:** 85% attendance is required for course promotion and appearing for the semester-end exam.
- **Condonation:** Up to 10% condonation by Principal, College of Pharmacy, is possible for medical emergencies with proper documentation submitted within a week. Students will be levied a condonation fee to appear for the semester-end exam.
- **Marginal Cases:** Attendance slightly below 75% due to severe medical or valid reasons may be considered for further relaxation by the condonation board appointed and headed by the Vice-Chancellor.

Attendance-based marks

- **Optional Marks:** Course coordinators can allocate up to 5% of the total marks for attendance, clearly stated in the course handout and approved by the Dean of Academics through proper channel.

- **Mark Distribution:** Marks are awarded based on attendance ranges: 85-88% = 1 mark, 89-91% = 2 marks, and so on. Below 85% results in zero marks, even with condonation.

- **Applicability:** Attendance marks, if given, apply to all L-T-P-S components cumulatively, not just the theory part.

Attendance waiver

- **Eligibility:** Students with overall cumulative marks percentage 90% or higher in the previous year can get an attendance waiver for up to three courses in the next semester, with prior approval from the Dean of Academics through proper channel.

- **Conditions:** Students using the attendance waiver can participate in all assessments and evaluation components without being marked ineligible due to attendance-based regulations.

Compensatory (Extra) attendance policy

- **Eligibility:** Students representing KLEF in events or participating in co-curricular / extracurricular activities can get compensatory attendance with prior written approval.

- **Limit:** Compensation is limited to 10% of total classes per course per semester and doesn't apply to the summer term.

Course-based promotion and detention policy

- **Minimum Attendance:** Students must meet the minimum attendance requirement to be promoted in a course. If a student fails to meet this requirement, their grade in the course will be marked as "DT", indicating that the student is detained in the course.

- **Next Steps after detention:** Student must re-register in a detained course and study it completely by attending the classwork, submitting all assessments, taking all evaluation components

Eligibility for appearing Sem-End Examination

A Student registered for a course and got promoted is eligible to write the Semester End Examination for that course unless found ineligible due to one or more of the following reasons:

- Shortfall of attendance.
- Acts of indiscipline.
- Withdrawal from a course.
- Non-payment of examination fees.
- Without a hall ticket.

Assessment & Evaluation

The assessment in each theory subject consists of Sem In Exams, in class quizzes/tutorials/home-assignments/Active Learning Methods (continuous assessment) and the Semester End Exanimation (SEE). Students are advised to refer to the course handout to get more detailed information on assessment.

- Sem In Examinations and the Semester End Examinations will be conducted as per the Academic Calendar.
- As per the necessity, the Supplementary examinations will be conducted at the discretion of Dean Academics with the approval of the Vice Chancellor.
- Students may have to take more than one examination in a day during Sem In exams, Semester End Examinations /Supplementary examinations.

College / School Name	Semester-In Evaluation (Weightage in percent) (A)	Sem End Examination (Weightage in percent) (B)	Minimum requirement for pass percent	
			(A+B)	B
College of Pharmacy	30	70	50	20

Semester-In Evaluation

The following guidelines are followed for the Semester In evaluation.

- The process of evaluation is continuous throughout the semester
- The distribution of marks for Semester In evaluation is 30 percent of aggregate marks of the course.
- The distribution of weightage for various evaluation components are decided and notified by the course coordinator through the course handout after approval by the Dean Academics, prior to the beginning of the semester.
- In order to maintain transparency in evaluation, answer scripts are shown to the students for verification, within one week of conduct of exam. If there is any discrepancy in evaluation, the student can request the course coordinator to re-evaluate.
- The solution key and scheme of evaluation for all examinations are displayed by the Course Coordinator in the appropriate web portal of the course, on the day of the conduct of examination.
- In case the student is unable to appear for any evaluation component owing to hospitalization, participation in extra/ co-curricular activities representing KLEF/ state/ country; the Dean Academics can permit to conduct of re-examination for such students.
- In case a student has missed any of the two in semester evaluations, S/he is eligible for and will be provided with an opportunity of appearing for re-examination.
- The pattern and duration of such examination are decided and notified by the Course Coordinator through the Course handout, after approval from the Dean Academic.
- To maintain transparency in evaluation, answer scripts are shown to the students for verification. If there is any discrepancy in evaluation, the student can request the Controller of Examinations to re-evaluate.
- If a student earns F grade in any of the courses of a semester, an instant supplementary exam (for only Semester End Exam component) will be provided within a fortnight of the declaration of the results.

Semester-End Evaluation

The following guidelines are followed for the End Semester evaluation.

- The end-semester evaluation typically includes a variety of components such as Sem End Exams, projects, presentations, or practical assessments, skill assessments as detailed in the course handout.
- Each component is evaluated based on the criteria outlined in the course handout.

- The distribution of weightage for various evaluation components are decided and notified by the course coordinator through the course handout after approval by the Dean Academics, prior to the beginning of the semester.

- To pass in a course, student must meet or exceed the minimum passing marks specified for each end semester summative assessment component mentioned in the course handout.

- The key and scheme of evaluation for all examinations are displayed by the Course Coordinator in the appropriate web portal of the course, on the day of the conduct of examination.

- In case the student is unable to appear for any Sem end summative evaluation component owing to hospitalization, participation in extra/ co-curricular activities representing KLEF/ state/ country; student can request for re-examination by taking prior permission from Dean Academics.

- If a student earns F grade in any of the courses of a semester, an instant supplementary exam (for only Semester End Exam component) will be provided within a fortnight of the declaration of the results.

Absence in Assessment and Examination

If a student misses a formative assessment component (quizzes, assignments, etc.) due to illness or other valid reasons, no retakes will be permitted, and a score of zero will be recorded. However, in cases of an excused absence, the instructor may allow the student to retake the assessment, subject to written approval from both the Principal and the relevant Head of Department.

Make-up Exams:

A student's absence from Semester In or Semester End Exams will only be considered for a make-up exam under the following circumstances.

- Pre-approved participation in university/state/national/international co-curricular or extracurricular activities.
- Illness or medical emergencies resulting in hospitalization, with a doctor's certification explicitly stating the student's inability to attend the exam within the designated period.
- Death of an immediate family member.

Remedial Exams:

- Remedial exams are conducted for students who score less than 60% on Semester In Exam I and have attended at least 85% of the remedial classes.
- For courses without remedial classes, no remedial exam will be scheduled.
- If a student does not take or scores less than 60% on Semester In Exam I, they must attend remedial classes and maintain a minimum 85% attendance to be eligible for the remedial exam. The remedial exam score will then be considered.
- The number of remedial classes will be 33% of the regular classes held prior to Semester In Exam I. However, there are no remedial exams for Semester In Exam II or laboratory exams.

Remedial Classes Policy

The following categories of students are recommended to attend Remedial classes:

- Students who did not attend or obtain a minimum of 60 percent marks in the Sem In exam1.
- Students for whom CO1/CO2 is (are) not attained in Sem In Exam 1
- Any other student may also be permitted to attend remedial classes as per the discretion of the principal.

The following are the guidelines to conduct remedial classes:

- Remedial classes which are scheduled to be conducted usually one or two weeks post conclusion of Sem In exam1.
- The number of remedial classes to be conducted shall be 33 percent of regular classes held till the Sem In exam I.
- Remedial classes MUST NOT be scheduled during regular class work hours.

Assessment of Project/Research based Courses

- All project or research-based subjects must have a defined time limit for completion.
- The specific time limits for completion and schedule for monitoring and evaluation of performance of students will be announced each term.
- The final project report, after getting the plagiarism certificate, only will be considered and evaluated by the panel of examiners.
- Student project reports must follow the guidelines prescribed by the office of Dean Academics.

Grading Process

Grading process is done on percentage basis for Pharm.D. program.

Course handout

A course handout is a document that provides essential information about a specific course. It's like a roadmap that guides you through the course, helping you understand the expectations, assignments, and grading criteria.

Significance of Course Handout:

- **Clarity and Organization:** Course handouts help you stay organized and focused by outlining the course structure, topics, and deadlines.
- **Expectations:** They communicate the instructor's expectations for your participation, assignments, and overall performance.
- **Grading:** Course handouts outline the grading criteria, so you know exactly how your work will be evaluated.
- **Resources:** They often list valuable resources, such as textbooks, articles, or online tools, that can aid your learning.

Expectations from the course handout:

- **Course Description:** A brief overview of the course, its goals, and its relevance to your studies.
- **Learning Outcomes:** Clear goals for what you should be able to do by the end of the course. These outcomes will help you understand the skills and knowledge that are expected to gain.
- **Instructor Information:** Contact details, office hours, and specific communication preferences.
- **Course Schedule:** A tentative timeline of topics, assignments, and exams.
- **Required Materials:** A list of textbooks, articles, or other materials essential for the course.
- **Assessment Methods:** A breakdown of how your final grade will be determined, including the weight of assignments, exams, and participation.
- **Assignment Guidelines:** Detailed instructions for each assignment, including due dates, submission requirements, and expectations.

Effective use of the course handout:

- **Refer to it regularly:** Check back to keep track of important dates and assignments.
- **Highlight key points:** Make notes or highlight sections that are particularly important to you.
- **Ask questions:** If something isn't clear, bring it up in class or during office hours.

Supplementary

- A student who fails in either the theory or practical examination of a subject must reappear for both components of that subject.
- Students who do not obtain the minimum required marks in a course are eligible to appear for the supplementary examination.
- Supplementary examinations are conducted once a year, following the announcement of the regular examination results.
- Students must register for the supplementary examination within the prescribed period after the declaration of results and are required to pay the applicable supplementary examination fee.
- Details regarding the fee structure and payment procedure will be notified along with the supplementary examination schedule.
- It is to be noted that a student who opts for the supplementary examination shall not be eligible for the award of a degree with First Class with Distinction.

Revaluation

Students desirous of seeing their Semester End Examination answer scripts have to apply online to the COE for the same within the timeframe as declared by the COE by paying the prescribed fee through ERP.

- There is no provision for re evaluation in case of Lab/Practical/skilling exams, project, viva voce exam or seminar / design / mini project courses.
- The final grades awarded to each course shall be announced by the COE and the same will be made available to students through the website/notice boards.

Semester Promotion policy

Year-based promotion is applicable for Pharm.D. students.

- All students who have appeared for all the subjects and passed the first-year annual examination are eligible for promotion to the second year and, so on. However, failure in more than two subjects shall debar him or her from promotion to the next year classes.
- A student can carry any one of the two courses i.e. either Remedial Mathematics or Biology of 1st year Pharm. D to 2nd year Pharm. D as an additional failed course along with two failed courses of 1st year as per the PCI guidelines.

Counselling procedure

KLEF is committed to fostering a supportive and nurturing environment for our students, addressing not only their academic needs but also their psychological well-being. To achieve this, KLEF is implementing a comprehensive Mentor-Mentee Scheme aimed at providing holistic support through academic, career, and psychological counselling. To achieve this, KLEF implement a comprehensive Mentor-Mentee Scheme and establish the Central Academic Counselling Board (CACB) in addressing academic, career and student-psychological issues.

The Mentor-Mentee Scheme aims to provide personalized guidance and support to students throughout their academic journey. Each student shall be assigned a mentor from the faculty, who will act as a guide, counselor, and advocate for the student's academic and personal growth. The mentor-mentee relationship is intended to facilitate communication, goal-setting, and problem-solving.

The primary objectives of the Mentor-Mentee Scheme are:

- To facilitate a strong and positive mentor-mentee relationship that supports students' academic growth, personal development, and psychological well-being.

- To offer career counselling, guiding mentees in exploring career options, developing professional skills, and making informed career-related decisions.

- To provide psychological counselling, offering a safe space for mentees to discuss psychological concerns and providing appropriate support or referrals when needed.
- To provide tailored academic counselling, helping mentees set academic goals, plan their course of study, and navigate academic challenges effectively.

Academic Counselling:
The mentors oversee the following academic counselling activities which are not limited to:

- Providing guidance during academic registration sessions
- Monitoring attendance and addressing attendance-related concerns
- Communicating attendance and marks information to parents/guardians
- Addressing concerns related to backlogs and providing advice
- Advising on domain specializations and academic flexibilities
- Assisting students in exploring study abroad opportunities
- Conducting student and parent meetings to address academic concerns

Career Counselling:
The mentors oversee the following career counselling activities which are not limited to:

- Recommending technical skilling courses and certificate programs
- Facilitating internship opportunities and competitive exam preparations
- Guiding students through term papers, projects, hackathons, and coding challenges
- Providing information on higher education options and entrance exams
- Encouraging entrepreneurship awareness and guiding start-ups initiatives
- Assisting students in preparing for placements and future career goals
- Conducting student and parent meetings to discuss career aspirations

Psychological Counselling:
The Mentors oversee the following psychological counselling activities which are not limited to:

- Providing guidance on time management and classroom activities
- Addressing anti-ragging issues and promoting a positive attitude
- Providing support for managing mental stress and promoting well-being
- Addressing hostel, room, home, and food-related concerns
- Conducting student and parent meetings to address personal well-being

Mentor-Mentee allocation

- The Department Academic Counselling Board (DACB) is responsible for assigning approximately 20 students to each faculty member, who will act as their mentor. The mentors will guide and support their assigned students throughout their academic journey.
- Counsellors/mentors will be appointed from the students' respective parent departments, and these faculty members will continue as mentors until the students complete their course.
- The counselling program aims to help students develop their character, academic abilities, professional skills, and social responsibilities. Mentors play a vital role in this process by:
    - Maintaining detailed records of mentor-mentee interactions in the ERP system. Mentors are required to update the ERP with counselling remarks for both students and their parents every fortnight.
    - Providing regular updates to parents about students' academic progress, career developments, and physiological status through various communication channels, including phone calls, SMS, WhatsApp, and Telegram.
    - Ensuring that counselling remarks are accurately recorded in the ERP system, and reflecting these updates in DACB monthly reports and CACB semester reports.

Academic Counselling Board

- Academic Counselling Board is constituted by the Dean Academics. This board shall comprise of the Chairman, Convener, Principal/Director, HOD and Professor/Associate Professor. A student will be put under Academic Counselling Board in the following circumstances:
    - Has CGPA of less than 6.00.
    - Has F grade or Detained in multiple courses.
- The first level of Counselling such students will be done by the Mentor of the student and the HoD followed by the ACB and the list of students who have to undergo the ACB counselling be forwarded by the HoD to the Office of Dean Academics.
- The students undergoing the Academic Counselling Board process may be allowed to register only for a few courses based on the recommendation of Academic Counselling Board.

Rustication policy

A student may be rusticated from the KLEF on disciplinary grounds, based on the recommendations of any empowered committee, by the Vice Chancellor.

Malpractice penalty policy

The following actions constitute malpractice during examinations and are subject to disciplinary actions as outlined below:

Clause 1: Possession of unauthorized material in the examination hall (e.g., paper, notebooks, programmable calculators, cell phones, or any material related to the exam subject). This includes any marks on the candidate's body that could be used as an aid.

Penalty: Immediate expulsion from the examination hall, without cancelling the paper.

Clause 2: a) Providing or receiving assistance, or communicating with others via oral means, body language, or electronic devices (such as cell phones), either inside or outside the examination hall. b) Smuggling in or out answer sheets, additional sheets, or arranging to send out the question paper or answer sheets during or after the exam. c) Using objectionable or offensive language in the answer paper or in communication with examiners, or attempting to influence examiners to award passing marks. d) Exchanging answer scripts or additional sheets in the examination hall

Penalty: Expulsion from the examination hall and cancellation of the comprehensive examination performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him

Clause 3: Copying from any unauthorized material (e.g., paper, books, programmable calculators, palm computers) during the exam.

Penalty: Expulsion from the examination hall, cancellation of the exam performance in that subject, and a fine of Rs. 1000.

Clause 4: a) Taking the answer script outside the exam hall, tearing the script or any part of it inside or outside the hall. b) Appearing for the exam in a drunken condition.

Penalty: Expulsion from the examination hall and cancellation of comprehensive examination performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining comprehensive examinations of the subjects of that semester/year.

Clause 5: a) Disobeying examination authorities, creating disturbances, organizing or instigating a walk-out, threatening or assaulting officials, or damaging property inside or outside the exam hall. b) Possession of any lethal weapon or firearm in the examination hall.

Penalty: Expulsion from the exam hall and cancellation of exam performance in all subjects. The student will be debarred from future exams and may forfeit their seat. Outsiders will be handed over to the police.

Clause 6: Impersonation during the examination.

Penalty: Both the impersonator and the original candidate will be expelled from the exam hall. The original candidate's performance will be cancelled in all subjects, including practical and project work, and they will be barred from exams for two consecutive semesters. Continuation in the course is subject to academic regulations. The impersonator (if an outsider) will be handed over to the police.

Clause 7: Repeated offenses.

Penalty: For a second offense, the candidate will face expulsion from the exam hall and cancellation of all exam performances for that term, with a fine of Rs. 1000. Repeated academic dishonesty may result in the issuance of a transfer certificate (TC).

Clause 8: Any other form of malpractice not specified.

Penalty: Punishment will be determined by the Examination Malpractice Committee and approved by the Vice-Chancellor.

Plagiarism Penalty Policy

Plagiarism is considered a serious breach of academic integrity, compromising both the ethical standards of the university and the intellectual development of students. The university enforces a strict zero-tolerance policy regarding plagiarism, and all students are expected to uphold the highest standards of academic honesty.

Penalties for plagiarism will be applied as follows:

First Offense:

- Minor Plagiarism (e.g., improper citation, small portions of copied work): The student will receive a warning and be required to resubmit the work with proper citations. Marks may be reduced up to 50%.
- Major Plagiarism (e.g., copying significant portions, submitting another person's work): The assignment will receive a grade of zero. The student may be required to attend a mandatory workshop on academic integrity.

Second Offense:

- Any second offense, regardless of severity, will result in a zero for the assignment and an official letter of reprimand placed in the student's record. The student will be placed on academic probation.

Third Offense:

- The student will face suspension from the university for one academic term. A record of academic misconduct will be permanently placed in the student's academic file.

Repeated Violations:

- Further violations after the third offense may lead to expulsion from the university.

In cases of group work, if plagiarism is identified, all group members will be held equally accountable unless it can be demonstrated that the act of plagiarism was isolated to specific individuals.

Terminology

Absolute Grading: Absolute grading is a method of assigning grades based on predetermined criteria or standards rather than comparing student performance to other students in the class (See: Relative Grading where the performances are compared).

Academic Bank of Credits (ABC): Academic Bank of Credits, an initiative of Government of India, is a digital platform that stores the academic credits earned by a student throughout their educational journey. It's essentially a virtual repository of a student's academic achievements.

Academic Council: The Academic Council is the highest academic body of the University and is responsible for the maintenance of standards of instruction, education and examination within the University. The Academic Council is an authority as per UGC regulations and has the right to decide all academic matters including academic research.

Academic Year: It is the period necessary to complete an actual course of study within a year. It comprises of two consecutive regular semesters i.e., Odd and Even semesters.

Acceleration: Acceleration of courses refers to a student's ability to progress through their academic program at a faster pace than traditional timelines.

Attendance: Attendance refers to the record of a student's presence or absence in educational institutions. It is a critical factor influencing academic performance, overall development, and future success.

Audited Course: It is a course of study which has zero credits and has a "Satisfactory" or an "Unsatisfactory" grade.

Backlog Course: A course is considered to be a backlog if the student has obtained 'F' grade or detained in the course.

Basic Sciences: The courses of foundational nature in the areas of Mathematics, Physics, Chemistry, Biology etc., are offered in this category.

Betterment: Betterment is a way that contributes towards improving the students' grade in any course(s). It can be done by either (a) re-appearing or (b) re-registering for the course.

Board of Studies: Board of Studies (BOS) is an authority as defined in UGC regulations, constituted by Vice Chancellor for each of the department separately. They are responsible for curriculum design and update in respect of all the programs offered by a department.

Branch of Study: It is a branch of knowledge, an area of study or a specific program (like Civil Engineering, Mechanical Engineering, Electrical and Electronics Engineering etc.)

Bridge Courses: Courses which are required to bridge the continuity among the Basic sciences/Engineering Sciences/professional courses (both core and electives) and are identified through gap analysis carried out using feedback obtained from various academic stakeholders are termed as Bridge Courses. These courses also do not yield any credits but require a "Satisfactory" result to register into the attached professional courses.

Capstone Project: A capstone project is the culminating academic experience for many students, typically undertaken in the final year of a degree program. It's designed to integrate and apply the knowledge and skills acquired throughout the course of study.

Certificate course: It is a course that makes a student gain hands-on expertise and skills required for holistic development. It is a mandatory, non-credited course for the award of degree.

Change of Branch: Change of branch means transfer from one's branch of study to another.

Compulsory course: Course required to be undertaken for the award of the degree as per the program.

Course: A course is a subject offered by the University for learning in a particular semester.

Course Handout: Course Handout is a document which gives a complete plan of the course. It contains the details of the course viz. Course title, Course code, Pre-requisite, Credit structure, team of instructors, Course objectives, Course rationale, Course Outcomes and the relevant syllabus, textbook(s) and reference books, Course delivery plan and session plan, evaluation method, chamber consultation hour, course notices and other course related aspects. In essence, course handout is an agreement between students (learners) and the instructor.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Course Withdrawal: Withdrawing from a Course means that a student can drop from a course within the first two weeks of the odd or even Semester (deadlines are different for summer sessions). However, s/he can choose a substitute course in place of it by exercising the option within 5 working days from the date of withdrawal.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value.

Credit point: It is the product of grade point and number of credits for a course.

Credit Transfer: The procedure of granting credit (s) to a student for course(s) undertaken at another institution.

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student over all the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Curriculum: Curriculum is a standards-based sequence of planned experiences where students practice and achieve proficiency in content and applied learning skills. Curriculum is the central guide for all educators as to what is essential for teaching and learning, so that every student has access to rigorous academic experiences.

Deceleration: Deceleration of courses typically refers to a student's decision to reduce their course load or extend the time taken to complete a degree program.

Degree: A student who fulfils all the Program requirements is eligible to receive a degree.

Degree Requirements: Degree requirements are the specific courses, credits, and academic standards that a student must fulfill to earn a particular degree.

Degree with Specialization: A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of Professional elective courses in a specialized area is eligible to receive a degree with specialization.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff and other resources.

Designing Your Own Degree: Designing your own degree is a revolutionary concept that empowers students to create a customized educational path aligned with their passions, career goals, and unique learning styles.

Dissertation: Dissertation is a substantial piece of original research written and defended by a candidate for a degree.

Detention in a course: Student who does not obtain minimum prescribed marks in continuous in-semester evaluation and /or minimum prescribed attendance in a course shall be detained in that course.

Double Major Degree: A double major degree allows students to specialize in two academic fields while earning a single bachelor's degree.

Dropping from the Semester: A student who doesn't want to register for the semester should do so in writing in a prescribed format before commencement of the semester.

End-semester Evaluation: End-semester evaluation is a summative assessment conducted at the conclusion of an academic term to measure students' overall performance.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective, Open Elective, Management Elective and Humanities Elective.

Engineering Sciences: The courses belonging to basic evolutionary aspects of engineering from Mechanical Sciences, Electrical Sciences and Computing like Engineering Mechanics, Data structures, Network Theory, Signal Analysis.

EPICS: EPICS stands for Engineering Projects in Community Service. It's a unique program that combines engineering education with community service.

Evaluation: Evaluation is the process of judging the academic work done by the student in her/his courses. It is done through a combination of continuous in-semester assessment and semester end examinations.

Experiential Learning: Experiential learning is a process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting. It involves learning by doing, where students engage in hands-on activities, real-world problem-solving, and reflective practices to gain deeper understanding and practical application of the concepts they are studying.

Flexi-Core course: A Flexi-Core course typically refers to an elective or optional course within a degree program that offers students flexibility in choosing subjects based on their interests and career goals.

Formative Assessment: Formative assessment is ongoing evaluation of student understanding to inform instruction and facilitate learning.

Flipped Learning: Flipped learning is an instructional strategy that reverses the traditional teaching model. In flipped learning, students are introduced to new content outside of class, usually through video lectures, readings, or other materials. The in-class time is then used for more interactive activities, such as discussions, problem-solving, group work, and applying the concepts learned at home.

Grade: It is an index of the performance of the students in a said course. Grades are denoted by alphabets.

Grade Point: It is a numerical weight allotted to each letter grade on a 10 - point scale.

Grade Point Average (GPA): Grade Point Average is a numerical representation of a student's academic performance. It is calculated by averaging the numerical equivalents of letter grades earned in courses, considering the number of credit hours for each course.

Honors Degree: A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of additional courses within the same program is eligible to receive an Honors degree.

Humanities, Arts and Social Sciences (HAS): It is a broad term that groups together the academic disciplines of humanities, arts and social sciences.

Industrial Training: Training program undergone by the student as per the academic requirement in any company/firm.

Industrial Visit: Visit to a company/firm as per the academic requirement.

Internship: Internship is a temporary work experience offered by an organization for a limited period. It provides students, graduates, or career changers with an opportunity to gain practical skills and experience in a specific field.

In-Semester Evaluation: Summative assessments used to evaluate student learning, acquired skills, and academic attainment during a course.

Induction Courses: Student who gets admitted into B.Tech. program must complete a set of Induction courses for a minimum period of 3 weeks and obtain a "Satisfactory" result prior to registering into 1st Semester of the Program.

Innovation Semester: An Innovation Semester is a dedicated academic term focused on cultivating a culture of creativity, problem-solving, and entrepreneurial thinking.

Lecture: A lecture is a formal instructional session where an instructor presents information to a large group of students.

Make-up Test: An additional test scheduled on a date other than the originally scheduled date.

Malpractice: Malpractice typically refers to academic dishonesty or misconduct during examinations or coursework. This can include a wide range of behaviors that compromise the integrity of the evaluation process.

Management elective: A course that develops managerial skills and inculcates entrepreneurial skills.

Minor Degree: A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of courses from another discipline is eligible to receive a minor degree in that discipline.

Multiple Entry and Multiple Exit (MEME): It is an educational framework designed to provide flexibility in learning pathways, allowing students to enter and exit educational programs at various stages based on their individual needs, prior knowledge, and career goals.

National Education Policy (NEP): NEP 2020 is a comprehensive framework for transforming India's Education System. It aims to create an equitable and vibrant knowledge society by providing high-quality education to all.

NHEQF: NHEQF stands for National Higher Education Qualifications Framework. It's a comprehensive framework designed to standardize and classify higher education qualifications in India. The primary goal of NHEQF is to ensure that qualifications from different institutions are comparable and recognized nationally and internationally.

Open Elective: This is a course of interdisciplinary nature. It is offered across the University for all Programs.

Overloading: Registering for more number of credits than normally prescribed by the Program in a semester.

Peer Learning: Peer learning is a collaborative learning process where students learn from each other. It involves sharing knowledge, skills, and experiences among peers.

Practical: A practical is a hands-on session where students apply theoretical knowledge in a real-world or laboratory setting. Practical sessions are designed to develop students' technical skills, problem-solving abilities, and understanding of experimental procedures.

Practice School: It is a part of the total program and takes one full semester in a professional location, where the students and the faculty get involved in finding solutions to real-world problems. A student can choose Project/Practice School during his/her final year to meet the final requirements for the award of degree.

Pre-requisite: A course, the knowledge required for registration into higher level course.

Product Development Semester: A Product Development Semester is an academic term dedicated to the process of creating new products or improving existing ones.

Professional Core: The courses that are essential constituents of each engineering discipline are categorized as Professional Core courses for that discipline.

Professional Elective: A course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.

Program: A set of courses offered by the Department. A student can opt and complete the stipulated minimum credits to qualify for the award of a degree in that Program.

Program Educational Objectives: The broad career, professional, personal goals that every student will achieve through a strategic and sequential action plan.

Program Outcome (PO): Program outcomes are statements that describe what students are expected to know, understand, and be able to do upon completing a specific academic program.

Project: Course that a student must undergo during his/her final year which involves the student to undertake a research or design, which is carefully planned to achieve a particular aim. It is a credit-based course.

Project-Based Learning (PBL): Project-Based Learning is an instructional approach where students actively engage in real-world and personally meaningful projects.

Rapid Prototyping Semester: A Rapid Prototyping Semester is an academic term dedicated to the practical application of rapid prototyping techniques to create physical models or prototypes of products or designs.

Registration: Process of enrolling into a set of courses in a semester/ term of the Program.

Re-Registration: Student who are detained in courses due to attendance or marks criteria as per their regulation are given a chance to re-register for the same and complete it during the summer term.

Relative Grading: Relative grading is a method of assigning grades based on a student's performance compared to the rest of the class.

Remedial Exam: A remedial Exam is an assessment designed to identify specific areas of weakness or gaps in a student's knowledge or skills. It is typically administered after a student has performed poorly on a regular assessment.

Research Project: A research project is a systematic investigation undertaken to answer a specific question or address a particular problem.

Research Semester: A research semester is a dedicated period within an academic program focused on independent research or scholarly inquiry.

Research Seminar: A research seminar is a formal academic gathering where researchers present their ongoing work to a group of peers, faculty, and other interested individuals.

Self-learning: Self-learning is the process of acquiring knowledge and skills independently without formal instruction.

Semester: It is a period of study consisting of 15+1 weeks of academic work equivalent to normally 90 working days including examination and preparation holidays. The odd Semester starts normally in July and even semester in December.

Semester End Examinations: It is an examination conducted at the end of a course of study.

Skilling: It is a process of developing and enhancing specific skills that are essential for performing particular tasks or activities effectively. It involves structured training and practice aimed at equipping individuals with the practical abilities, knowledge, and competencies required for professional success and personal development.

Social Immersive Learning (SIL): Social Immersive Learning is a pedagogical approach that combines the power of social interaction with immersive technologies to create engaging and impactful learning experiences.

Social Service: An activity designed to promote social awareness and generate well-being; to improve the life and living conditions of society.

Student Outcomes: The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioral.

Substitution of Elective course: Replacing an elective course with another elective course as opted by the student.

Summative Assessment: Summative Assessment is a type of evaluation that occurs at the end of a learning period.

Summer term: The term during which courses are offered from May to July. Summer term is not a student's right and will be offered at the discretion of the University.

Supplementary: A student can reappear only in the semester end examination for the Theory component of a course, subject to the regulations contained herein.

Term paper: A 'term paper' is a research report written by students that evolves their course-based knowledge, accounting for a grade. Term paper is a written original research work discussing a topic in detail. It is a credit-based course.

Tutorial: A tutorial is a small group session designed to provide personalized guidance and support to students. Tutorials often involve discussions, problem-solving activities, and hands-on practice to reinforce concepts learned in lectures.

Under-loading: Registering for lesser number of credits than normally prescribed for a semester in that Program.

Value-Added Courses: Courses leading to global certification and those which are conducted exclusively for employability are referred to as value added courses.

FAQs

Q: Can I choose my preferred faculty members for certain courses?

A: During registrations prior to commencement of each semester, if a course is offered for multiple sections and if multiple faculty are teaching the same course, you will then have a choice of selecting the section being taught by that faculty under whom you wish to study.

Q: When and how do I register for courses?
A: Student must register for courses on the designated registration day. There is a one-week window for adding courses and a two-week window for dropping or changing them.

Q: Can I get an attendance waiver?
A: Students with overall cumulative marks percentage 90% or higher in the previous year can get an attendance waiver for up to three courses in the next semester, with prior approval from the Dean of Academics through proper channel.

Q: What is the minimum attendance requirement for promotion?
A: 85% attendance is required for course promotion and appearing for the semester-end exam.

Q: Are there any extracurricular activities or clubs available?

A: Yes, KLEF offers various extracurricular activities and clubs, such as sports, cultural events, and student organizations.

Q: What happens if I have less than 85% attendance?
A: Upto 75% attendance, student may be eligible for condonation or marginal case consideration, but need to provide proper documentation and may be subject to fees. But falling below 75% will make you detain in the course.

Q: What happens if I detain a course?
A: Student who detained in a course must re-register for the course and study it again in summer term. If the detained course is not offered by the department, then the student can study other equivalent course from the same category upon taking approval from office of Dean Academics.

Q: What is ABC?
A: ABC enables you to digitally store your earned credits and potentially use them towards future studies at other institutions.

Program - Degrees(Design your own Degree)

S#	Major Flexibility	Program Addon
1	No Flexibility	No Add-on

Degree-wise Credit Requirements

1. No Flexibility with No Add-on

a) Credit Requirement **Total Credit Required:**

S#	Category	Sub-Category	Min-Credit	Max-Credit	Min-Courses	Max-Courses	Grouping
1	BSC	BSC-CORE	0.0	0.0	1	2	
2	PCC	PCC-CORE	0.0	0.0	45	45	
3	PRI	PRI-CORE	0.0	0.0	1	1	
4	VAC	VAC-CERT	0.0	0.0	3	3	
5	AUC	AUC-CAREER	0.0	0.0	1	1	

b) Outcome Requirement

- Must complete minimum 48 courses outline in the program structure.
- Have obtained 50% marks in each course at the end of the program.
- Must have finished all the above-mentioned requirements in less than twice the period of the program, which includes deceleration period chosen by the student, deceleration imposed by KLEF or debarred from the KLEF.

Program Structure

S#	Cat	Sub-Cat	CourseCode	Course Title	Mode	Acrym	L	T	P	S	CR	CH	Pre-req
1	BSC	BSC-CORE	26PY610B6P	REMEDIAL BIOLOGY-P	R	RBP	0	0	3	0	0	3	
2	BSC	BSC-CORE	26PY610B6T	REMEDIAL BIOLOGY-T	R	RBT	3	1	0	0	0	4	
3	BSC	BSC-CORE	26PY610M6T	REMEDIAL MATHEMATICS	R	RMT	3	1	0	0	0	4	
4	PCC	PCC-CORE	26PY6201T	PATHOPHYSIOLOGY	R	PATHO	3	1	0	0	0	4	
5	PCC	PCC-CORE	26PY6202P	PHARMACEUTICAL MICROBIOLOGY-P	R	PMB-P	0	0	3	0	0	3	
6	PCC	PCC-CORE	26PY6202T	PHARMACEUTICAL MICROBIOLOGY-T	R	PMB-T	3	1	0	0	0	4	
7	PCC	PCC-CORE	26PY6203P	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-P	R	P. COG-P	0	0	3	0	0	3	
8	PCC	PCC-CORE	26PY6203T	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-T	R	P. COG-T	3	1	0	0	0	4	
9	PCC	PCC-CORE	26PY6204T	PHARMACOLOGY I	R	P.COL1	3	1	0	0	0	4	
10	PCC	PCC-CORE	26PY6205T	COMMUNITY PHARMACY	R	COM.PH	2	1	0	0	0	3	
11	PCC	PCC-CORE	26PY6206P	PHARMACOTHERAPEUTICS-I-P	R	PCT1-P	0	0	3	0	0	3	
12	PCC	PCC-CORE	26PY6206T	PHARMACOTHERAPEUTICS-I-T	R	PCT1-T	3	1	0	0	0	4	
13	PCC	PCC-CORE	26PY6301P	PHARMACOLOGY-II-P	R	PCOL -	0	0	3	0	0	3	
14	PCC	PCC-CORE	26PY6301T	PHARMACOLOGY-II-T	R	PCOL -	3	1	0	0	0	4	
15	PCC	PCC-CORE	26PY6302P	PHARMACEUTICAL ANALYSIS-P	R	PA-P	0	0	3	0	0	3	
16	PCC	PCC-CORE	26PY6302T	PHARMACEUTICAL ANALYSIS-T	R	PA-T	3	1	0	0	0	4	
17	PCC	PCC-CORE	26PY6303P	PHARMACOTHERAPEUTICS-II-P	R	PCTP -	0	0	3	0	0	3	
18	PCC	PCC-CORE	26PY6303T	PHARMACOTHERAPEUTICS-II-T	R	PCTP -	3	1	0	0	0	4	
19	PCC	PCC-CORE	26PY6304T	PHARMACEUTICAL JURISPRUDENCE	R	PJ	2	0	0	0	0	2	
20	PCC	PCC-CORE	26PY6305P	MEDICINAL CHEMISTRY-P	R	MC-P	0	0	3	0	0	3	
21	PCC	PCC-CORE	26PY6305T	MEDICINAL CHEMISTRY-T	R	MC-T	3	1	0	0	0	4	
22	PCC	PCC-CORE	26PY6306P	PHARMACEUTICAL FORMULATIONS-P	R	PF-P	0	0	3	0	0	3	
23	PCC	PCC-CORE	26PY6306T	PHARMACEUTICAL FORMULATIONS-T	R	PF-T	2	1	0	0	0	3	
24	PCC	PCC-CORE	26PY6401P	PHARMACOTHERAPEUTICS-III-P	R	PCTP -	0	0	3	0	0	3	
25	PCC	PCC-CORE	26PY6401T	PHARMACOTHERAPEUTICS-III-T	R	PCTP -	3	1	0	0	0	4	
26	PCC	PCC-CORE	26PY6402P	HOSPITAL PHRMACY-P	R	HP-P	0	0	3	0	0	3	
27	PCC	PCC-CORE	26PY6402T	HOSPITAL PHRMACY-T	R	HP-T	2	1	0	0	0	3	

S#	Cat	Sub-Cat	CourseCode	Course Title	Mode	Acrym	L	T	P	S	CR	CH	Pre-req
28	PCC	PCC-CORE	26PY6403P	CLINICAL PHARMACY-P	R	CP-P	0	0	3	0	0	3	
29	PCC	PCC-CORE	26PY6403T	CLINICAL PHARMACY-T	R	CP-T	3	1	0	0	0	4	
30	PCC	PCC-CORE	26PY6404T	BIO STATISTICS AND RESEARCH METHODOLOGY	R	BSRM	2	1	0	0	0	3	
31	PCC	PCC-CORE	26PY6405P	BIO PHARMACEUTICS AND PHARMACOKINETICS-P	R	BPPK-P	0	0	3	0	0	3	
32	PCC	PCC-CORE	26PY6405T	BIO PHARMACEUTICS AND PHARMACOKINETICS-T	R	BPPK-T	3	1	0	0	0	4	
33	PCC	PCC-CORE	26PY6406T	CLINICAL TOXICOLOGY	R	CT	2	1	0	0	0	3	
34	PCC	PCC-CORE	26PY6501T	CLINICAL RESEARCH	R	CR	3	1	0	0	0	4	
35	PCC	PCC-CORE	26PY6502T	PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS	R	PE&PE	3	1	0	0	0	4	
36	PCC	PCC-CORE	26PY6503T	CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING	R	CP-PDM	2	1	0	0	0	3	
37	PCC	PCC-CORE	26PY6101P	HUMAN ANATOMY AND PHYSIOLOGY-P	R	HAP-P	0	0	3	0	0	3	
38	PCC	PCC-CORE	26PY6101T	HUMAN ANATOMY AND PHYSIOLOGY-T	R	HAP-T	3	1	0	0	0	4	
39	PCC	PCC-CORE	26PY6102P	PHARMACEUTICS-P	R	PC-P	0	0	3	0	0	3	
40	PCC	PCC-CORE	26PY6102T	PHARMACEUTICS-T	R	PC-T	2	1	0	0	0	3	
41	PCC	PCC-CORE	26PY6103P	MEDICINAL BIOCHEMISTRY-P	R	MBC-P	0	0	3	0	0	3	
42	PCC	PCC-CORE	26PY6103T	MEDICINAL BIOCHEMISTRY-T	R	MBC-T	3	1	0	0	0	4	
43	PCC	PCC-CORE	26PY6104P	PHARMACEUTICAL ORGANIC CHEMISTRY-P	R	POC-P	0	0	3	0	0	3	
44	PCC	PCC-CORE	26PY6104T	PHARMACEUTICAL ORGANIC CHEMISTRY-T	R	POC-T	3	1	0	0	0	4	
45	PCC	PCC-CORE	26PY6105P	PHARMACEUTICAL INORGANIC CHEMISTRY-P	R	PIC-P	0	0	3	0	0	3	
46	PCC	PCC-CORE	26PY6105T	PHARMACEUTICAL INORGANIC CHEMISTRY-T	R	PIC-T	2	1	0	0	0	3	
47	PCC	PCC-CORE	26PY650N4	CLERKSHIP	R	CS	0	1	0	0	0	1	
48	PCC	PCC-CORE	26PY660N1	INTERNSHIP	R	ITS	0	0	40	0	0	40	
49	PRI	PRI-CORE	26PY650E5	PROJECT WORK (SIX MONTHS)	R	PW	0	0	20	0	0	20	

ogram Articulation Matrix

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	BSC	26PY610B6P - RBP	CO1	Applications of the Organisation of plants, plant tissues and plant kingdom and application of biological principles in study of plant kingdom	3											
2	BSC	26PY610B6P - RBP	CO2	Application of biological principles in studying morphology and plant physiology	3											
3	BSC	26PY610B6P - RBP	CO3	Application of biological principles in study of taxonomy, microorganisms, animals and other poisonous animals.	3											
4	BSC	26PY610B6T - RBT	CO1	Understand the classification and salient features of plant kingdoms	2											
5	BSC	26PY610B6T - RBT	CO2	Understand the plants morphology and salient features of the plants	2											
6	BSC	26PY610B6T - RBT	CO3	Understand the taxonomy of plants, fruits and seeds	2											
7	BSC	26PY610B6T - RBT	CO4	Understand the plant physiology and study of different microorganisms	2											
8	BSC	26PY610B6T - RBT	CO5	Understanding the anatomy of frog	2											
9	BSC	26PY610B6T - RBT	CO6	understand the knowledge on general organization of mammals	2											
10	BSC	26PY610M6T - RMT	CO1	Algebra : Determinants, Matrices Trigonometry : Sides and angles of a triangle, solution of triangles	3	3										
11	BSC	26PY610M6T - RMT	CO2	Analytical Geometry:Points, Straight line, circle, parabola	2	2										
12	BSC	26PY610M6T -	CO3	Differential calculus and Partial differentiation	3	3										
13	BSC	26PY610M6T -	CO4	ntegral Calculus:	2	2										

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
14	BSC	26PY610M6T -	CO5	Differential equations	3	3										
15	BSC	26PY610M6T -	CO6	Laplace transform	3	3										
16	PCC	26PY6101P - HAP-P	CO1	Application of gross morphology of body organs using microscope and Determining blood cell count Determining ESR, Blood Haemoglobin and Bleeding time	3			3								
17	PCC	26PY6101P - HAP-P	CO2	Determination of Blood pressure and Blood group Identifying various Parts of Skeletal, Cardiovascular, Respiratory, Digestive, Urinary systems with models, charts & Specimens	3			3								
18	PCC	26PY6101P - HAP-P	CO3	Identifying various Parts of Nervous, Special senses, Reproductive systems with models, charts & Specimens Recording the muscle curves in different conditions using sciatic nerve preparation	3			3								
19	PCC	26PY6101T - HAP-T	CO1	Understand the cellular level and tissue level of organization in the human body, Process of blood cell, Lymph formation and their importance in body physiology	2			2								
20	PCC	26PY6101T - HAP-T	CO2	Understand the gross anatomy and functions of organs involved in circulatory and respiration	3			2								
21	PCC	26PY6101T - HAP-T	CO3	Understand the process of digestion, and Anatomical location, physiological functions of human nervous system	3			2								
22	PCC	26PY6101T - HAP-T	CO4	Understand and acquire the knowledge on endocrinal hormones and Physiology of excretory organs.	3			2								

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
23	PCC	26PY6101T - HAP-T	CO5	Understand and summarise the Anatomy and functions of special sense organs, and understand the process of reproduction	2			2								
24	PCC	26PY6101T - HAP-T	CO6	Understand and elaborate the skeletal system of humans and sports physiology	2			2								
25	PCC	26PY6102P - PC-P	CO1	Know the preparation of Syrups, elixirs and linctus, Preparation of Solutions and liniments	3											
26	PCC	26PY6102P - PC-P	CO2	Know the preparation of lotions and emulsions, Preparation of Powders and Suppositories	3											
27	PCC	26PY6102P - PC-P	CO3	Know the preparation of Incompatibilities, Preparation of ear drops and pastes	3											
28	PCC	26PY6102T - PC-T	CO1	Understand the different dosage forms, History of Pharmacy and pharmacopoeias	2											
29	PCC	26PY6102T - PC-T	CO2	Understand the different dosage forms, History of Pharmacy and pharmacopoeias	2											
30	PCC	26PY6102T - PC-T	CO3	Understand the preparation of Monophasic liquid dosage forms	2											
31	PCC	26PY6102T - PC-T	CO4	understand the biphasic liquid dosage forms	2											
32	PCC	26PY6102T - PC-T	CO5	understand the concepts of suppositories and Gelanicals	2											
33	PCC	26PY6102T - PC-T	CO6	Understand the principles of Surgical aids and incompatibilities	2											
34	PCC	26PY6103P - MBC-P	CO1	Analyse the catalytic activity of enzymes and importance of isoenzymes in diagnosis of disease and role of carbohydrates and their metabolic disorders	1			3								

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
35	PCC	26PY6103P - MBC-P	CO2	Analyse the role of carbohydrates and their metabolic disorders and biological oxidation process in body ,Understand the liver and lipid profile tests	1			3								
36	PCC	26PY6103P - MBC-P	CO3	Anlayse the concepts of proteins, amino acids and genetic organization in mammalians ,Understand the clinical chemistry of cell and kidney function tests	1			3								
37	PCC	26PY6103T - MBC-T	CO1	Understand the catalytic activity of enzymes and importance of isoenzymes indiagnosis of disease	2			2					2			
38	PCC	26PY6103T - MBC-T	CO2	Understand the metabolic process biomolecules in health and illness (metabolicdisorders)	2			2					2			
39	PCC	26PY6103T - MBC-T	CO3	Understand the concepts of t h e genetic organization of mammalian genome; protein synthesis, replication, mutation and repair mechanism	2			2					2			
40	PCC	26PY6103T - MBC-T	CO4	Understand the biochemical principles of organ function tests of kidney, liver andendocrine gland	2			2					2			
41	PCC	26PY6103T - MBC-T	CO5	Understand the principles, significance and methods of different biochemical tests	2			2					2			
42	PCC	26PY6103T - MBC-T	CO6	Understand the Immunochemical techniques for determination of hormone levels and protein levels in serum	2			2					2			
43	PCC	26PY6104P - POC-P	CO1	Applying the knowledge to Synthesize organic compounds by acetylation, benzoylation, bromination, condensation, diazotisation and coupling and hydrolysis methods.	3											

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
44	PCC	26PY6104P - POC-P	CO2	Applying the knowledge to Synthesize organic compounds by nitration reactions, oxidation, reduction and miscellaneous reactions methods	3											
45	PCC	26PY6104P - POC-P	CO3	Acquiring knowledge to Identify Phenols, amides, carbohydrates, amines, Carboxylic acids, aldehyde, ketones, alcohols, Carboxylic acids, aldehyde, ketones and alcohols Esters, hydrocarbons, anilides and nitro compounds	3											
46	PCC	26PY6104T - POC-T	CO1	Understand the IUPAC/Common system of nomenclature of simple organic compounds	2											
47	PCC	26PY6104T - POC-T	CO2	To understand the organic reactions, reactivity, stability, mechanisms involved in aliphatic and alicyclic compounds	2											
48	PCC	26PY6104T - POC-T	CO3	To understand the free radical addition and the theory of resonance	2											
49	PCC	26PY6104T - POC-T	CO4	To understand the nucleophilic & electrophilic aromatic substitution reactions, reactivity and orientation	2											
50	PCC	26PY6104T - POC-T	CO5	To understand the named organic reactions with mechanisms and Interpret oxidation and reduction reactions	2											
51	PCC	26PY6104T - POC-T	CO6	To understand the preparation, test for purity, assay and medicinal uses of official compounds	2											
52	PCC	26PY6105P - PIC-P	CO1	To understand and test for identification of impurities and selected inorganic compounds	2			3								
53	PCC	26PY6105P - PIC-P	CO2	To apply Analyze the purity of selected inorganic compounds	3			3								
54	PCC	26PY6105P - PIC-P	CO3	To Analyze and Estimate the mixtures and preparation of selected organic compounds	3			3								

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
55	PCC	26PY6105T - PIC-T	CO1	Make Use of Analytical knowledge in identifying errors and concepts of indicators in volumetric analysis	3											
56	PCC	26PY6105T - PIC-T	CO2	Application of principles and procedures of analysis of drugs	3											
57	PCC	26PY6105T - PIC-T	CO3	Application of principle of limit tests in identifying the impurities	3											
58	PCC	26PY6105T - PIC-T	CO4	Understand the role of medicinal gases and drugs used to treat gastrointestinal diseases.	3											
59	PCC	26PY6105T - PIC-T	CO5	Understand the role of electrolyte replenishers and essential trace elements to maintain physiological balance & MOA of antimicrobials	3											
60	PCC	26PY6105T - PIC-T	CO6	Understand the importance of inorganic pharmaceuticals in preventing and curing the diseases	3											
61	PCC	26PY6201T - PATHO	CO1	understand the basic principles of cell injury, adaptations and inflammation	2											
62	PCC	26PY6201T - PATHO	CO2	understand the pathophysiology of diseases related to immunity					2							
63	PCC	26PY6201T -	CO3	understand the detailed pathogenesis of cancer					2							
64	PCC	26PY6201T - PATHO	CO4	understand biological effects of radiation, environmental and nutritional diseases					2							
65	PCC	26PY6201T - PATHO	CO5	understand pathophysiology of common diseases					2							
66	PCC	26PY6201T -	CO6	understand pathogenesis of Infectious diseases					2							
67	PCC	26PY6202P - PMB-P	CO1	Examine and Analyze various culture media for the growth of microorganisms, Identify and isolate bacteria	2			2		2						

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
68	PCC	26PY6202P - PMB-P	CO2	Examine and analyse aseptic procedures, Carrying out sterilization and sterility testing of pharmaceuticals	2			2		2						
69	PCC	26PY6202P - PMB-P	CO3	Test for antimicrobials and determine the MIC of antimicrobial agents,Conduct planned experiments and prepare laboratory report in a standard format	2			2		2						
70	PCC	26PY6202T - PMB-T	CO1	Understand methods of identification, classification and relationship among various microorganisms	2			2								
71	PCC	26PY6202T - PMB-T	CO2	Understand nutritional requirements, isolation identification cultivation and preservation of various microorganisms	2			2								
72	PCC	26PY6202T - PMB-T	CO3	Understand the importance and implementation of sterilization in pharmaceutical processing and industry and learn disinfectants, procedures of disinfection for pharmaceutical products.	2			2								
73	PCC	26PY6202T - PMB-T	CO4	Understand of Immunology concepts, Antigen-Antibody reactions, and immunization programs	2			2								
74	PCC	26PY6202T - PMB-T	CO5	Understanding of different diagnostic tests in microbiology including Elisa, Western Blot test, and PCR etc.	2			2								
75	PCC	26PY6202T - PMB-T	CO6	Understand the diagnostic tests, microbial assays and infectious diseases	2			2								
76	PCC	26PY6203P - P. COG-P	CO1	Apply the principles of pharmacognosy of macroscopy, microscopy, and powder characteristics of natural drugs.	2											
77	PCC	26PY6203P - P. COG-P	CO2	Apply the principles of pharmacognosy of powder characteristics of natural drugs.	2											

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78	PCC	26PY6203P - P. COG-P	CO3	Apply the principles of pharmacognosy to perform the different chemical tests	2											
79	PCC	26PY6203T - P. COG-T	CO1	Understand the history and scope of Pharmacognosy and Classification of crude drugs	2			1								
80	PCC	26PY6203T - P. COG-T	CO2	Understand the cultivation, collection, and processing of crude drugs and study of cell constituents and natural pesticides	2			2								
81	PCC	26PY6203T - P. COG-T	CO3	Understand about the organic farming and different methods of pest control	2			2								
82	PCC	26PY6203T - P. COG-T	CO4	Understand the detailed study carbohydrates containing drugs	2			2								
83	PCC	26PY6203T - P. COG-T	CO5	Understand the different methods of extraction, chemistry and analysis of lipids and oils and protein based natural drug	2			2								
84	PCC	26PY6203T - P. COG-T	CO6	Understand different types of plants fibres used in surgical dressings and related products and understand different methods of adulteration of crude drugs	1			1								
85	PCC	26PY6204T - P.COL1	CO1	Understanding the pharmacological actions of different categories of drugs	2											
86	PCC	26PY6204T - P.COL1	CO2	Understand the pharmacology of drugs acting on Autonomic nervous system	2											
87	PCC	26PY6204T - P.COL1	CO3	Understand the pharmacology of drugs acting on cardio vascular system	2											
88	PCC	26PY6204T - P.COL1	CO4	Understand the pharmacology of drugs acting on central nervous system	2											
89	PCC	26PY6204T - P.COL1	CO5	Understand the pharmacology of drugs acting on Respiratory system	2											

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90	PCC	26PY6204T - P.COL1	CO6	Understand the pharmacology of hormonal and antihistaminic drugs	2											
91	PCC	26PY6205T - COM.PH	CO1	Understand the roles and responsibilities of community pharmacist	2											
92	PCC	26PY6205T - COM.PH	CO2	Understand the layout and infrastructure requirements for community pharmacy	2											
93	PCC	26PY6205T - COM.PH	CO3	Understand the need of inventory control and understand the various methods	2											
94	PCC	26PY6205T - COM.PH	CO4	Understand the factors affecting medication adherence	2											
95	PCC	26PY6205T - COM.PH	CO5	Apply pharmacy practice principles to Perform general patient counselling	2											
96	PCC	26PY6205T - COM.PH	CO6	Apply health screening services in community pharmacy	3											
97	PCC	26PY6206P - PCT1-P	CO1	Apply the knowledge and present the recorded cases in Cardiology department and Pulmonology		3	3									
98	PCC	26PY6206P - PCT1-P	CO2	Apply the knowledge and present the recorded cases in Endocrinology department and to understand the prescribing guidelines		3	3									
99	PCC	26PY6206P - PCT1-P	CO3	Apply the knowledge and present the recorded cases in Ophthalmology department and the guidelines in the rational of drug use		3	3									
100	PCC	26PY6206T - PCT1-T	CO1	Understand etiopathogenesis and Pharmacotherapy of CVS diseases (Hypertension, Congestive cardiac failure, Angina Pectoris)	2	2										

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
101	PCC	26PY6206T - PCT1-T	CO2	Understand etiopathogenesis and Pharmacotherapy of CVS diseases (Myocardial infarction Hyperlipidaemias, Cardiac Arrhythmia	2	2										
102	PCC	26PY6206T - PCT1-T	CO3	Understand etiopathogenesis and Pharmacotherapy of Respiratory system diseases	2	2										
103	PCC	26PY6206T - PCT1-T	CO4	Understand etiopathogenesis and Pharmacotherapy of Endocrine system diseases	2	2										
104	PCC	26PY6206T - PCT1-T	CO5	Understand the general prescribing guidelines for Paediatric, Geriatric, Pregnancy and Breast feeding, To understand etiopathogenesis and Pharmacotherapy of ophthalmology diseases	2	2										
105	PCC	26PY6206T -	CO6	Understand the Rational use of drugs	2	2										
106	PCC	26PY6301P - PCOL - 2P	CO1	understand the laboratory animals and their handling, To know the importance of solutions and laboratory appliances used in experimental pharmacology, Understand the anesthetics used in laboratory animals,	3			3								
107	PCC	26PY6301P - PCOL	CO2	Apply bioassays Ach	3			3								
108	PCC	26PY6301P - PCOL - 2P	CO3	Apply bioassays of histamine, understand the demonstrate intraperitoneal and intramuscular routes of administration of drugs in animals and describe different anaesthetics used in laboratory animals	3			3								
109	PCC	26PY6301T - PCOL - 2T	CO1	understand the pharmacology of drugs acting on blood and blood forming agents and Renal system	2							2				
110	PCC	26PY6301T - PCOL	CO2	Understand the pharmacology of chemotherapy	2							2				

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
111	PCC	26PY6301T - PCOL - 2T	CO3	Understand the immuno pharmacology and principles of animal toxicology	2							2				
112	PCC	26PY6301T - PCOL - 2T	CO4	Acquire the knowledge on cell, macromolecules, cell signalling, DNA replication and cell cycle.	2							2				
113	PCC	26PY6301T - PCOL - 2T	CO5	Understand the importance of gene and its structure, genome, gene expression, recombinant DNA technology and other associated aspects	2							2				
114	PCC	26PY6301T - PCOL - 2T	CO6	Understand the importance of RNA and other associated aspects	2							2				
115	PCC	26PY6302P - PA-P	CO1	Apply chromatography and spectroscopy techniques for analysis of unkown compounds	2	2										
116	PCC	26PY6302P - PA-P	CO2	Apply experiments of electro titrimetric methods and absorption spectroscopy for analysis of drugs	2	2										
117	PCC	26PY6302P - PA-P	CO3	Apply various analytical techniques and determination of concentrations by flame photometry	2	2										
118	PCC	26PY6302T - PA-T	CO1	Understand the importance of various documentation practices followed in pharmaceutical industry	2	2										
119	PCC	26PY6302T - PA-T	CO2	Understand the knowledge about assay of pharmaceutical substance and product	2	2										
120	PCC	26PY6302T - PA-T	CO3	Develop basic practical skills using instrumental techniques	2	2										
121	PCC	26PY6302T - PA-T	CO4	Inculcate theoretical knowledge on various instrumental techniques adopted for analysis of pharmaceuticals	2	2										

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
122	PCC	26PY6302T - PA-T	CO5	Understand various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained	2	2										
123	PCC	26PY6302T - PA-T	CO6	Understand and gain knowledge on trouble shooting in adopting various methodologies using instrumental techniques	2	2										
124	PCC	26PY6303P - PCTP - 2P	CO1	Analyse Case studies on Infectious diseases, Respiratory diseases, Reproductive diseases.	3				3	3						
125	PCC	26PY6303P - PCTP - 2P	CO2	Analyse Case studies on Musculoskeletal diseases and renal diseases	3				3	3						
126	PCC	26PY6303P - PCTP	CO3	Analyse Case studies on cancer	3				3	3						
127	PCC	26PY6303T - PCTP - 2T	CO1	Understand basic guidelines of antibiotics, surgical prophylaxis and respiratory tract infectious diseases	3				3	3						
128	PCC	26PY6303T - PCTP - 2T	CO2	Understand the etiopathogenesis and pharmacotherapy of infectious diseases	3				3	3						
129	PCC	26PY6303T - PCTP - 2T	CO3	Understand the etiopathogenesis and pharmacotherapy of musculoskeletal diseases	3				3	3						
130	PCC	26PY6303T - PCTP - 2T	CO4	Understand the etiopathogenesis and pharmacotherapy of Renal system	3				3	3						
131	PCC	26PY6303T - PCTP - 2T	CO5	Understand the etiopathogenesis and pharmacotherapy of Oncology	3				3	3						
132	PCC	26PY6303T - PCTP - 2T	CO6	Understand the etiopathogenesis and pharmacotherapy of Dermatology	3				3	3						
133	PCC	26PY6304T - PJ	CO1	Understand the importance of code of pharmaceutical ethics	2							3				
134	PCC	26PY6304T - PJ	CO2	Understand in detail about various sections of Drugs and Cosmetics Act	2							3				

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135	PCC	26PY6304T - PJ	CO3	Understand various provisions of Pharmacy Act 1948	2							3				
136	PCC	26PY6304T - PJ	CO4	Understand the provisions of Medicinal and Toilet Preparation Act 1955	2							3				
137	PCC	26PY6304T - PJ	CO5	Understand various provisions of NDPS Act 1985	2							3				
138	PCC	26PY6304T - PJ	CO6	Understand various Indian pharmaceutical Acts and Indian Laws pertaining to Drugs and magic remedies Act, DPCO, Prevention Of Cruelty to animals, patents.	2							3				
139	PCC	26PY6305P - MC-P	CO1	Develop skills in the synthesis of medicinal compounds and analyze pharmaceutical drug properties using monograph methods	3											
140	PCC	26PY6305P - MC-P	CO2	Employ analytical techniques to quantify the concentration of a specific drug within an unknown solution, subsequently estimating its purity	2											
141	PCC	26PY6305P - MC-P	CO3	Understand experimentally the partitioning behavior and acid/base dissociation properties of a given compound	3											
142	PCC	26PY6305T - MC-T	CO1	To provide comprehensive understanding of modern concept in drug design and their significance in developing novel therapeutics	2											
143	PCC	26PY6305T - MC-T	CO2	To know the metabolism, adverse effect, and therapeutic activity of anti-infective, anti-fungal agents	2											
144	PCC	26PY6305T - MC-T	CO3	To understand the concept of microbial diseases and different anti-viral agents	2											
145	PCC	26PY6305T - MC-T	CO4	To explore the mechanisms involved in the cardiac diseases	2											

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
146	PCC	26PY6305T - MC-T	CO5	To understand the chemistry involved in anti-diabetic and thyroid drugs	2											
147	PCC	26PY6305T - MC-T	CO6	To discover the drugs involved in steroids and thyroid agents	2											
148	PCC	26PY6306P - PF-P	CO1	Prepare formulations of tablets and capsules, coating of the tablets.	2											
149	PCC	26PY6306P - PF-P	CO2	To prepare various parenteral products, different dosage forms by performing quality control tests as per the batch formula	2											
150	PCC	26PY6306P - PF-P	CO3	Prepare and evaluate various semi-solid preparations, cosmetics such as lipstick, cold cream and shampoo	2											
151	PCC	26PY6306T - PF-T	CO1	understand the significance of formulation, preparation and evaluation of tablets	2											
152	PCC	26PY6306T - PF-T	CO2	understand the significance of formulation, preparation and evaluation of capsules	2											
153	PCC	26PY6306T - PF-T	CO3	understand the significance of formulation, preparation and evaluation of liquid orals	3											
154	PCC	26PY6306T - PF-T	CO4	understand the significance of formulation, preparation and evaluation of parenteral Preparations	2											
155	PCC	26PY6306T - PF-T	CO5	understand the manufacturing methods of semisolid, and ophthalmic products	2											
156	PCC	26PY6306T - PF-T	CO6	understand the concepts of Novel Local drug delivery system	2											
157	PCC	26PY6401P - PCTP - 3P	CO1	Analyse Case studies on Infectious diseases, Respiratory diseases, Reproductive diseases	3				3	3						
158	PCC	26PY6401P - PCTP - 3P	CO2	Analyse Case studies on Musculoskeletal diseases and renal diseases	3				3	3						

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
159	PCC	26PY6401P - PCTP - 3P	CO3	Analyse Case studies on cancer and dermatological diseases	3				3	3						
160	PCC	26PY6401T - PCTP - 3T	CO1	Understand basic guidelines of antibiotics, surgical prophylaxis and respiratory tract infectious diseases.	2				2	2						
161	PCC	26PY6401T - PCTP - 3T	CO2	Understand the etiopathogenesis and pharmacotherapy of infectious diseases	2				2	2						
162	PCC	26PY6401T - PCTP - 3T	CO3	Understand the etiopathogenesis and pharmacotherapy of musculoskeletal diseases	2				2	2						
163	PCC	26PY6401T - PCTP - 3T	CO4	Understand the etiopathogenesis and pharmacotherapy of Renal system	2				2	2						
164	PCC	26PY6401T - PCTP - 3T	CO5	Understand the etiopathogenesis and pharmacotherapy of Oncology	2				2	2						
165	PCC	26PY6401T - PCTP - 3T	CO6	Understand the etiopathogenesis and pharmacotherapy of Dermatology	2				2	2						
166	PCC	26PY6402P - HP-P	CO1	Analyse and report different drug interactions in a given case study	3			3								
167	PCC	26PY6402P - HP-P	CO2	Prepare various parenteral formulations and powders.	3			3								
168	PCC	26PY6402P - HP-P	CO3	Analyse the case and answer the related drug information queries posted by healthcare professionals and patients	3			3								
169	PCC	26PY6402T - HP-T	CO1	Know the organizational structure and functions of a hospital	3											
170	PCC	26PY6402T - HP-T	CO2	Gain the knowledge on hospital drug policy	3											
171	PCC	26PY6402T - HP-T	CO3	Understand the hospital pharmacy services	3											
172	PCC	26PY6402T - HP-T	CO4	Know the manufacturing practices of various formulations in hospital set up	3											

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173	PCC	26PY6402T - HP-T	CO5	Understand the professional development programs	3											
174	PCC	26PY6402T - HP-T	CO6	Understand the practice-based research methods	3											
175	PCC	26PY6403P - CP-P	CO1	analyse the case and answer the related drug information queries posted by healthcare professionals and patients.						2						
176	PCC	26PY6403P - CP-P	CO2	analyse medication counselling of patients and laboratory investigations						2						
177	PCC	26PY6403P - CP-P	CO3	analyse conduct interview to elicit the patient past medication history and ADR analysis						2						
178	PCC	26PY6403T - CP-T	CO1	understand the role of a clinical pharmacist in a pharmacy		2										
179	PCC	26PY6403T - CP-T	CO2	understand the process of obtaining patients history and evaluation of drug therapy based on the history		2										
180	PCC	26PY6403T - CP-T	CO3	understand and gain the knowledge about various clinical laboratory tests to diagnose diseases.		2										
181	PCC	26PY6403T - CP-T	CO4	understand the working of drug and poison information center.		2										
182	PCC	26PY6403T - CP-T	CO5	understand the role of pharmacovigilance in ADR monitoring		2										
183	PCC	26PY6403T - CP-T	CO6	understand and gain the knowledge on communication skills for better interaction with patients		2										
184	PCC	26PY6404T - BSRM	CO1	Understand the concept of clinical study designs and case studies	3	3										

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185	PCC	26PY6404T - BSRM	CO2	Understand the methods used to determine the sample size for a study	3	3										
186	PCC	26PY6404T - BSRM	CO3	Understand the basic concepts of biostatistics	3	3										
187	PCC	26PY6404T - BSRM	CO4	Understand the basics of hypothesis testing	3	3										
188	PCC	26PY6404T - BSRM	CO5	Understand the statistical methods used in epidemiology	3	3										
189	PCC	26PY6404T - BSRM	CO6	Understand the computer applications in pharmacy	3	3										
190	PCC	26PY6405P - BPPK-P	CO1	Illustrate the in vitro drug release profile of different marketed products and Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs	3	3										
191	PCC	26PY6405P - BPPK-P	CO2	Demonstrate the bioavailability (absolute and relative) and bioequivalence from the given clinical data and Calculate the drug content in blood sample using Area Under Curve approach	3	3										
192	PCC	26PY6405P - BPPK-P	CO3	Interpret various pharmacokinetic parameters from the given clinical data and conduct planned experiments and prepare laboratory report in a standard format	3	3										
193	PCC	26PY6405T -	CO1	Understand the concepts of biopharmaceutics	2	2										
194	PCC	26PY6405T - BPPK-T	CO2	Understand the process of metabolism and excretion	2	2										
195	PCC	26PY6405T - BPPK-T	CO3	Understand the concept of pharmacokinetics with the use of one compartment open model.	2	2										
196	PCC	26PY6405T - BPPK-T	CO4	Understand the concept of pharmacokinetics with the use of multi compartment analysis	2	2										

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197	PCC	26PY6405T - BPPK-T	CO5	understand the Non-linear and non-compartmental kinetics	2	2										
198	PCC	26PY6405T - BPPK-T	CO6	Understand the concepts of bioavailability and bioequivalence	2	2										
199	PCC	26PY6406T - CT	CO1	Understand the mechanism of action of common poisons and antidotes	2	2										
200	PCC	26PY6406T - CT	CO2	Understand the concepts of Toxicokinetics	2	2										
201	PCC	26PY6406T - CT	CO3	Understand the etiology of acute poisoning and its management by various therapeutic agents	2	2										
202	PCC	26PY6406T - CT	CO4	Understand the etiology of chronic poisoning and its management by various therapeutic agents	2	2										
203	PCC	26PY6406T - CT	CO5	Understand the poisoning caused by plant and animal sources	2	2										
204	PCC	26PY6406T - CT	CO6	Understand the etiology and management of substance abuse	2	2										
205	PCC	26PY6501T - CR	CO1	Understand the various approaches for a new drug discovery		2		2								
206	PCC	26PY6501T - CR	CO2	Understand the principles and phases in clinical trial of drug		2		2								
207	PCC	26PY6501T - CR	CO3	Understand the various guidelines associated with clinical trials		2		2								
208	PCC	26PY6501T - CR	CO4	Understand the various regulatory requirements in India and other countries to conduct clinical trials		2		2								
209	PCC	26PY6501T - CR	CO5	Understand recognise differing roles and obligations of the Investigator, Sponsor and Institutional Review Board		2		2								

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
210	PCC	26PY6501T - CR	CO6	Understand the various documents associated with clinical trials		2		2								
211	PCC	26PY6502T - PE&PE	CO1	Understand the scope, need, origin and evaluation of Pharmacoepidemiology		2					2					
212	PCC	26PY6502T - PE&PE	CO2	understand the importance of Measurement of outcomes in Pharmacoepidemiology		2					2					
213	PCC	26PY6502T - PE&PE	CO3	understand the method for measuring the outcome of Pharmacoepidemiology for a disease		2					2					
214	PCC	26PY6502T - PE&PE	CO4	understand the appropriate Pharmaco-epidemiological method for a given drug and address the risks associated with Pharmaco-epidemiological study		2					2					
215	PCC	26PY6502T - PE&PE	CO5	Understand the basic principles, role and relevance of Pharmacoeconomics in the development of a new drug		2					2					
216	PCC	26PY6502T - PE&PE	CO6	understand and justify an appropriate evaluation method for Pharmacoeconomics study of a disease		2					2					
217	PCC	26PY6503T - CP-PDM	CO1	Discuss the pharmacokinetic principles to individualize drug therapy in patient care situations	3	3										
218	PCC	26PY6503T - CP-PDM	CO2	Understand the methods to calculate various dosage regimens	3	3										
219	PCC	26PY6503T - CP-PDM	CO3	Understand the principles of pharmacokinetics to analyse and predict drug interactions	3	3										
220	PCC	26PY6503T - CP-PDM	CO4	Understand the concepts of therapeutic drug monitoring	3	3										

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
221	PCC	26PY6503T - CP-PDM	CO5	Understand the dose adjustment in renal and hepatic disorders	3	3										
222	PCC	26PY6503T - CP-PDM	CO6	Understand the concepts of population pharmacokinetics	3	3										
223	PCC	26PY650N4 - CS	CO1	Understand the role of Pharmacist in clinical pharmacy services		2								3		3
224	PCC	26PY650N4 - CS	CO2	Applying the skills of a clinical Pharmacist				3						3		3
225	PCC	26PY650N4 - CS	CO3	Understand the available therapeutic options in the management of diseases		2								3		3
226	PCC	26PY650N4 - CS	CO4	Understand and prepare a pharmaceutical care plan for a given case		2								3		3
227	PCC	26PY650N4 - CS	CO5	analyse the case and report medication errors				3						3		3
228	PCC	26PY650N4 - CS	CO6	analyse the case and report drug interactions				3						3		3
229	PCC	26PY660N1 - ITS	CO1	To apply the acquired proficiency of knowledge on each case management and involve in patient care	3	3				2					3	
230	PCC	26PY660N1 - ITS	CO2	To apply the competency and skills expected for providing Clinical Pharmacy Services	3	3				2					3	
231	PCC	26PY660N1 - ITS	CO3	Make advantage of health care specialists and participate in conversations and research related to patient care	3	3				2					3	
232	PRI	26PY650E5 - PW	CO1	Appyl & Address a problem related to Pharmacy practice in hospital, community service or clinical set up with a wider perspective and generality		3		3					3		3	
233	PRI	26PY650E5 - PW	CO2	Apply & address and translate the problem into a statement of aim,		3		3					3		3	

S#	Cat	Course	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
234	PRI	26PY650E5 - PW	CO3	Apply objectives, scope and plan for the project		3		3					3		3	
235	PRI	26PY650E5 - PW	CO4	Apply & Preparation of report an information survey and take account of findings in executing project		3		3					3		3	
236	PRI	26PY650E5 - PW	CO5	Apply relevant theories and techniques from the full range of courses studied using conceptual models and frameworks to enhance depth of understanding		3		3					3		3	
237	PRI	26PY650E5 - PW	CO6	Apply & Select appropriate methodology for investigative work, taking into account the pros and cons of the alternatives available and develop solution proposals based on reasoned judgement		3		3					3		3	
					2.4	2.4	3	2.4	2.5	2.4	2	2.5	2.5	3	3	3



Y26: Pharm. D

Category: Basic Science Courses (BSC)

26PY610B6P - REMEDIAL BIOLOGY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY610B6P	REMEDIAL BIOLOGY-P	RBP	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Applications of the Organisation of plants, plant tissues and plant kingdom and application of biological principles in study of plant kingdom	3	PO1
CO2	Application of biological principles in studying morphology and plant physiology	3	PO1
CO3	Application of biological principles in study of taxonomy, microorganisms, animals and other poisonous animals.	3	PO1

Syllabus

1. Introduction to experiments in biology: a) Study of Microscope b) Section cutting techniques; c) Mounting and staining d) Permanent slide preparation 2. Study of cell and its inclusions 3. Study of mitochondria and golgi apparatus 4. Study of Stem modifications 5. Study of root modifications 6. Study of leaf modifications 7. Identification of fruits 8. Identification of seeds 9. Study of transverse section of Ephedra 10. Study of transverse section of acacia

1. Study of transverse section of ephedra 2. Study of transverse section of podophyllum 3. Study of plant transpiration 4. Study of photosynthesis 5. Study of pollen germination 6. Study of plant population density by quadrat method

1. Different types of bones 2. Detailed study of frog 3. Study of frogs digestive system 4. Study of frogs nervous system 5. Study of frogs reproductive system 6. Study of frogs circulatory system 7. Study of computer based tutorials 8. Action on salivary amylase on starch 9. Study of plasmolysis 10. Study of distribution of stomata 11. Study of osmosis

Reference Books

1 A Text book of Biology , S. B. Gokhale (Author), Dr. M. G. Kalaskar (Author), Dr. Y. A. Kulkarni (Author), 2nd edition,2019, Nirali Prakashan.

2 A Text book of Biology, Dr. Thulajappa and Dr. Seetaram, 2nd edition, June 1, 2015, Cengage Learning India Private Limited; 2nd edition.

3 A Text book of Biology, Naidu and Murthy, 1st edition,1988, Bangalore Prakasha Sahithya 1988.

4 A Text book of Biology, B.V. Sreenivasa Naidu, 1st edition,1988, Bangalore Prakasha Sahithya.

26PY610B6T - REMEDIAL BIOLOGY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY610B6T	REMEDIAL BIOLOGY-T	RBT	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the classification and salient features of plant kingdoms	2	PO1
CO2	Understand the plants morphology and salient features of the plants	2	PO1
CO3	Understand the taxonomy of plants, fruits and seeds	2	PO1
CO4	Understand the plant physiology and study of different microorganisms	2	PO1
CO5	Understanding the anatomy of frog	2	PO1
CO6	understand the knowledge on general organization of mammals	2	PO1

Syllabus

Introduction General organization of plants and its inclusions Plant tissues Plant kingdom and its classification includes all multicellular, photosynthetic organisms. These organisms are primarily autotrophic, using chlorophyll to convert sunlight into energy through photosynthesis. Plants play a crucial role in the Earth\'s ecosystems, producing oxygen and serving as the base of food chains.

Morphology of plants Root, Stem, Leaf and Its modifications Inflorescence and Pollination of flowers Morphology of fruits and seeds

Plant physiology Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliaceae, Zinziberaceae, Rubiaceae , Comparative Anatomy and Morphology: the structural differences and similarities among plant species, linking form to function and evolutionary adaptations. Ecological Interactions: how plants interact with their environment, including mutualistic relationships, competition, and the impact of abiotic factors on plant physiology and distribution.

Study of Fungi, Yeast, Penicillin and Bacteria, Study of Animal cell, Study animal tissues,Structure and classification of epithelial tissues (simple vs. stratified, squamous, cuboidal, columnar). Functions and examples of epithelial tissues in various organs.

Detailed study of frog and its Physiological functions, Overview of frog species, habitats, and biological classification. Importance of frogs in the ecosystem as indicators of environmental health.

Study of Pisces, Raptiles, Aves, Genearal organization of mammals, Study of poisonous animals

Reference Books

1 A Text book of Biology, S. B. Gokhale (Author), Dr. M. G. Kalaskar (Author), Dr. Y. A. Kulkarni (Author), 2nd edition,2019, Nirali Prakashan.

2 A Text book of Biology, Dr. Thulajappa and Dr. Seetaram, 2nd edition,June 1, 2015, Cengage Learning India Private Limited; 2nd edition.

3 A Text book of Biology, Naidu and Murthy, 1st edition,1988, Bangalore Prakasha Sahithya 1988.

4 A Text book of Biology, B.V. Sreenivasa Naidu, 1st edition,1988, Bangalore Prakasha Sahithya.

26PY610M6T - REMEDIAL MATHEMATICS (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY610M6T	REMEDIAL MATHEMATICS	RMT	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Algebra : Determinants, Matrices Trigonometry : Sides and angles of a triangle, solution of triangles	3	PO1, PO2
CO2	Analytical Geometry:Points, Straight line, circle, parabola	2	PO1, PO2
CO3	Differential calculus and Partial differentiation	3	PO1, PO2
CO4	ntegral Calculus:	3	PO1, PO2
CO5	Differential equations	3	PO1, PO2
CO6	Laplace transform	3	PO1, PO2

Syllabus

Algebra : Determinants, Matrices >Trigonometry : Sides and angles of a triangle, solution of triangles

Analytical Geometry :Points, Straight line, circle, parabola >Differential calculus: Limit of a function, Differential calculus, Differentiation of a sum

Differential calculus - Limit of a function, Differential calculus, Differentiation of a sum, Product, Quotient Composite, Parametric, exponential, trigonometric and Logarithmic function. Successive differentiation, Leibnitz theorem, Partial differentiation, Euler theorem on homogeneous functions of two variables

Integral Calculus: Definite integrals, integration by substitution and by parts, Properties of definite integrals.

Differential equations: Definition, order, degree, variable separable, homogeneous, Linear, heterogeneous, linear, differential equation with constant coefficient, simultaneous linear equation of second order.

Laplace transform: Definition, Laplace transform of elementary functions, Properties of linearity and shifting.

Reference Books

1 Higher Engineering Mathematics b, Dr.B.S.Grewal, 10, Khannan.

2 Integral Calculus S, hanthinarayan , 2005 , Schand.

3 Pharmaceutical Mathematics with application , Panchaksharappa Gowda D.H, 4, SChand.

4 Differential Calculus, D H Panchaksharappa Gowda, 5, Schand.



Y26: Pharm. D

Category: Professional Core Courses (PCC)

26PY6101P - HUMAN ANATOMY AND PHYSIOLOGY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6101P	HUMAN ANATOMY AND PHYSIOLOGY-P	HAP-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Application of gross morphology of body organs using microscope and Determining blood cell count Determining ESR, Blood Haemoglobin and Bleeding time	3	PO1, PO4
CO2	Determination of Blood pressure and Blood group Identifying various Parts of Skeletal, Cardiovascular, Respiratory, Digestive, Urinary systems with models, charts & Specimens	3	PO1, PO4
CO3	Identifying various Parts of Nervous, Special senses, Reproductive systems with models, charts & Specimens Recording the muscle curves in different conditions using sciatic nerve preparation	3	PO1, PO4

Syllabus

Study of tissues of human body Epithelial tissue. Muscular tissue. Study of tissues of human body Connective tissue. Nervous tissue. Determination of W.B.C. count of blood. Determination of R.B.C. count of blood. Determination of differential count of blood Determination of Erythrocyte Sedimentation Rate. Determination of Hemoglobin content of Blood. Determination of Bleeding time & Clotting time Respiratory system

Determination of Blood Pressure. Determination of Blood group. Skeleton system part I-axial skeleton with the help of charts, models & specimens. Skeleton system part II- appendicular skeleton with the help of charts, models & specimens. Cardiovascular system with the help of charts, models & specimens. Respiratory system with the help of charts, models & specimens. Digestive system with the help of charts, models & specimens. Urinary system with the help of charts, models & specimens.

Nervous system with the help of charts, models & specimens. Special senses with the help of charts, models & specimens. Reproductive system with the help of charts, models & specimens. Study of different family planning appliances. To perform pregnancy diagnosis test. Study of appliances used in experimental physiology. To record simple muscle curve using gastroenemius sciatic nerve preparation. To record simple summation curve using gastroenemius sciatic nerve preparation. To record simple effect of temperature using gastroenemius sciatic nerve preparation. To record simple effect of load & after load using gastroenemius sciatic nerve preparation.

Reference Books

1 Text book of Medical Physiology, Arthur C, Guyton and John E. Hall, 14th (2020), Elsevier.

2 Physiological basis of Medical Practice, Best and Tailor, 13th (2019), Wolters Kluwer India Pvt..

3 Principles of Anatomy and Physiology, Tortora Grabowski, 15th (2017), Wiley.

4 Anatomy and Physiology in Health and Illness, Kathleen J.W. Wilson, 13th (2018), Elsevier.

26PY6101T - HUMAN ANATOMY AND PHYSIOLOGY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6101T	HUMAN ANATOMY AND PHYSIOLOGY-T	HAP-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the cellular level and tissue level of organization in the human body, Process of blood cell, Lymph formation and their importance in body physiology	2	PO1, PO4
CO2	Understand the gross anatomy and functions of organs involved in circulatory and respiration	2	PO1, PO4
CO3	Understand the process of digestion, and Anatomical location, physiological functions of human nervous system	2	PO1, PO4
CO4	Understand and acquire the knowledge on endocrinal hormones and Physiology of excretory organs.	2	PO1, PO4
CO5	Understand and summarise the Anatomy and functions of special sense organs, and understand the process of reproduction	2	PO1, PO4
CO6	Understand and elaborate the skeletal system of humans and sports physiology	2	PO1, PO4

Syllabus

Scope of anatomy and physiology basic terminologies used in this subject Description of the body as such planes and terminologies Structure of cell its components and their functions. Elementary tissues of the human body epithelial connective Muscular and nervous tissues their subtypes and characteristics Haemopoietic System a. Composition and functions of blood b. Hemopoiesis and disorders of blood components definition of disorder c. Blood groups d. Clotting factors and mechanism Platelets and disorders of coagulation Lymph a. Lymph and lymphatic system composition formation and circulation. b. Spleen structure and functions Disorders c. Disorders of lymphatic system definition only

Cardiovascular system a. Anatomy and functions of heart b. Blood vessels and circulation Pulmonary coronary and systemic circulation c. Electrocardiogram ECG d. Cardiac cycle and heart sounds e. Blood pressure its maintenance and regulation Definition of the following disorders Hypertension Hypotension Arteriosclerosis Atherosclerosis Angina Myocardial infarction Congestive heart failure Cardiac arrhythmias Respiratory system a. Anatomy of respiratory organs and functions b. Mechanism physiology of respiration and regulation of respiration c. Transport of respiratory gases d. Respiratory volumes and capacities and Definition of Hypoxia Asphyxia Dybarism Oxygen therapy and resuscitation.

Digestive system a. Anatomy and physiology of GIT b. Anatomy and functions of accessory glands of GIT c. Digestion and absorption Disorders of GIT definitions only Nervous system a. Definition and classification of nervous system b. Anatomy physiology and functional areas of cerebrum c. Anatomy and physiology of cerebellum d. Anatomy and physiology of mid brain e. Thalamus hypothalamus and Basal Ganglia f. Spinal card Structure and reflexes mono poly planter g. Cranial nerves names and functions ANS Anatomy functions of sympathetic and parasympathetic N.S

Urinary system a. Anatomy and physiology of urinary system b. Formation of urine c. Renin Angiotensin system Juxtaglomerular apparatus acid base Balance Clearance tests and micturition Endocrine system a. Pituitary gland b. Adrenal gland c. Thyroid and Parathyroid glands d. Pancreas and gonads

Reproductive system a. Male and female reproductive system b. Their hormones Physiology of menstruation c. Spermatogenesis and Oogenesis d. Sex determination genetic basis e. Pregnancy and maintenance and parturition Sense organs a. Eye b. Ear c. Skin d. Tongue e. Nose

Osseous system structure, composition and functions of the Skeleton. Classification of joints, Types of movements of joints, and disorders of joints Definitions only Skeletal muscles a. Histology b. Physiology of Muscle contraction Physiological properties of skeletal muscle and their disorders definitions Sports physiology. a. Muscles in exercise, Effect of athletic training on muscles and muscle performance, b. Respiration in exercise, CVS in exercise, Body heat in exercise, Body fluids and salts in exercise, Drugs and athletics

Reference Books

1 Text book of Medical Physiology, Arthur C, Guyton and John E. Hall, 14th (2020), Elsevier.

2 Physiological basis of Medical Practice, Best and Tailor, 13th (1983), Wolters Kluwer India Pvt..

3 Principles of Anatomy and Physiology, Tortora Grabowski, 16th (2021), Wiley.

4 Anatomy and Physiology in Health and Illness, Kathleen J.W. Wilson, 14th (2020), Elsevier.

26PY6102P - PHARMACEUTICS-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6102P	PHARMACEUTICS-P	PC-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Know the preparation of Syrups, elixirs and linctus, Preparation of Solutions and liniments	2	PO1
CO2	Know the preparation of lotions and emulsions, Preparation of Powders and Suppositories	2	PO1
CO3	Know the preparation of Incompatibilities, Preparation of ear drops and pastes	2	PO1

Syllabus

Simple Syrup IP Syrup of ferrous Phosphate IP Orange syrup Piperazine Citrate Elixir BP Paracetamol Elixir BPC Simple linctus BPC Terpin Hydrate Linctus IP Solution of cresol with soap IP Strong solution of ferric chloride BPC Aqueous iodine solution IP Strong solution of iodine IP Strong solution of ammonium acetate IP

Liniments of turpentine IP Liniments of camphor IP Calamine lotion Magnesium hydroxide mixture BP Caster oil emulsion Liquid paraffin emulsion ORS powder IP Dusting powder USP Insufflations Boric acid suppositories

Mixture of Magnesium Carbonate Sodium Bicarbonate &Citric Acid Alkaloldal Salt with Alkaline Substance Phenol Glycerine throat paint Sodium bicarbonate Ear drops Zinc oxide Paste

Reference Books

1 Remington. Essentials of pharmaceutics , Alfonso R , 2020, John Wiley & Sons Australia, Limited .

2 Pharmaceutical Dosage Form and Drug Delivery System , H.C. Ansel , 2018, Wolters Kluwer Health, Baltimore .

3 Theory and Practice of Industrial Pharmacy , Lachmann , 2020, Lea & Febiger Publisher .

4 Pharmaceutical dosage forms - Tablets, volume 1 -3 , Larry L Augsburger, Stephen W Hoag , 2006, Informa Healthcare .

26PY6102T - PHARMACEUTICS-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6102T	PHARMACEUTICS-T	PC-T	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the different dosage forms, History of Pharmacy and pharmacopoeias	2	PO1
CO2	Understand the different dosage forms, History of Pharmacy and pharmacopoeias	2	PO1
CO3	Understand the preparation of Monophasic liquid dosage forms	2	PO1
CO4	understand the biphasic liquid dosage forms	2	PO1
CO5	understand the concepts of suppositories and Gelanicals	2	PO1
CO6	Understand the principles of Surgical aids and incompatibilities	2	PO1

Syllabus

Introduction to dosage forms - classification and definitions. Prescription: definition, parts and handling. Posology: Definition, Factors affecting dose selection. Calculation of children and infant doses. History of Pharmacy: Historical back ground and development of profession of pharmacy and pharmaceutical industry in brief. Development of Indian Pharmacopoeia and introduction to other Pharmacopoeias such asBP, USP, European Pharmacopoeia, Extra pharmacopoeia and Indian national formulary

Pharmaceutical calculations. Weights and measures- Imperial and Metric system, Calculations involving percentage solutions, allegation, proof spirit and isotonic solutions based on freezing point and molecular weight. Powders and Granules- Classification advantages and disadvantages, Preparation of simple, compound powders, Insufflations, Dusting powders, Eutectic and Explosive powders, Tooth powder and effervescent powders and granules.

Monophasic liquids: Theoretical aspects of formulation including adjuvant like stabilizers, colorants, flavors with examples. Study of Monophasic liquids like gargles, mouth washes, Throat paint, Ear drops, Nasal drops, Liniments and lotions, Enemas and collodions.

Biphasic dosage forms: Suspensions and emulsions, Definition, advantages and disadvantages, classification, test for the type of emulsion, formulation, stability and evaluation.

Suppositories and pessaries: Definition, advantages and disadvantages, types of bases, method of preparation, Displacement value and evaluation. Galenical: Definition, equipment for different extraction processes like infusion, Decoction, Maceration and Percolation, methods of preparation of spirits, tinctures and extracts.

Surgical aids: Surgical dressings, absorbable gelatin sponge, sutures, ligatures and medicated bandages. Incompatibilities: Introduction, classification and methods to overcome the incompatibilities.

Reference Books

1. Pharmaceutical Dosage Form and Drug Delivery System, , H.C. Ansel et al.,, 2018, Lippincott Williams and Walkins, New Delhi. .
2. Cooper and Gunns-Dispensing for Pharmaceutical Students, , Carter S.J., , 2012, CBS publishers, New Delhi. .
3. Theory and Practice of Industrial Pharmacy, , Lachmann., 2022, Lea and Febiger Publisher, The University of Michigan. .
4. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) , Adeboye Adejare , 2020, Elsevier Academic Press .

26PY6103P - MEDICINAL BIOCHEMISTRY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6103P	MEDICINAL BIOCHEMISTRY-P	MBC-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Analyse the catalytic activity of enzymes and importance of isoenzymes in diagnosis of disease and role of carbohydrates and their metabolic disorders	3	PO1, PO4
CO2	Analyse the role of carbohydrates and their metabolic disorders and biological oxidation process in body ,Understand the liver and lipid profile tests	3	PO1, PO4
CO3	Anlayse the concepts of proteins, amino acids and genetic organization in mammalians ,Understand the clinical chemistry of cell and kidney function tests	3	PO1, PO4

Syllabus

Qualitative analysis of normal constituents of urine. 2. Qualitative analysis of abnormal constituents of urine. 3. Quantitative estimation of urine sugar by Benedicts reagent method.

Quantitative estimation of urine chlorides by Volhards method. Quantitative estimation of urine calcium by precipitation method. Preparation of Folin Wu filtrate from blood.Quantitative estimation of urine creatinine by Jaffes method. 13. Experiment on lipid profile tests 14. Determination of Glucose by means of Glucoseoxidase.

Quantitative estimation of blood creatinine. 8. Quantitative estimation of blood sugar Folin Wu tube method.Estimation of SGOT in serum. 10. Estimation of SGPT in serum. 11. Determination of serum bilirubin

Reference Books

1 Principles of biochemistry , Lehninger, 8th ed. 2021, W.H.Freeman & Co Ltd.

2 Textbook Of Biochemistry, Ramarao, 9, 2022, UBS Publishers' Distributors Ltd.

3 Practical Biochemistry, David T.Plummer, 3, 2006, McGraw Hill Education.

4 Harpers Illustrated Biochemistry, W Rodwell David A Bender, 8, 2011, McGraw Hill.

26PY6103T - MEDICINAL BIOCHEMISTRY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6103T	MEDICINAL BIOCHEMISTRY-T	MBC-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the catalytic activity of enzymes and importance of isoenzymes indiagnosis of disease	2	PO1, PO4, PO9
CO2	Understand the metabolic process biomolecules in health and illness (metabolicdisorders)	2	PO1, PO4, PO9
CO3	Understand the concepts of t h e genetic organization of mammalian genome; protein synthesis, replication, mutation and repair mechanism	2	PO1, PO4, PO9
CO4	Understand the biochemical principles of organ function tests of kidney, liver andendocrine gland	2	PO1, PO4, PO9
CO5	Understand the principles, significance and methods of different biochemical tests	2	PO1, PO4, PO9
CO6	Understand the Immunochemical techniques for determination of hormone levels and protein levels in serum	2	PO1, PO4, PO9

Syllabus

Introduction to biochemistry- Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance. Enzymes- Definition- Nomenclature; IUB classification. Factor affecting enzyme activity, Enzyme action, enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications,Coenzymes and their biochemical role and deficiency diseases.

Carbohydrate metabolism-Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases) Glucose, Galactose tolerance test and their significance, hormonal regulation of carbohydrate metabolism. Lipid metabolism- Oxidation of saturated (-oxidation), Ketogenesis and ketolysis, biosynthesis of fatty acids, lipids, metabolism of cholesterol, Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atheroslerosis, fatty liver, hypercholesterolmiea).

Biological oxidation- Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture, regulation and inhibition) Uncouplers of ETC, Oxidative phosphorylation, Protein and amino acid metabolism- protein turn over, nitrogen balance, Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders, production of bile pigments, hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.

Nucleic acid metabolism- Metabolism of purine and pyrimidine nucleotides, Protein synthesis, Genetic code, inhibition of protein synthesis, mutation and repair mechanism, DNA replication (semiconservative ,onion peel models) and DNA repair mechanism. Introduction to clinical chemistry- Cell, composition, malfunction, Roll of the clinical chemistry laboratory. The kidney function tests- Role of kidney, Laboratory tests for normal function includes a. Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.) b. Test for NPN constituents. (Creatinine ,urea clearance, determination of blood and urine creatinine, urea and uric acid)c. Urine concentration test d. Urinary tract calculi. (stones)

Liver function tests- Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation. a. Test for hepatic dysfunction-Bile pigments metabolism. b. Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen. c. Dye tests of excretory function. d. Tests based upon abnormalities of serum proteins. Selected enzyme tests

Lipid profile tests- Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. Immunochemical techniques for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases. Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA). Electrolytes- Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium, potassium, chlorides, bicarbonates in the body fluids.

Reference Books

1 Principles of biochemistry, Lehninger, 8, 2011, WH Freeman.

2 Textbook of Biochemistry, RamaRao, 9, 2002, UBS Publishers' Distributors Pvt. Ltd..

3 An Introduction to Practical Biochemistry, David Plummer , 3, 2011, McGraw Hill Education.

4 https://www.mooc-list.com/course/drug-discovery-medicinal-chemistry-edx, David L Nelson and Michael M Cox , 6, 2005, W H Freeman.

26PY6104P - PHARMACEUTICAL ORGANIC CHEMISTRY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6104P	PHARMACEUTICAL ORGANIC CHEMISTRY-P	POC-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Applying the knowledge to Synthesize organic compounds by acetylation, benzoylation, bromination, condensation, diazotisation and coupling and hydrolysis methods.	3	PO1
CO2	Applying the knowledge to Synthesize organic compounds by nitration reactions, oxidation, reduction and miscellaneous reactions methods	3	PO1
CO3	Acquiring knowledge to Identify Phenols, amides, carbohydrates, amines, Carboxylic acids, aldehyde, ketones, alcohols, Carboxylic acids, aldehyde, ketones and alcohols Esters, hydrocarbons, anilides and nitro compounds	3	PO1

Syllabus

Introduction to the various laboratory techniques through demonstration involving synthesis of the actylation, benzoylation and bromination reactions. 1. Acetanilde or aspirin by Acetylation, 2. Benzanilide or Phenyl benzoate by Benzoylation, 3. para bromo acetanilide or 2,4,6 tribromo aniline by Bromination, 4. Dibenzylidene acetone by Condensation, 5. 1 Phenylazo 2 napthol by Diazotisation and coupling, 6. Benzoic acid or salicylic acid by Hydrolysis of ester

Introduction to the various laboratory techniques through demonstration involving synthesis of the condensation, diazotization and coupling and hydrolysis reactions 1. Preparation of benzoic acid from toluene or benzaldehyde 2. meta phenylene diamine by Reduction of meta dinitrobenzene or Aniline from nitrobenzene 3. meta dinitro benzene by Nitration 4. Benzophenone oxime 5. Nitration of salicylic acid 6. Preparation of picric acid 7. Preparation of ortho chlorobenzoic acid from ortho chlorotolune

Identification of organic compounds belonging to the following classes by systematic qualitative organic analysis including preparation of derivatives like Phenols, Amides, Carbohydrates. Amines. Carboxylic acids, Aldehyde, Ketones, Alcohols, Esters, Hydrocarbons, Anilides and Nitro compounds

Reference Books

1 Elementary Practical Organic Chemistry, Vogel A.I., 2nd edition (2010), CBS.

2 A Small Scale Approach to Organic Laboratory Techniques, Donald, LP. Lampman, GM. Kriz, GS. Engel, RG., 4th edition (2016), Saunders College Publishers.

3 Practical Organic Chemistry, Mann, FG. Saunders, B.C., 4th edition (2009), Orient Longman Limited.

4 Textbook of Practical Organic Chemistry, Vogel, A. I. and Furniss, B.S., 5th edition (2003), Pearson.

26PY6104T - PHARMACEUTICAL ORGANIC CHEMISTRY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6104T	PHARMACEUTICAL ORGANIC CHEMISTRY-T	POC-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the IUPAC/Common system of nomenclature of simple organic compounds	2	PO1
CO2	To understand the organic reactions, reactivity, stability, mechanisms involved in aliphatic and alicyclic compounds	2	PO1
CO3	To understand the free radical addition and the theory of resonance	2	PO1
CO4	To understand the nucleophilic & electrophilic aromatic substitution reactions, reactivity and orientation	2	PO1
CO5	To understand the named organic reactions with mechanisms and Interpret oxidation and reduction reactions	3	PO1
CO6	To understand the preparation, test for purity, assay and medicinal uses of official compounds	3	PO1

Syllabus

Structures and Physical properties: Polarity of bonds, polarity of molecules, M.P, Inter molecular forces, B.P, Solubility, non-ionic solutes and ionic solutes, protic and aprotic Solvents, ion pairs. Acids and bases, Lowry bronsted and Lewis theories Isomerism. Nomenclature of organic compound belonging to the following classes Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, A Sem-ines, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes.

Nucleophilic aliphatic substitution mechanism: Nucleophiles and leaving groups, kinetics of second and first order reaction, mechanism and kinetics of SN2 reactions. Stereochemistry and steric hindrance, role of solvents, phase transfer catalysis, mechanism and kinetics of SN1 reactions, stereochemistry, carbocation and their stability, rearrangement of carbocation, role of solvents in SN1 reaction, Ion dipole bonds, SN2 versus SN1 solvolyses, nucleophilic assistance by the solvents. Dehydro halogenation of alkyl halides: 1,2 elimination, kinetics, E2 and E1 mechanism, elimination via carbocation, evidence for E2 mechanism, absence of rearrangement isotope effect, absence hydrogen exchange, the element effect, orientation and reactivity, E2 versus E1, elimination versus substitution, dehydration of alcohol, ease of dehydration, acid catalysis, reversibility, orientation. Free radicals chain reactions of alkane: Mechanism, relative reactivity and stability. Alicyclic compounds: Preparations of cyclo alkanes, Bayer strain theory and orbital picture of angle strain.

Electrophilic and free radicals addition: Reactions at carbon-carbon, double bond, electrophile, hydrogenation, heat of hydrogenation and stability of alkenes, markownikoff rule, addition of hydrogen halides, addition of hydrogen broSem-ines, peroxide effect, electrophillic addition, mechanism, rearrangement, absence of hydrogen exchange, orientation and reactivity, addition of halogen, mechanism, halohydin formation, mechanism of free radicals addition, mechanism of peroxide initiated addition of hydrogen broSem-ine, orientation of free addition, additions of carbene to alkene, cyclo addition reactions. Carbon-carbon double bond as substituents: Free radical halogenations of alkenes, comparison of free radical substitution with free radical addition, free radical substitution in alkenes, orientation and reactivity, allylic rearrangements. Theory of resonance: Allyl radical as a resonance hybrid, stability, orbital picture, resonance stabilisation of allyl radicals, hyper conjugation, allyl cation as a resonance hybrid, nucleophyllic substitution in allylic substrate, SN1 reactivity, allylic rearrangement, resonance stabilisation of allyl cation, hyper conjugation, nucleophilic substitution in allylic substrate, SN2 nucleophilic substitution in vinylic substrate, vinylic cation, stability of conjugated dienes, resonance in alkenes, hyper conjugation, ease of formation of conjugated dienes, orientation of elimination, electrophilic addition to conjugated dienes, 1,4- addition, 74 1,2-versus 1,4-addition, rate versus equilibrium, orientation and reactivity of free radical addition to conjugated dienes.

Electrophilic aromatic substitution: Effect of substituent groups, determination of orientation, determination of relative reactivity, classification of substituent group, mechanism of nitration, sulphonation, halogenation, friedel craft alkylation, friedel craft acylation, reactivity and orientation, activating and deactivating O,P,M directing groups, electron release via resonance, effect of halogen on electrophilic aromatic substitution in alkyl benzene, side chain halogination of alkyl benzene, resonance stabilization of benzyl radical. Nucleophilic addition reaction: Mechanism, ionisation of carboxylic acids, acidity constants, acidity of acids, structure of carboxylate ions, effect of substituent on acidity, nucleophilic acyl substitution reaction, conversion of acid-to-acid chloride, esters, amide and anhydride. Role of caboxyl group, comparison of alkyl nucleophilic substitution with acyl nucleophilic substitution. Nucleophilic aromatic substitution: Bimolecular displacement mechanisms, orientation, comparison of aliphatic nucleophilic substitution with that of aromatic.

Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation, perkin condensation. Knoevenagel, Reformatsky reaction, Wittig reaction, Michael addition. Hoffman rearrangement: Migration to electron deficient nitrogen, Sandmeyers reaction, basicity of amines, diazotisation and coupling, acidity of phenols, Williamson synthesis, Fries rearrangement, Kolbe reaction, Reimer tiemans reactions. Oxidation reduction reaction.

Study of the following official compounds- preparation, test for purity, assay and medicinal uses of Chlorbutol, Dimercaprol, Glyceryl trinitrate, Urea, Ethylene diamine dihyrate, Vanillin, Paraldehyde, Ethylene chloride, Lactic acid, Tartaric acid, citric acid, salicylic acid, aspirin, methyl salicylate, ethyl benzoate, benzyl benzoate, dimethyl pthalate, sodium lauryl sulphate, saccharin sodium, mephensin.

Reference Books

1 Organic chemistry, William H. Brown and Lawrence S. Brown, 6th edition (2011), Brooks/Cole.

2 A text book of organic chemistry, Arun Bahl, B.S. Bahl, 22nd ediiton (2019), S Chand & Co. Ltd.

3 March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Michael B. Smith, 8th edition (2020), Wiley.

4 Organic Chemistry, Morrison and Boyd, 7th edition (2010), Pearson.

5 Organic Chemistry, Pine, Stanley H.; Hendrickson, James B.; Cram, Donald J.; Hammond, George S, 5th edition (2006), McGraw-Hill Companies.

26PY6105P - PHARMACEUTICAL INORGANIC CHEMISTRY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6105P	PHARMACEUTICAL INORGANIC CHEMISTRY-P	PIC-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	To understand and test for identification of impurities and selected inorganic compounds	3	PO1, PO4
CO2	To apply Analyze the purity of selected inorganic compounds	3	PO1, PO4
CO3	To Analyze and Estimate the mixtures and preparation of selected organic compounds	4	PO1, PO4

Syllabus

Limit test for chlorides, Limit test for sulphates, Limit test for iron, Limit test for heavy metals, Limit test for arsenic, Modified limit tests for chlorides and sulphates. Test for identity Sodium bicarbonate, Barium sulphate, Ferrous sulphate, and Potassium chloride

Test for purity Swelling power in Bentonite Acid neutralising capacity in aluminium hydroxide gel, Ammonium salts in potash alum, Adsorption power heavy Kaolin and Presence of Iodates in KI.

Preparations Boric acids, Potash alum, Calcium lactate, and Magnesium sulphate

Reference Books

1 Practical Pharmaceutical chemistry Vol-I & Vol-II , AH. Beckett and J. B. Stanlakes , 6, Athlone London. .

2 Inorganic Pharmaceutical Chemistry, P. Gundu Rao , 3, Vallabh Publications .

3 Pharmaceutical Inorganic chemistry , Dr. B. G. Nagavi , 1, Pragati Books Pvt. Ltd .

4 Inorganic Pharmaceutical Chemistry , Anand & Chatwal , 1, Himalaya Pub.

26PY6105T - PHARMACEUTICAL INORGANIC CHEMISTRY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6105T	PHARMACEUTICAL INORGANIC CHEMISTRY-T	PIC-T	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Make Use of Analytical knowledge in identifying errors and concepts of indicators in volumetric analysis	2	PO1
CO2	Application of principles and procedures of analysis of drugs	3	PO1
CO3	Application of principle of limit tests in identifying the impurities	3	PO1
CO4	Understand the role of medicinal gases and drugs used to treat gastrointestinal diseases.	2	PO1
CO5	Understand the role of electrolyte replenishers and essential trace elements to maintain physiological balance & MOA of antimicrobials	2	PO1
CO6	Understand the importance of inorganic pharmaceuticals in preventing and curing the diseases	2	PO1

Syllabus

Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision, and significant figures Volumetric analysis: Classification of volumetric analytical techniques based on principle, Primary and secondary standards. Preparation and standardization of various molar and normal solutions Acid-base titrations: Classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves Theory of indicators: Theories of indicators used in acid-base, redox and Complexometric titrations

Redox titrations Concepts of oxidation and reduction, Types of redox titrations Principles and applications, Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate Nonaqueous titrations Solvents, Acidimetry and Alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl Precipitation titrations Mohrs method, Volhards, Modified Volhards, Fajans method, estimation of sodium chloride

Complexometric titrations Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. Gravimetry Principle and steps involved in gravimetric analysis. Purity of the precipitate coprecipitation and post precipitation, Estimation of barium sulphate Limit tests Principles involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate

Medicinal gases, Oxygen, carbon dioxide, Nitrogen, Helium, Nitrous oxide, Acidifiers, Ammonium chloride and Dil. HCl Antacids, Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate, Aluminium hydroxide gel, Magnesium hydroxide mixture Cathartics Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

Electrolyte replenishers, Functions of major physiological ions, Electrolytes used in the replacement therapy, Sodium chloride, Potassium chloride, Calcium gluconate and Oral Rehydration Salt (ORS), Physiological acid base balance. 79 Essential Trace elements, Importance of trace elements in human body physiology and homeostasis including zinc Zn, copper Cu, selenium Se, chromium Cr, cobalt Co, iodine I, manganese Mn, and molybdenum Mo. Antimicrobials, Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide, Chlorinated lime, Iodine and its preparations Pharmaceutical aids, Inorganic diluents, Disintegrants, colorants, Glidants used in pharmaceutical formulation

Dental Products, Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement Miscellaneous compounds, Expectorants, Potassium iodide, Ammonium chloride, Emetics Copper sulphate, Sodium potassium tartarate, Hematinics Ferrous sulphate, Ferrous gluconate, Poison and Antidote, Sodium thiosulphate, Activated charcoal, Sodium nitrite, Astringents, Zinc Sulphate, Potash Alum Radio Pharmaceuticals, Radio activity, Measurement of radioactivity, Properties of alpha, beta, gamma radiations, Half-life, radio isotopes and study of radio isotopes Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substance

Reference Books

1 A textbook Inorganic medicinal chemistry, Surendra N. Pandeya, 2005, S G Publisher.

2 Practical Pharmaceutical chemistry , A H Beckett and J B Stanlakes, 1988, Athlone, London.

3 Inorganic Pharmaceutical Chemistry , P. Gundu Rao, 2005, Vallabh Publications.

4 Inorganic Pharmaceutical Chemistry, Anand & Chatwal , 2010, Himalaya Pub .

5 Pharmaceutical Inorganic chemistry, Dr. B. G. Nagavi, 2008, Pragati Books Pvt. Ltd.

26PY6201T - PATHOPHYSIOLOGY (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6201T	PATHOPHYSIOLOGY	PATHO	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	understand the basic principles of cell injury, adaptations and inflammation	2	PO1
CO2	understand the pathophysiology of diseases related to immunity	2	PO5
CO3	understand the detailed pathogenesis of cancer	2	PO5
CO4	understand biological effects of radiation, environmental and nutritional diseases	2	PO5
CO5	understand pathophysiology of common diseases	2	PO5
CO6	understand pathogenesis of Infectious diseases	2	PO5

Syllabus

Basic principles of cell injury and Adaptation a) Causes, Pathogenesis and morphology of cell injury b) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen infiltration and glycogen infiltration and glycogen storage diseases Inflammation a) Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation b) Repairs of wounds in the skin, factors influencing healing of wounds

Diseases of Immunity a) Introduction to T and B cells b) MHC proteins or transplantation antigens c) Immune tolerance - Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs - Autoimmunity Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft. - Acquired immune deficiency syndrome (AIDS) - Amylodosis

Cancer: differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors, etiology and pathogenesis of cancer. Types of shock, mechanisms, stages and management.

Biological effects of radiation. Environmental and nutritional diseases i) Air pollution and smoking- SO2, NO, NO2, and CO ii) Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation.

Pathophysiology of common diseases a. Parkinsonism b. Schizophrenia c. Depression and mania d. Hypertension, e. Stroke (ischaemic and hemorrhage) f. Angina, CCF, Atherosclerosis, Myocardial infarction g. Diabetes Mellitus h. Peptic ulcer and inflammatory bowel diseases i. Cirrhosis and Alcoholic liver diseases j. Acute and chronic renal failure k. Asthma and chronic obstructive airway diseases

Infectious diseases : Sexually transmitted diseases (HIV, Syphilis, Gonorrhea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic), Hepatitis- infective hepatitis

Reference Books

1 Pathologic basis of disease, Cotran, Kumar, Robbins, 10th edition,2020, Elsevier.

2 Text book of Pathology, Harsh Mohan, 9th edition, 2015, Jaypee Brothers Medical Publishers.

3 Text book of Pathology, Y.M. Bhinde,Deodhare S.G., 2nd edition, 2008, Popular Prakashan Ltd.

4 Clinical Pharmacy and Therapeutics, Roger Walker, 2nd edition,2011, Churchill Livingstone publication.

26PY6202P - PHARMACEUTICAL MICROBIOLOGY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6202P	PHARMACEUTICAL MICROBIOLOGY-P	PMB-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Examine and Analyze various culture media for the growth of microorganisms, Identify and isolate bacteria	4	PO1, PO4, PO6
CO2	Examine and analyse aseptic procedures, Carrying out sterilization and sterility testing of pharmaceuticals	4	PO1, PO4, PO6
CO3	Test for antimicrobials and determine the MIC of antimicrobial agents,Conduct planned experiments and prepare laboratory report in a standard format	4	PO1, PO4, PO6

Syllabus

Equipments used in experimental microbiology, to perform sterilization of glassware and preparation and sterilization of culture media,To perform bacteria and fungi subculturing, applying the staining techniques of bacteria

Sterilization techniques and isolation of Pure Cultures, demonstration of bacterial motility, Enumeration of micro-organisms Total and Viable count,Applying the knowledge of biochemical tests in identifying microbes, culture sensitivity tests of microbes and sterility testing for powders and liquids

Minimum inhibitory concentration assays, perform microbiological assay of vitamins and antibiotics, milk, To perform the bacteriological analysis of water, determination of RWC for disinfectant, diagnostic tests of Cholera, Typhoid, and Malaria

Reference Books

1 Microbiology , Prescot L.M., Jarley G.P Klein D.A , 2nd Edition (2007), Mc Graw Hill Company Inc. .

2 Practical Microbiology , Brian J. Tindall and Michael J. Goodfellow , 5th Edition (2013), Wiley- Blackwell .

3 Laboratory Manual for Microbiology, Gerard J. Tortora, Berdell R. Funke, Christine L. Case , 12th Edition (2014), Pearson .

4 Microbiology: A Practical Approach , Colin R. Harwood and Michael J. Wilson , 8th Edition (2004), Wiley-Blackwell.

5 Microbiology: Experiments in Microbiology, Plant Pathology, and Biotechnology , R.P. Singh and P.K. Sharma , 9th Edition (2022), Pearson Education India .

26PY6202T - PHARMACEUTICAL MICROBIOLOGY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6202T	PHARMACEUTICAL MICROBIOLOGY-T	PMB-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand methods of identification, classification and relationship among various microorganisms	2	PO1, PO4
CO2	Understand nutritional requirements, isolation identification cultivation and preservation of various microorganisms	2	PO1, PO4
CO3	Understand the importance and implementation of sterilization in pharmaceutical processing and industry and learn disinfectants, procedures of disinfection for pharmaceutical products.	2	PO1, PO4
CO4	Understand of Immunology concepts, Antigen-Antibody reactions, and immunization programs	2	PO1, PO4
CO5	Understanding of different diagnostic tests in microbiology including Elisa, Western Blot test, and PCR etc.	2	PO1, PO4
CO6	Understand the diagnostic tests, microbial assays and infectious diseases	2	PO1, PO4

Syllabus

Introduction to the science of microbiology. Major divisions of microbial world and Relationship among them. Different methods of classification of microbes and study of Bacteria, Fungi, virus, Rickettsiae, Spirochetes.

Nutritional requirements, growth and cultivation of bacteria and virus. Study of different important media required for the growth of aerobic and anaerobic bacteria & fungi. Differential media, enriched media and selective media, maintenance of lab cultures. Different methods used in isolation and identification of bacteria with emphasis to different staining techniques and biochemical reactions. Counting of bacteria -Total and Viable counting techniques.

Detailed study of different methods of sterilization including their merits and demerits. Sterilization methods for all pharmaceutical products. Detailed study of sterility testing of different pharmaceutical preparations. Brief information on Validation. Disinfectants- Study of disinfectants, antiseptics, fungicidal and virucidal agents factors affecting their activation and mechanism of action. Evaluation of bactericidal, bacteristatic, virucidal activities, evaluation of preservatives in pharmaceutical preparations.

Immunology- Immunity, Definition, Classification, General principles of natural immunity, Phagocytosis, acquired immunity (active and passive). Antigens, chemical nature of antigens structure and formation of Antibodies, Antigen-Antibody reactions. Bacterial exotoxins and endotoxins. Significance of toxoids in active immunity, Immunization programme, and importance of booster dose.

Diagnostic tests Schicks Test, Elisa test, Western Blot test, Southern Blot PCR Widal, QBC, Mantaux Peripheral smear. Study of malarial parasite.

Microbial culture sensitivity Testing: Interpretation of results Principles and methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B2 and B12. Standardisation of vaccines and sera. Study of infectious diseases- Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhea and HIV.

Reference Books

1 Microbiology, An Introduction, Gerard J. Tortora and Derek Weber, 13th (2021), Addison-Wesley and Pearson.

2 Microbiology, Prescot L.M., Jarley G.P Klein D.A, 22nd (2020), Mc Graw Hill Company Inc..

3 Immunology, War Roitt, Jonathan Brostoff, David male, 3rd (1993), Mosby- year book Europe Ltd, London..

4 Pharmacopoeia of India, Govt of India., 9th (2019), Govt of India..

26PY6203P - PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6203P	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-P	P. COG-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply the principles of pharmacognosy of macroscopy, microscopy, and powder characteristics of natural drugs.	3	PO1
CO2	Apply the principles of pharmacognosy of powder characteristics of natural drugs.	3	PO1
CO3	Apply the principles of pharmacognosy to perform the different chemical tests	3	PO1

Syllabus

a. Introduction of Pharmacognosy laboratory and experiments. b. Study of cell wall constituents and cell inclusions. c. Macro, powder and microscopic study of Datura. d. Macro, powder and microscopic study of Senna. e. Macro, powder and microscopic study of Cassia, f. Macro, powder and microscopic study of Cinnamon. g. Macro, powder and microscopic study of Cinchona. i. Macro, powder and microscopic study of Ephedra. j. Macro, powder and microscopic study of Quassia. k. Macro, powder and microscopic study of Clove

a. Macro, powder and microscopic study of Fennel. b. Macro, powder and microscopic study of Coriander. c. Macro, powder and microscopic study of Isapgol. d. Macro, powder and microscopic study of Nux vomica. e. Macro, powder and microscopic study of Rauwolfia. f. Macro, powder and microscopic study of Liquorice. g. Macro, powder and microscopic study of Ginger. k. Macro, powder and microscopic study of Podophyllum. l. Determination of Iodine value.

a. Determination of Saponification value and unsaponifiable matter. b. Determination of ester value. c. Determination of Acid value. d. Chemical tests for Acacia. e. Chemical tests for Tragacanth. f. Chemical tests for Agar. g. Chemical tests for Starch. h. Chemical tests for Lipids. (Castor oil, sesame oil, shark liver oil, bees wax) i. Chemical tests for Gelatin.

Reference Books

1 Trease and Evans Pharmacognosy, 16th edition, W.C.Evans and Trease, 2009, B. Sounders & Co., London.

2 Pharmacognosy, 9th Edn, Tyler, V.E., Brady, L.R. and Robbers, J, 2018, Lea and Febiger, Philadelphia.

3 Text book of Pharmacognosy, C.K. Kokate, Purohit, Gokhlae, 2008, Nirali Prakashan, New Delhi..

4 Practical Pharmacognosy, Mr. S. B. Gokhale, Dr. C. K. Kokate, 2008, Nirali Prakashan, New Delhi..

26PY6203T - PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6203T	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS-T	P. COG-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the history and scope of Pharmacognosy and Classification of crude drugs	2	PO1, PO4
CO2	Understand the cultivation, collection, and processing of crude drugs and study of cell constituents and natural pesticides	2	PO1, PO4
CO3	Understand about the organic farming and different methods of pest control	2	PO1, PO4
CO4	Understand the detailed study carbohydrates containing drugs	2	PO1, PO4
CO5	Understand the different methods of extraction, chemistry and analysis of lipids and oils and protein based natural drug	2	PO1, PO4
CO6	Understand different types of plants fibres used in surgical dressings and related products and understand different methods of adulteration of crude drugs	2	PO1, PO4

Syllabus

Introduction to Pharmacognosy Phytochemistry History and Scope of pharmacognosy Scheme for pharmacognostic studies of crude drugs Sources of Drugs Plants Animals Mierals Marine Tissue culture Organized drugs Unorganized drugs Study of cell wall constituents Cell inclusions Alphabetical and morphological classification of crude drugs Taxonomical classification of crude drugs Chemical classification of crude drugs Pharmacological classification of drugs Serotaxonomical classification of drugs Chemotaxonomical classification of drugs Traditional Chinese medicine Ayurveda Indian system of medicine Yoga and Naturopathy system of medicine Homeopathy system of medicine Siddha and Unani system of medicine Acupuncture system of medicine

Crude drug adulteration Intentional crude drug adulteration Unintentional crude drug adulteration Introduction to Microscopy of natural drugs Stomata Trichomes Calcium crystals Cultivation and Factors affecting cultivation Collection and processing of crude drugs Storage of crude drugs Plant growth regulators Plant tissue culture Micronutrients

Pests and Pest control Fertilizers and manuers Biopesticides Neem Pyrethrum Tobacco Derris Chemical pesticides Introduction to organic farming Methods in organic farming Advantage and disadvantages of Organic farming

Introduction to Carbohydrates Pharmacognosy of Acacia Pharmacognosy of Guar gum Pharmacognosy of Tragacanth Pharmacognosy of Fenugreek Pharmacognosy of Starch Pharmacognosy of Honey Pharmacognosy of Chitosan Pharmacognosy of Ispaghula Pharmacognosy of Bale Pharmacognosy of Dextran Pharmacognosy of Cyclodextrins

Introduction to Lipids and Oils Extractions techniques Solvents used in extraction Soxhlet apparatus Pharmacognosy of Olive oil Pharmacognosy of almond oil Pharmacognosy of Rice bran oil Pharmacognosy of Neem oil Pharmacognosy of Linseed oil Pharmacognosy of Cocoa butter Pharmacognosy of Yellow bees wax Pharmacognosy of shark liver oil Pharmacognosy of Cod liver oil Introduction to protein based crude drugs Introduction to Enzymes Pharmacognosy of Chymotrypsion Pharmacognosy of Yeast Pharmacognosy of Diastase Pharmacognosy of Pepsin Pharmacognosy of L-asparginase Pharmacognosy of Urokinase Pharmacognosy of Renin Pharmacognosy of streptokinase Pharmacognosy of Papain Pharmacognosy of Bromelan

Introduction to surgical dressings Pharmacognosy of Absorbent cotton Pharmacognosy of Silk Pharmacognosy of Wool Pharmacognosy of Rayon Pharmacognosy of Sutures Pharmacognosy of Surgical dressings Pharmacognosy of Woven dressings Pharmacognosy of Mineral fibres Pharmacognosy of Jute

Reference Books

1 Trease and Evans Pharmacognosy , W.C.Evans, 16, 2009, W.B. Sounders & Co., London.

2 Text book of Pharmacognosy , C.K. Kokate, Purohit, Gokhlae , 57, 2021, Nirali Prakashan.

3 Essentials of Pharmacognosy, Dr.SH.Ansari, 2, 2016, Birla publications.

4 Herbal drug industry, R.D. Choudhary, 1, 1996, Eastern Publisher.

26PY6204T - PHARMACOLOGY I (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6204T	PHARMACOLOGY I	P.COL1	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understanding the pharmacological actions of different categories of drugs	2	PO1
CO2	Understand the pharmacology of drugs acting on Autonomic nervous system	2	PO1
CO3	Understand the pharmacology of drugs acting on cardio vascular system	2	PO1
CO4	Understand the pharmacology of drugs acting on central nervous system	2	PO1
CO5	Understand the pharmacology of drugs acting on Respiratory system	2	PO1
CO6	Understand the pharmacology of hormonal and antihistaminic drugs	2	PO1

Syllabus

General Pharmacology a) Introduction, definitions and scope of pharmacology b) Routes of administration of drugs c) Pharmacokinetics (absorption, distribution, metabolism and excretion) d) Pharmacodynamics e) Factors modifying drug effects f) Drug toxicity - Acute, sub- acute and chronic toxicity. g) Pre-clinical evaluations h) Drug interactions.

Pharmacology of drugs acting on ANS a) Adrenergic and antiadrenergic drugs b) Cholinergic and anticholinergic drugs c) Neuromuscular blockers d) Mydriatics and miotics e) Drugs used in myasthenia gravis f) Drugs used in Parkinsonism.

Pharmacology of drugs acting on cardiovascular system a) Antihypertensives b) Antianginal drugs c) Anti-arrhythmic drugs d) Drugs used for therapy of Congestive Heart Failure e) Drugs used for hyperlipidaemias.

Pharmacology of drugs acting on Central Nervous System a) General anesthetics b) Sedatives and hypnotics c) Anticonvulsants d) Analgesic and anti-inflammatory agents e) Psychotropic drugs f) Alcohol and methyl alcohol g) CNS stimulants and cognition enhancers h) Pharmacology of local anesthetic.

Pharmacology of Drugs acting on Respiratory tract a) Bronchodilators b) Mucolytics c) Expectorants d) Antitussives e) NasalDecongestants.

Pharmacology of Hormones and Hormone antagonists a) Thyroid and Antithyroid drugs b) Insulin, Insulin analogues and oral hypoglycemic agents c) Sex hormones and oral contraceptives d) Oxytocin and other stimulants and relaxants. Pharmacology of autocoids and their antagonists a) Histamines and Antihistaminics b) 5- Hydroxytryptamine and its antagonists c) Lipid derived autocoids and platelet activating factor.

Reference Books

1. A Text book of Pharmacology, Rang, H.P. & Dale, M.M, 2023, Churchill Living stone..
2. The pharmacological Basis of therapeutics, Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P., 2023, Mc Graw Hill, Pergamon press.
3. Essentials of medical pharmacology, K D Tripathi, 2018, Jaypee, Delhi.
4. LIR Pharmacology, Sangeeta Sharma, 2018, Wolters kluwer.

26PY6205T - COMMUNITY PHARMACY (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6205T	COMMUNITY PHARMACY	COM.PH	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the roles and responsibilities of community pharmacist	2	PO1
CO2	Understand the layout and infrastructure requirements for community pharmacy	2	PO1
CO3	Understand the need of inventory control and understand the various methods	2	PO1
CO4	Understand the factors affecting medication adherence	2	PO1
CO5	Apply pharmacy practice principles to Perform general patient counselling	3	PO1
CO6	Apply health screening services in community pharmacy	3	PO1

Syllabus

Definition, scope, of community pharmacy Roles and responsibilities of Community pharmacist 2 Community Pharmacy Management a) Selection of site, Space layout, and design b) Staff, Materials- coding, stocking c) Legal requirements d) Maintenance of various registers e) Use of Computers: Business and health care soft waresPrescriptions parts of prescription, legality & identification of medication related problems like drug interactions. 4 Inventory control in community pharmacy Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock s

Pharmaceutical care Definition and Principles of Pharmaceutical care. 6 Patient counselling Definition, outcomes, various stages, barriers, Strategies to overcome barriers Patient information leaflets- content, design, & layouts, advisory labels 7 Patient medication adherence Definition, Factors affecting medication adherence, role of pharmacist in improving the adherence

Health screening services Definition, importance, methods for screening Blood pressure/ blood sugar/ lung function and Cholesterol testing 9 OTC MedicationDefinition, OTC medication list & Counselling 10 Health Education WHO Definition of health, and health promotion, care for children, pregnant & breastfeedingwomen, and geriatric patients

Commonly occurring Communicable Diseases, causative agents, Clinical presentations and prevention of communicable diseases Tuberculosis, Hepatitis, Typhoid, Amoebiasis, Malaria, Leprosy, Syphilis, Gonorrhea and AIDS Balance diet, and treatment & prevention of deficiency disorders Family planning role of pharmacistResponding to symptoms of minor ailments Relevant pathophysiology, common drug therapy to, Pain, GI disturbances Ophthalmic symptoms, worms infestations. 12 Essential Drugs concept and Rational Drug Therapy Role of community pharmacist 13 Code of ethics for community pharmacists

Reference Books

1 Health Education and Community Pharmacy, NS Palmar, 2018, Vallabh .

2 WHO consultative group report, WHO, 2021, WHO.

3 Drug store & Business management by Mohammed Ali & Jyoti., MohammedAli, 2020, Prakashan.

4 Comprehensive Pharmacy Review, Edt. Leon Shargel, 8 (2012), Lippincott Williams & Wilkins..

26PY6206P - PHARMACOTHERAPEUTICS-I-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6206P	PHARMACOTHERAPEUTICS-I-P	PCT1-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply the knowledge and present the recorded cases in Cardiology department and Pulmonology	3	PO2, PO3
CO2	Apply the knowledge and present the recorded cases in Endocrinology department and to understand the prescribing guidelines	3	PO2, PO3
CO3	Apply the knowledge and present the recorded cases in Ophthalmology department and the guidelines in the rational of drug use	3	PO2, PO3

Syllabus

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented ,most common diseases.

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge.

Reference Books

1 Pathologic basis of disease , Robins SL, 11th edition (2023) , W.B.Saunders publication.

2 Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice, Green and Harris, 3rd edition (2008), Chapman and Hall publication.

3 Clinical Pharmacy and Therapeutics, Eric T. Herfindal, 5th edition (1992), Williams and Wilkins Publication.

4 Avery s Drug Treatment, Trevor M.speight Nicholas H.G.Holford, 4th edition (2011), wiley india.

26PY6206T - PHARMACOTHERAPEUTICS-I-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6206T	PHARMACOTHERAPEUTICS-I-T	PCT1-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand etiopathogenesis and Pharmacotherapy of CVS diseases (Hypertension, Congestive cardiac failure, Angina Pectoris)	2	PO1, PO2
CO2	Understand etiopathogenesis and Pharmacotherapy of CVS diseases (Myocardial infarction Hyperlipidaemias, Cardiac Arrhythmia	2	PO1, PO2
CO3	Understand etiopathogenesis and Pharmacotherapy of Respiratory system diseases	2	PO1, PO2
CO4	Understand etiopathogenesis and Pharmacotherapy of Endocrine system diseases	2	PO1, PO2
CO5	Understand the general prescribing guidelines for Paediatric, Geriatric, Pregnancy and Breast feeding, To understand etiopathogenesis and Pharmacotherapy of ophthalmology diseases	2	PO1, PO2
CO6	Understand the Rational use of drugs	2	PO1, PO2

Syllabus

Cardiovascular system: Hypertension, Congestive cardiac failure, Angina Pectoris,

Cardiovascular system: Myocardial infarction, Hyperlipidaemias, Electrophysiology of heart and Arrhythmias

Respiratory system: Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases

Endocrine system: Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis.

General prescribing guidelines for (A) Paediatric patients (B) Geriatric patients (c) Pregnancy and breast feeding Ophthalmology: Glaucoma, Conjunctivitis- viral & bacterial

Introduction to rational drug use: Definition, Role of pharmacist Essential drug concept Rational drug formulations

Reference Books

1 Goodman & Gilman's: The Pharmacological Basis of Therapeutics, Laurence L. Brunton, Bj?rn C. Knollmann, 14th edition (2022), Mc graw hill.

2 Pathologic basis of disease , Robins SL, 1th edition (2023), W.B.Saunders publication.

3 Clinical Pharmacy and Therapeutics , Eric T. Herfindal, 5th edition (1992), Williams and Wilkins Publication.

4 Avery s Drug Treatment, Trevor M.speight Nicholas H.G.Holford, 4th edition (2011), wiley india.

26PY6301P - PHARMACOLOGY-II-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6301P	PHARMACOLOGY-II-P	PCOL - 2P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	understand the laboratory animals and their handling, To know the importance of solutions and laboratory appliances used in experimental pharmacology, Understand the anesthetics used in laboratory animals,	3	PO1, PO4
CO2	Apply bioassays Ach	3	PO1, PO4
CO3	Apply bioassays of histamine, understand the demonstrate intraperitoneal and intramuscular routes of administration of drugs in animals and describe different anaesthetics used in laboratory animals	3	PO1, PO4

Syllabus

Study of physiological salt solutions used in experimental pharmacology Study of laboratory appliances used in experimental pharmacology Study of use of anaesthetics in laboratory animals

record the dose response curve of Ach using isolated ileum/rectus abdominis muscle preparation. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by interpolation method. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by three point method.

Record the dose response curve of Histamine using isolated guineapig ileum preparation Study of agonistic and antagonistic effects of drugs using isolated guineapig ileum preparation To carry out bioassay of Histamine using isolated guineapig ileum preparation by interpolation method

Reference Books

1 Fundamentals of Experimental Pharmacology , M. N. Ghosh , 2008, Hilton and Company .

2 Hand book of Experimental Pharmacology , S. K. Kulakarni , 2014, Vallabh Prakashan .

3 CPCSEA guidelines for laboratory animal facility. , ccsea, 2018, Ministry of Environment, forest,climate change government of India .

4 Essentials of medical pharmacology , Tripathi, K. D , 2015, Jaypee, Delhi .

26PY6301T - PHARMACOLOGY-II-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6301T	PHARMACOLOGY-II-T	PCOL - 2T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	understand the pharmacology of drugs acting on blood and blood forming agents and Renal system	2	PO1, PO8
CO2	Understand the pharmacology of chemotherapy	2	PO1, PO8
CO3	Understand the immuno pharmacology and principles of animal toxicology	2	PO1, PO8
CO4	Acquire the knowledge on cell, macromolecules, cell signalling, DNA replication and cell cycle.	2	PO1, PO8
CO5	Understand the importance of gene and its structure, genome, gene expression, recombinant DNA technology and other associated aspects	2	PO1, PO8
CO6	Understand the importance of RNA and other associated aspects	2	PO1, PO8

Syllabus

Pharmacology of Drugs acting on Blood and blood forming agents 1. Anticoagulants 2. Thrombolytics and antiplatelet agents 3. Haemopoietic and plasma expanders Pharmacology of drugs acting on Renal System 1. Diuretics 2. Antidiuretics

Chemotherapy 1. Introduction 2. Sulfonamides and co-trimoxazole 3. Penicillins and Cephalosporins 4. Tetracyclins and Chloramphenicol 5. Macrolides, Aminoglycosides, Polyene & Polypeptide antibiotics 6. Quinolines and Fluroquinolines 7. Antifungal antibiotics 8. Antiviral agents 9. Chemotherapy of tuberculosis and leprosy 10. Chemotherapy of Malaria 11. Chemotherapy of protozoal infections (amoebiasis, Giardiasis) 12. Pharmacology of Anthelmintic drugs 13. Chemotherapy of cancer (Neoplasms)

Immunopharmacology Pharmacology of immunosuppressants and stimulants Principles of Animal toxicology Acute, sub-acute and chronic toxicity

The dynamic cell: The structures and functions of the components of the cell 1. Cell and macromolecules: Cellular classification, subcellular organelles, macromolecules, large macromolecular assemblies 2. Chromosome structure: Pro and eukaryotic chromosome structures, chromatin structure, genome complexity, the flow of genetic information. 3. DNA replication: General, bacterial and eukaryotic DNA replication. 4. The cell cycle: Restriction point, cell cycle regulators and modifiers. 5. Cell signalling: Communication between cells and their environment, ion-channels, signal transduction pathways (MAP kinase, P38 kinase, JNK, Ras and PI3-kinase pathways, biosensors.

The Gene: Genome structure and function: 1. Gene structure: Organization and elucidation of genetic code. 2. Gene expression: Expression systems (pro and eukaryotic), genetic elements that control gene expression (nucleosomes, histones, acetylation, HDACS, DNA binding protein families. 3. Transcription and Transcription factors: Basic principles of transcription in pro and eukaryotes. Transcription factors that regulate transcription in pro and eukaryotes

RNA processing: rRNA, tRNA and mRNA processing. Protein synthesis: Mechanisms of protein synthesis, initiation in eukaryotes, translation control and post-translation events Altered gene functions: Mutations, deletions, amplifications, LOH, traslocations, trinucleotide repeats and other genetic abnormalities. Oncogenes and tumor suppressor genes. The gene sequencing, mapping and cloning of human disease genes. Introduction to gene therapy and targeting. Recombinant DNA technology: principles. Processes (gene transfer technology) and applications

Reference Books

1 Illustrative pharmacology, lippincott, 2018, wolters kluwer.

2 P Goodman and Gilmans The pharmacological Basis of therapeutics, Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, 2023, Prentice Hall, International .

3 Pharmacology , Rang, H.P. and Dale, M.M. , 2018, Churchill Living stone .

4 Essentials of medical pharmacology , Tripathi, K. D , 2023, Jaypee, Delhi .

26PY6302P - PHARMACEUTICAL ANALYSIS-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6302P	PHARMACEUTICAL ANALYSIS-P	PA-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply chromatography and spectroscopy techniques for analysis of unkown	3	PO1, PO2
CO2	Apply experiments of electro titrimetric methods and absorption spectroscopy for analysis of drugs	3	PO1, PO2
CO3	Apply various analytical techniques and determination of concentrations by flame photometry	3	PO1, PO2

Syllabus

Module describes the conduction of experiments for separation and identification of Amino Acids and drugs by paper & thin layered Chromatography. Also covers experiments related to assessment of physicochemical parameters and estimation of unknow substances using UV-visible spectroscopy.

The present module emphasizes the identification and quantification of unknown substances using electrochemical methods, colorimetry, flourimetry and nephloturbidimetry etc.

This modules involves determination of sodium and potassium, determination of pKa and measuremnt of specific rotation. Also covers demonstrations and interpretation of analytical instruments and reports.

Reference Books

1 Quantitative Chemical Analysis , A.I Vogel , 6th edition (2023), Pearson education Delhi..

2 Textbook of Pharm. Analysis, KA Connors, John Wiley & Sons, 8th edition (2007), New York, Brisbane, Singapore.

3 Quantitative Drug Analysis, Garrot. D , 3rd edition (2008), Chapman & Hall Ltd., London.

4 Instrumental Analysis , Willard and Merritt , 7th edition (2004), EWP, East West Press Ltd., Delhi/Madras.

5 Textbook of Drug Analysis , P.D. Sethi , 3rd edition (2013), CBS Publishers, Delhi.

26PY6302T - PHARMACEUTICAL ANALYSIS-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6302T	PHARMACEUTICAL ANALYSIS-T	PA-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the importance of various documentation practices followed in pharmaceutical industry	2	PO1, PO2
CO2	Understand the knowledge about assay of pharmaceutical substance and product	2	PO1, PO2
CO3	Develop basic practical skills using instrumental techniques	2	PO1, PO2
CO4	Inculcate theoretical knowledge on various instrumental techniques adopted for analysis of pharmaceuticals	2	PO1, PO2
CO5	Understand various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained	2	PO1, PO2
CO6	Understand and gain knowledge on trouble shooting in adopting various methodologies using instrumental techniques	2	PO1, PO2

Syllabus

Quality Assurance: a. Introduction, sources of quality variation, control of quality variation. b. Concept of statistical quality control. c. Validation methods- quality of equipment, validation of equipment and validation of analytical instruments and calibration. d. GLP, ISO 9000. e. Total quality management, quality review and documentation. f. ICH-international conference for harmonization-guidelines. g. Regulatory control

Chromatography: Introduction, history, classification, separation techniques, choice of methods. The following techniques be discussed with relevant examples of pharmaceutical products involving principles and techniques of separation of drugs from excipients. a. Column Chromatography: Adsorption column chromatography, Operational technique, frontal analysis and elution analysis. Factors affecting column efficiency, applications and partition chromatography. b. TLC: Introduction, principle, techniques, Rf value and applications. c. PC: Introduction, principle, types of paper chromatography, preparation techniques, development techniques, applications. d. Ion-exchange chromatography: Introduction, principles, types of ion exchange synthetic resins, physical properties, factors affecting ion exchange, methodology and applications.

a. HPLC: Introduction, theory, instrumentation, and applications. b. HPTLC: Introduction, theory, instrumentation, and applications. c. Gas Chromatography: Introduction, theory, instrumentation-carrier gases, types of columns, stationary phases in GLC & GSC. Detectors- Flame ionization detectors, electron capture detector, thermal conductivity detector. Typical gas chromatogram, derivatisation techniques, programmed temperature gas chromatography, applications. d. Electrophoresis: Principles of separation, equipment for paper and gel 107 electrophoresis, and application. e. Gel filtration and affinity chromatography: Introduction, technique, applications.

Electrometric Methods: Theoretical aspects, instrumentation, interpretation of data/spectra and analytical applications be discussed on the following topics. a. Potentiometry: Electrical potential, electrochemical cell, reference electrodes, indicator electrodes, measurement of potential and pH, construction and working of electrodes, Potentiometric titrations, methods of detecting end point, Karl Fischer titration. b. Conductometry: Introduction, conductivity cell, conductometric titrations and applications. c. Polarography: Instrumentation, DME, residual current, diffusion current and limiting current, polarographic wave, Ilkovics equation, Effect of oxygen on polarographic wave, Polarographic maxima and suppressors and applications. d. Amperometric Titrations: Introduction, types of electrodes used, reference and indicator electrode, instrumentation, titration procedure, advantages and disadvantages of Amperometry over potentiometry. Pharma applications.

Theoretical aspects, instrumentation, elements of interpretation of data/spectra and application of analytical techniques be discussed on: a. Absorption Spectroscopy: Theory of electronic, atomic and molecular spectra. Fundamental laws of photometry, Beer Lamberts Law, application and its deviation, limitation of Beer law, application of the law to single and multiple component analysis, measurement of equilibrium constant and rate constant by spectroscopy. Spectra of isolated chromophores, auxochromes, bathochromic shift, hypsochromic shift, hyperchromic and hypochromic effect, effect of solvent on absorption spectra, molecular structure and infrared spectra. Instrumentation, Photometer, UV Visible spectrophotometer, sources of UV Visible radiations, collimating systems, monochromators, samples cells and following detectors, Photocell, Barrier layer cell, Phototube, Diode array, applications of UV Visible spectroscopy in pharmacy and spectrophotometric titrations. b. Infrared Spectroscopy: Vibrational transitions, frequency structure correlations, Infrared absorption bands, Instrumentation, IR spectro meter, sources of IR, Collimating systems, monochromators, sample cells, sample handling in IR spectroscopy and detectors, Thermocouple, Golay Cells, Thermistor, Bolometer, Pyroelectric detector, Applications of IR in pharmacy. c. Fluorimetric Analysis: Theory, luminescence, factors affecting fluorescence, quenching. Instrumentation, Applications, fluorescent indicators, study of pharmaceutically important compounds estimated by fluorimetry. d. Flame Photometry: Theory, nebulisation, flame and flame temperature, interferences, flame spectrometric techniques and instrumentation and pharmaceutical applications. e. Atomic Absorption Spectrometry: Introduction, Theory, types of electrodes, instrumentation and applications

Theoretical aspects, instrumentation, elements of interpretation of data/spectra and application of analytical techniques be discussed on: a. Atomic Emission Spectroscopy: Spectroscopic sources, atomic emission spectrometers, photographic and photoelectric detection. b. NMR and ESR (introduction only): Introduction, theoretical aspects and applications. c. Mass Spectroscopy: (Introduction only), Fragmentation, types of ions produced mass spectrum and applications. d. Polarimetry: (Introduction only), Introduction to optical rotatory dispersion, circular dichroism, polarimeter. e. X-RAY Diffraction: (Introduction only), Theory, reciprocal lattice concept, diffraction patterns and applications. f. Thermal Analysis: Introduction, instrumentation, applications, and DSC and DTA.

Reference Books

1 Quantitative Chemical Analysis, A.I Vogel , 6th edition (2023), Pearson education Delhi.

2 Textbook of Pharm. Analysis , KA Connors, John Wiley & Sons, 8th edition (2007), New York, Brisbane, Singapore.

3 Spectroscopy by Silverstein , John & Wiley & Sons. Inc.,, 6th edition (2021), Wiley publications .

4 Instrumental Analysis , Willard and Merritt, 7th edition (2004), EWP, East West Press Ltd., Delhi/Madras.

5 Textbook of Drug Analysis , P.D. Sethi, 3rd edition (2013), CBS Publishers, Delhi .

26PY6303P - PHARMACOTHERAPEUTICS-II-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6303P	PHARMACOTHERAPEUTICS-II-P	PCTP - 2P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Analyse Case studies on Infectious diseases, Respiratory diseases, Reproductive diseases.	3	PO1, PO5, PO6
CO2	Analyse Case studies on Musculoskeletal diseases and renal diseases	3	PO1, PO5, PO6
CO3	Analyse Case studies on cancer	3	PO1, PO5, PO6

Syllabus

Case study on rational use of antibiotics, Surgical prophylaxis, tuberculosis, Meningitis, Gastroenteritis, Septicaemia, Urinary tract infections, Malaria, HIV, Syphilis, along with pathophysiology, etiolgy diagnosis and management of disease.

Case study on Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus, acute renal failure, Chronic renal failure, renal dialysis, drug induced renal disorders, drug interactions & contraindications interlinked with Renal. along with pathophysiology, etiolgy diagnosis and management of disease.

Case study on cancer therapy protocol, widely used chemotherapeutics agents, breast cancer, Leukaemia, management of chemotherapy nausea and emesis, psoriasis, Scabies, Eczema, Impetigo, drug induced skin allergies. along with pathophysiology, etiolgy diagnosis and management of disease.

Reference Books

1 Pharmacotherapy: A Pathophysiologic approach , Joseph T. Dipiro et al. Appleton & Lange , 11, 2020, Mc Graw Hill .

2 Clinical Pharmacy and Therapeutics, Eric T. , 6, 2018, Herfindal Williams.

3 Applied Therapeutics: The clinical Use of Drugs. , Lloyd Young and Koda-Kimble MA Williams and Wilkins , 11, 2017 , Lippincott Williams & Wilkins.

4 Goodman and Gilman' The Pharmacological Basis of Therapeutics, by Laurence Brunton, Bjorn Knollman, and Randa Hilal-Dandan, 14, 2023, Mc Graw Hill.

26PY6303T - PHARMACOTHERAPEUTICS-II-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6303T	PHARMACOTHERAPEUTICS-II-T	PCTP - 2T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand basic guidelines of antibiotics, surgical prophylaxis and respiratory tract infectious diseases	2	PO1, PO5, PO6
CO2	Understand the etiopathogenesis and pharmacotherapy of infectious diseases	2	PO1, PO5, PO6
CO3	Understand the etiopathogenesis and pharmacotherapy of musculoskeletal diseases	2	PO1, PO5, PO6
CO4	Understand the etiopathogenesis and pharmacotherapy of Renal system	2	PO1, PO5, PO6
CO5	Understand the etiopathogenesis and pharmacotherapy of Oncology	2	PO1, PO5, PO6
CO6	Understand the etiopathogenesis and pharmacotherapy of Dermatology	2	PO1, PO5, PO6

Syllabus

Infectious disease: Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis. (Icluding pathophysiology, etiology, diagnosis and management of disease)

Infectious disease : Septicemia,Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis (Icluding pathophysiology, etiology, diagnosis and management of disease)

Musculoskeletal disorders Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus (Icluding pathophysiology, etiology, diagnosis and management of disease)

Renal system Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders (Icluding pathophysiology, etiology, diagnosis and management of disease)

Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis (Icluding pathophysiology, etiology, diagnosis and management of disease)

Dermatology: Psoriasis, Scabies, Eczema, Impetigo (Icluding pathophysiology, etiology, diagnosis and management of disease)

Reference Books

1. Pharmacotherapy: A Pathophysiologic approach , Joseph T. Dipiro et al. Appleton & Lange , 11, 2020 , Mc Graw Hill.
2. Clinical Pharmacy and Therapeutics , Eric T. Herfindal Williams and Wilkins , 6, 2018, Herfindal Williams.
3. Applied Therapeutics: The clinical Use of Drugs. , Lloyd Young and Koda-Kimble MA Williams and Wilkins, 11, 2017, Lippincott Williams & Wilkins.
4. Principles of Pharmacology The Pathophysiologic Basis of Drug Therapy, David E. Golan, Ehrin J. Armstrong, and April W. Armstrong, 7, 2016, Lippincott.

26PY6304T - PHARMACEUTICAL JURISPRUDENCE (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6304T	PHARMACEUTICAL JURISPRUDENCE	PJ	R	2	0	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the importance of code of pharmaceutical ethics	2	PO1, PO8
CO2	Understand in detail about various sections of Drugs and Cosmetics Act	2	PO1, PO8
CO3	Understand various provisions of Pharmacy Act 1948	2	PO1, PO8
CO4	Understand the provisions of Medicinal and Toilet Preparation Act 1955	2	PO1, PO8
CO5	Understand various provisions of NDPS Act 1985	2	PO1, PO8
CO6	Understand various Indian pharmaceutical Acts and Indian Laws pertaining to Drugs and magic remedies Act, DPCO, Prevention Of Cruelty to animals, patents.	2	PO1, PO8

Syllabus

Pharmaceutical Legislations A brief review. Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI

Drugs and Cosmetics Act of 1940 and its rules 1945. Objectives Legal definition Study of Schedules with reference to Schedule B, C, C1, D, E1, F, F1, F2, F3, FF, G, H, J, K, M, N, P, R, V, W, X, Y Sales, Import, labeling and packaging of Drugs And Cosmetics Provisions Relating to Indigenous Systems. Constitution and Functions of DTAB,DCC,CDL. Qualification and duties Govt. analyst and Drugs Inspector

Pharmacy Act 1948. Objectives Legal Definitions, General Study, Constitution and Functions of State & Central Council, Registration & Procedure, ER.

Medicinal and Toilet Preparation Act 1955. Objectives, Legal Definitions, Licensing, Bonded and Non Bonded Laboratory, Ware Housing, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietory Preparations.

Narcotic Drugs and Psychotropic substances Act 1985 and Rules. Objectives, Legal Definitions, General Study, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and regulations, Schedules to the Act

Study of Salient Features of Drugs and magic remedies Act and its rules. Study of essential Commodities Act Relevant to drugs price control Order. Drug Price control Order & National Drug Policy. Prevention Of Cruelty to animals Act 1960.Patents & design Act 1970.Brief study of prescription and Nonprescription Products

Reference Books

1 Forensic Pharmacy , B.Suresh , 1st Edition (2010), CBS Publishers & Distributors .

2 Text book of Forensic Pharmacy , R.M.Mithal , 1st Edition (2011), Vikas Publishing House .

3 Hand book of drug law , M.L.Mehra , 9th Edition (1997), Jain publishers .

4 A text book of Forensic Pharmacy , N.K.Jain , 4th Edition (2017), Vallabh Prakashan .

5 Text book of Forensic Pharmacy , C.K.Kokate , 2nd Edition (2012), Pharmamed Press .

26PY6305P - MEDICINAL CHEMISTRY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6305P	MEDICINAL CHEMISTRY-P	MC-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Develop skills in the synthesis of medicinal compounds and analyze pharmaceutical drug properties using monograph methods	3	PO1
CO2	Employ analytical techniques to quantify the concentration of a specific drug within an unknown solution, subsequently estimating its purity	3	PO1
CO3	Understand experimentally the partitioning behavior and acid/base dissociation properties of a given compound	3	PO1

Syllabus

Preparation of medicinally important compounds or intermediates required for synthesis of drugs. Monograph analysis of important drugs.

Assays of important drugs from the course content

Determination of partition coefficients, dissociation constants and molar refractivity of compounds for QSAR analysis

Reference Books

1 Vogel textbook of Practical Organic Chemistry, Furniss BS, Hannford AJ, Smith PWG, Tatchell AR, 2008, Longman Gruage UK.

2 Principles of Medicinal Chemistry, William.O.Foye, 2000, B.I. Waverly Pvt Ltd New Delhi.

3 A Textbook of Medicinal Chemistry , Surendra N. Pandeya, 2010, S.G. Publisher.

4 Practical Organic Chemistry, Mann FG, Saunders BC, 1975, Orient Log man Pvt. Ltd.

5 Practical Pharmaceutical Chemistry, Beckett AH, Stenlake JB, 2005, CBS Publisher.

26PY6305T - MEDICINAL CHEMISTRY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6305T	MEDICINAL CHEMISTRY-T	MC-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	To provide comprehensive understanding of modern concept in drug design and their significance in developing novel therapeutics	2	PO1
CO2	To know the metabolism, adverse effect, and therapeutic activity of anti-infective, anti-fungal agents	2	PO1
CO3	To understand the concept of microbial diseases and different anti-viral agents	2	PO1
CO4	To explore the mechanisms involved in the cardiac diseases	2	PO1
CO5	To understand the chemistry involved in anti-diabetic and thyroid drugs	2	PO1
CO6	To discover the drugs involved in steroids and thyroid agents	2	PO1

Syllabus

Modern concept of rational drug design: A brief introduction to Quantitative Structure Activity Relationship (QSAR), prodrug, combinatorial chemistry, and computer aided drug design (CADD) and concept of antisense molecules. Describe the below mentioned topics (CO II to CO VI) as follows: Structural Activity Relationship studies (SAR), Mechanism of action, Synthesis of some important compounds, chemical nomenclature, brand names of important marketed products and their side effects.

Local anti-infective agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Preservatives: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antifungal agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Urinary tract anti-infectives: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules 5. Antitubercular agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules

Antiviral agents and Anti-AIDS agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antiprotozoal agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Anthelmintics: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Anti-scabies and Ant pedicular agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Sulphonamides and sulphones: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antimalarials: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules

Antibiotics: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antineoplastic agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antihypertensive agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antianginal agents and vasodilators: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Antiarrhythmic agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules

Antihyperlipidemic agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Coagulants and Anticoagulants: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Endocrine: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Hypoglycemic agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules

Thyroid and Antithyroid agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Diuretics: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Diagnostic agents: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules. Steroidal Hormones and Adrenocorticoids: Classification of Drugs, Mechanism of Actions, SAR, Synthesis of important molecules

Reference Books

1. Organic Medicinal and Pharmaceutical Chemistry, Wilson and Gisvold's, 2015, Lippincott Raven Publishers, New York, Philadelphia.
2. Principles of Medicinal Chemistry, William.O.Foye, 2000, B.I. Waverly Pvt. Ltd., New Delhi.
3. A Textbook of Medicinal Chemistry, Vol. I and II by Surendra N. Pandeya, 2020, S.G. Publisher,.
4. Burger's medicinal chemistry and drug discovery, Donald J. Abraham, 2003, Wiley interscience Publication.
5. Medicinal Chemistry, Ashutosh Kar, 2014, New Age International Publisher.
6. Medicinal Chemistry A molecular and Biochemical Approach, Thomas Nogrady, Donald F Weaver, 2005, Oxford University Press.

26PY6306P - PHARMACEUTICAL FORMULATIONS-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6306P	PHARMACEUTICAL FORMULATIONS-P	PF-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Prepare formulations of tablets and capsules, coating of the tablets.	3	PO1
CO2	To prepare various parenteral products, different dosage forms by performing quality control tests as per the batch formula	3	PO1
CO3	Prepare and evaluate various semi-solid preparations, cosmetics such as lipstick, cold cream and shampoo	3	PO1

Syllabus

Tablet compression by wet granulation method, Tablet compression by direct compression method, Formulation of soluble tablets, Formulation of Chewable tablets, Formulation of tetracycline hard gelatin capsule, Quality control test of tablets, Quality control test of capsules, Demonstration of Tablet coating

Formulation of ascorbic acid injection, Formulation of calcium gluconate injection, Formulation of sodium chloride infusion, Formulation of Dextrose and sodium chloride injection or infusion, Quality control test of parentrals, Formulation of paracetamol syrup, Formulation of aluminum hydroxide gel suspension

Formulation of salicylic acid and Benzoic acid ointment, Formulation of Diclofenac gel, Formulation of Lipstick, Formulation of cold cream, Formulation of vanishing cream, Formulation of clear liquid shampoo, Formulation of tooth paste, Formulation of tooth powder

Reference Books

1 Pharmaceutical dosage forms Tablets, Larry L Augsburger, Stephen W Hoag, 3 (2008), Informa Healthcare.

2 Pharmaceutical dosage forms Capsules, Larry L Augsburger, Stephen W Hoag, 4 (2008), Informa Healthcare.

3 Pharmaceutical dosage forms Parenterals volume 1, 2, Liberman and Lachman, Kenneth E. Avis, 2 (1993), Informa Healthcare.

4 Controlled and Novel Drug delivery, N K Jain, 1 (2019), CBS HB.

26PY6306T - PHARMACEUTICAL FORMULATIONS-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6306T	PHARMACEUTICAL FORMULATIONS-T	PF-T	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	understand the significance of formulation, preparation and evaluation of tablets	2	PO1
CO2	understand the significance of formulation, preparation and evaluation of capsules	2	PO1
CO3	understand the significance of formulation, preparation and evaluation of liquid orals	2	PO1
CO4	understand the significance of formulation, preparation and evaluation of parenteral Preparations	2	PO1
CO5	understand the manufacturing methods of semisolid, and ophthalmic products	2	PO1
CO6	understand the concepts of Novel Local drug delivery system	2	PO1

Syllabus

Formulation of different types of tablets, tablet excipients, granulation techniques quality control and evaluation of tablets. Tablet coating, Type of coating, quality control tests for coated tablet.

Production and filling of hard gelatin capsules, Raw material for shell, finishing, quality control tests for capsules. Production and filling of soft gelatin capsules, quality control tests for soft gelatin capsules

Formulation and evaluation of suspensions, emulsions and solutions.

Introduction and classification Factors affecting absorption and anatomy of skin Packaging storage and labelling, Ointments Types of Ointment Base Preparation of ointment, Jellies Types of jellies Formulation of jellies Suppositories, Method of preparation, Types Packaging

Introduction and classification Factors affecting absorption and anatomy of skin Packaging storage and labelling, Ointments Types of Ointment Base Preparation of ointment, Jellies Types of jellies Formulation of jellies Suppositories, Method of preparation, Types Packaging

Controlled and Novel drug delivery systems of with available examples, viz. parenteral, transdermal, buccal, rectal, nasal, implants, ocular

Reference Books

1 Pharmaceutical dosage forms - Tablets, volume 1 -3 , Larry L Augsburger, Stephen W Hoag, 2008, Informa Healthcare.

2 Pharmaceutical dosage forms - Capsules, Larry L Augsburger, Stephen W Hoag, 1998, Informa Healthcare.

3 Pharmaceutical dosage forms - Parenterals volume1-2, Liberman & Lachman, Kenneth E. Avis, 1990, Informa Healthcare.

4 Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS), Adeboye Adejare, 2022, Elsevier Academic Press.

5 Pharmaceutics- The science of dosage form design by M.E.Aulton, Aulton, 2021, Elsevier Academic Press.

26PY6401P - PHARMACOTHERAPEUTICS-III-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6401P	PHARMACOTHERAPEUTICS-III-P	PCTP - 3P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Analyse Case studies on Infectious diseases, Respiratory diseases, Reproductive diseases	4	PO1, PO5, PO6
CO2	Analyse Case studies on Musculoskeletal diseases and renal diseases	4	PO1, PO5, PO6
CO3	Analyse Case studies on cancer and dermatological diseases	4	PO1, PO5, PO6

Syllabus

Case study on rational use of antibiotics, Surgical prophylaxis, tuberculosis, Meningitis, Gastroenteritis, Septicaemia, Urinary tract infections, Malaria, HIV, Syphilis,

Case study on Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus, acute renal failure, Chronic renal failure, renal dialysis, drug induced renal disorders, drug interactions & contraindications interlinked with Renal.

Case study on cancer therapy protocol, widely used chemotherapeutics agents, breast cancer, Leukaemia, management of chemotherapy nausea and emesis, psoriasis, Scabies, Eczema, Impetigo, drug induced skin allergies

Reference Books

1 Pharmacotherapy: A Pathophysiologic approach , Joseph T. Dipiro et al. Appleton & Lange, 12th edition (2020), Mc Graw Hill .

2 Clinical Pharmacy and Therapeutics , Eric T. Herfindal, 5th edition (1992), Williams and Wilkins .

3 Applied Therapeutics: The clinical Use of Drugs., Lloyd Young and Koda-Kimble MA, 7th edition (2001), Williams and Wilkins .

4 Avery s Drug Treatment, Trevor M.speight Nicholas H.G.Holford, 4th edition (2011), wiley india.

26PY6401T - PHARMACOTHERAPEUTICS-III-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6401T	PHARMACOTHERAPEUTICS-III-T	PCTP - 3T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand basic guidelines of antibiotics, surgical prophylaxis and respiratory tract infectious diseases.	2	PO1, PO5, PO6
CO2	Understand the etiopathogenesis and pharmacotherapy of infectious diseases	2	PO1, PO5, PO6
CO3	Understand the etiopathogenesis and pharmacotherapy of musculoskeletal diseases	2	PO1, PO5, PO6
CO4	Understand the etiopathogenesis and pharmacotherapy of Renal system	2	PO1, PO5, PO6
CO5	Understand the etiopathogenesis and pharmacotherapy of Oncology	2	PO1, PO5, PO6
CO6	Understand the etiopathogenesis and pharmacotherapy of Dermatology	2	PO1, PO5, PO6

Syllabus

Infectious disease: Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis

Infectious disease : Septicemia,Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis

Musculoskeletal disorders Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.

Renal system Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders

Oncology: Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis.

Dermatology: Psoriasis, Scabies, Eczema, Impetigo

Reference Books

1. Pharmacotherapy: A Pathophysiologic approach , Joseph T. Dipiro et al. Appleton & Lange , 12th edition (2020), Mc Graw Hill .
2. Pathologic basis of disease , Robins SL, 11th edition (2023), W.B.Saunders publication. .
3. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice , Green and Harris, 3rd edition (2008), Chapman and Hall publication. .
4. Clinical Pharmacy and Therapeutics , Eric T. Herfindal, 5th edition (1992), Williams and Wilkins Publication.

26PY6402P - HOSPITAL PHRMACY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6402P	HOSPITAL PHRMACY-P	HP-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Analyse and report different drug interactions in a given case study	3	PO1, PO4
CO2	Prepare various parenteral formulations and powders.	2	PO1, PO4
CO3	Analyse the case and answer the related drug information queries posted by healthcare professionals and patients	2	PO1, PO4

Syllabus

During ward rounds, healthcare professionals assessed potential drug interactions in the given prescriptions. This evaluation was crucial for ensuring patient safety, preventing adverse effects, and optimizing therapeutic outcomes. Identifying and managing these interactions is essential for effective and safe patient care

Manufacturing parenteral formulations and powders involves sterile production processes to ensure safety and efficacy. This includes precise compounding, aseptic filling, and rigorous quality control to produce injectable medications and powdered drugs for reconstitution, adhering to stringent pharmaceutical standards

During postings at the Drug Information Center (DIC), various drug information queries were noticed and addressed. These included inquiries about medication usage, potential side effects, drug interactions, contraindications, dosing regimens, and therapeutic alternatives. Addressing these queries was crucial for ensuring accurate medication management, patient safety, and optimal therapeutic outcomes

To evaluate inventory control in the hospital pharmacy, methods like Economic Order Quantity (EOQ), ABC analysis, and VED analysis were used. EOQ optimized order quantities, ABC analysis prioritized inventory management based on cost significance, and VED analysis categorized drugs by their criticality to ensure efficient stock management and availability

Reference Books

1 Hospital Pharmacy , Martin Stephens, 2,2003, Pharmaceutical Press .

2 Handbook of Institutional Pharmacy Practice, TThomas R. Brown, 1,1986, ASHP.

3 Applied Therapeutics: The Clinical Use of Drugs, Mary Anne Koda-Kimble, 21, 2009, Lippincott Williams and Wilkins.

4 Hospital Pharmacy, Martin Stephens, 2, 2011, Pharmaceutical Press.

26PY6402T - HOSPITAL PHRMACY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6402T	HOSPITAL PHRMACY-T	HP-T	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Know the organizational structure and functions of a hospital	2	PO1
CO2	Gain the knowledge on hospital drug policy	2	PO1
CO3	Understand the hospital pharmacy services	2	PO1
CO4	Know the manufacturing practices of various formulations in hospital set up	2	PO1
CO5	Understand the professional development programs	2	PO1
CO6	Understand the practice-based research methods	2	PO1

Syllabus

Hospital - its organization and functions, Hospital Pharmacy-Organization and management 1. Organizational structure-Staff, Infrastructure & work load statistics 2. Management of materials and finance 3. Roles & responsibilities of hospital pharmacist

The Budget Preparation and implementation Hospital drug policy 1. Pharmacy and Therapeutic committee 2. Hospital formulary 3. Hospital committees a. Infection committee b. Research and ethical committee 4. Developing therapeutic guidelines 5. Hospital pharmacy communication Newsletter

Hospital pharmacy services 1. Procurement & warehousing of drugs and Pharmaceuticals 2. Inventory control: Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock 3. Drug distribution in the hospital a. Individual prescription method b. Floor stock method c. Unit dose drug distribution method d. Distribution of Narcotic and other controlled substances e. Central sterile supply services Role of pharmacist

Manufacture of Pharmaceutical preparations 1. Sterile formulations large and small volume parenterals 2. Manufacture of Ointments, Liquids, and creams 3. Manufacturing of Tablets, granules, capsules, and powders 4. Total parenteral nutrition Continuing professional development programs, Education and training, Radio Pharmaceuticals Handling and packaging Professional Relations and practices of hospital pharmacist

Understanding professional development programs involves evaluating training, workshops, and continuing education opportunities designed to enhance skills, knowledge, and competencies of healthcare professionals, fostering career growth, improved patient care, and adherence to evolving industry standards

Understanding practice-based research methods involves studying approaches that integrate clinical practice with research activities. This includes designing studies in real-world settings, collecting and analyzing data to improve patient care, and translating findings into practical applications to enhance healthcare outcomes and evidence-based practice

Reference Books

1. Remington: The Science and Practice of Pharmacy, Loyd V. Allen Jr., Nicholas G. Popovich, Howard C. Ansel, 23, 2021, Pharmaceutical Press.
2. Handbook of Institutional Pharmacy Practice, Thomas R. Brown, Robert S. Brown, 4. 1992, American Society of Health-System Pharmacists.
3. Applied Therapeutics: The Clinical Use of Drug, Mary Anne Koda-Kimble, Brian K. Alldredge, Robin L. Corelli, B. Joseph Guglielmo,, 24, 2021, Lippincott Williams & Wilkins.
4. Essentials of Hospital Pharmacy, Claudia S. Plakogianni, 1, 2014, Jones & Bartlett Learning.

26PY6403P - CLINICAL PHARMACY-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6403P	CLINICAL PHARMACY-P	CP-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	analyse the case and answer the related drug information queries posted by healthcare professionals and patients.	4	PO6
CO2	analyse medication counselling of patients and laboratory investigations	4	PO6
CO3	analyse conduct interview to elicit the patient past medication history and ADR analysis	4	PO6

Syllabus

Drug information queries posted by healthcare professionals and patients and analyse the case and answer the related drug information queries posted by healthcare professionals and patients.

medication counselling for patients and laboratory investigations and analyse the laboratory investigations based on the condition and identify related problems and provide the safety outcomes to the patients

conduct interview to elicit the patient past medication history and ADR analysis and analyse the drug interactions that causing adverse events which cause the negative outcomes to the patients

Reference Books

1 Australian drug information - Procedure manual, The Society of Hospital Pharmacists of Australia, 1st edition, 1996, The Society of Hospital Pharmacists of Australia..

2 Clinical Pharmacokinetics, Rowland and Tozer, 5th edition,2019, Williams and Wilkins.

3 Pharmaceutical statistics. Practical and clinical applications, Sanford Bolton, Marcel Dekker, Inc., 5th edition, 2010, CRC Press.

4 A text book of Clinical Pharmacy Practice, Dr.G.Parthasarathi etal, 2nd edition,2012, Universities Press (india) Private Limited.

26PY6403T - CLINICAL PHARMACY-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6403T	CLINICAL PHARMACY-T	CP-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	understand the role of a clinical pharmacist in a pharmacy	2	PO2
CO2	understand the process of obtaining patients history and evaluation of drug therapy based on the history	2	PO2
CO3	understand and gain the knowledge about various clinical laboratory tests to diagnose diseases.	2	PO2
CO4	understand the working of drug and poison information center.	2	PO2
CO5	understand the role of pharmacovigilance in ADR monitoring	2	PO2
CO6	understand and gain the knowledge on communication skills for better interaction with patients	2	PO2

Syllabus

Definitions, development and scope of clinical pharmacy, Introduction to daily activities of a clinical pharmacist: Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions), Ward round participation, Adverse drug reaction management, Drug information and poisons information, Medication history, Patient counselling, Drug utilisation evaluation (DUE) and review (DUR), Quality assurance of clinical pharmacy services

Patient data analysis The patients case history, its structure and use in evaluation of drug therapy & understanding common medical abbreviations and terminologies used in clinical practices

Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results: Haematological, Liver function, Renal function, thyroid function tests, Tests associated with cardiac disorders, Fluid and electrolyte balance, Microbiological culture sensitivity tests, Pulmonary Function Tests.

Drug & Poison information: Introduction to drug information resources available. Systematic approach in answering DI queries. Critical evaluation of drug information and literature. Preparation of written and verbal reports. Establishing a Drug Information Centre. Poisons information- organization & information resources.

Pharmacovigilance Scope, definition and aims of pharmacovigilance. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]. Reporting, evaluation, monitoring, preventing & management of ADRs. Role of pharmacist in management of ADR.

Communication skills, including patient counselling techniques, medication history interview, presentation of cases. Pharmaceutical care concepts. Critical evaluation of biomedical literature. Medication errors

Reference Books

1. Australian drug information - Procedure manual., The Society of Hospital Pharmacists of Australia, 1st edition, 1996, The Society of Hospital Pharmacists of Australia..
2. Clinical Pharmacokinetics, Rowland and Tozer, 5th edition,2019, Williams and Wilkins.
3. Pharmaceutical statistics. Practical and clinical applications, Sanford Bolton, Marcel Dekker, Inc., 5th edition, 2010, CRC Press.
4. A text book of Clinical Pharmacy Practice, Dr.G.Parthasarathi etal, 2nd edition,2012, Universities Press (india) Private Limited.

26PY6404T - BIO STATISTICS AND RESEARCH METHODOLOGY (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6404T	BIO STATISTICS AND RESEARCH METHODOLOGY	BSRM	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the concept of clinical study designs and case studies	2	PO1, PO2
CO2	Understand the methods used to determine the sample size for a study	2	PO1, PO2
CO3	Understand the basic concepts of biostatistics	2	PO1, PO2
CO4	Understand the basics of hypothesis testing	2	PO1, PO2
CO5	Understand the statistical methods used in epidemiology	2	PO1, PO2
CO6	Understand the computer applications in pharmacy	2	PO1, PO2

Syllabus

Research Methodology a. Types of clinical study designs: b. Case studies, observational studies, interventional studies, c. Designing the methodology d. Sample size determination and Power of a study e. Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study f. Report writing and presentation of data. Biostatistics a. Introduction b. Types of data distribution c. Measures describing the central tendency distributions- average, median, mode d. Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.

Data graphics a. Construction and labeling of graphs, histogram, pie charts, scatter plots, semilogarithmic plots Basics of testing hypothesis a. Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals. b. Level of significance-Parametric data- students t test-paired and unpaired, chi Square test, Analysis of Variance-one-way and two-way c. Level of significance-Non-parametric data- Sign test, Wilcoxan signed rank test, Wilcoxan rank sum test, Mann Whitney U test, Kruskal-Wall test-one way ANOVA Basics of testing hypothesis a. Linear regression and correlation- Introduction, Pearsonn and Spearmann correlation and correlation co-efficient. b. Introduction to statistical software- SPSS, Epi Info, SAS.

Statistical methods in epidemiology a. Incidence and prevalence, relative risk, attributable risk

Computer applications in pharmacy Computer System in Hospital Pharmacy- Patterns of Computer use in Hospital Pharmacy-Patient record database management, Medication order entry-Drug labels and list-Intravenous solution and admixture, patient medication profiles, Inventory control, Management report and Statistics. Computer In Community Pharmacy-Computerizing the Prescription Dispensing process Use of Computers for Pharmaceutical Care in community pharmacy Accounting and General ledger system Drug Information Retrieval and Storage- Introduction-Advantages of Computerized Literature Retrieval Use of Computerized Retrieval

Reference Books

1. Pharmaceutical statistics, Sanford Bolton, 3rd edition,2023, Marcel Dekker Inc. NewYork.
2. Biostatistics and Research methodology, N. K. Nag, 3rd Edition, 2004, Kalyani.
3. Biostatistics and Research methodology , N. K. Nag,, 3rd-2004, Kalyani Publishers.
4. Pharmaceutical statistics-Practical and clinical applications, Sanford Bolton, 2nd edition,2012, publisher Marcel Dekker Inc. NewYork.

26PY6405P - BIO PHARMACEUTICS AND PHARMACOKINETICS-P (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6405P	BIO PHARMACEUTICS AND PHARMACOKINETICS-P	BPPK-P	R	0	0	3	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Illustrate the in vitro drug release profile of different marketed products and Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs	3	PO1, PO2
CO2	Demonstrate the bioavailability (absolute and relative) and bioequivalence from the given clinical data and Calculate the drug content in blood sample using Area Under Curve approach	3	PO1, PO2
CO3	Interpret various pharmacokinetic parameters from the given clinical data and conduct planned experiments and prepare laboratory report in a standard format	3	PO1, PO2

Syllabus

1. Improvement of dissolution characteristics of slightly soluble drugs by some methods. 2. Comparison of dissolution studies of two different marketed products of same drug. 3. Influence of polymorphism on solubility and dissolution. 4. Protein binding studies of a highly protein bound drug and poorly protein bound drug. 5. Extent of plasma-protein binding studies on the same drug (i.e. highly and poorly protein bound drug) at different concentrations in respect of constant time. 6. Bioavailability studies of some commonly used drugs on animal/human model.

7. Calculation of Ka, Ke, t1/2, Cmax, AUC, AUMC, MRT etc. from blood profile data. 8. Calculation of bioavailability from urinary excretion data for two drugs 9. Calculation of AUC and bioequivalence from the given data for two drugs. 10. In vitro absorption studies. 11. Bioequivalency studies on the different drugs marketed. (eg) Tetracycline, Sulpha-methoxzole, Trimethoprim, Aspirin etc., on animals and human volunteers 12. Absorption studies in animal inverted intestine using various drugs.

13. Effect on contact time on the plasma protein binding of drugs. 14. Studying metabolic pathways for different drugs based on elimination kinetics data. 15. Calculation of elimination half-life for different drugs by using urinary elimination data and blood level data. 16. Determination of renal clearance.

Reference Books

1. Hand Book of Clinical Pharmacokinetics, , By Milo Gibaldi and Laurie Prescott by , 12, ADIS Health Science Press..
2. Cilincal Pharmacokinetics, Concepts and Applications: , ., By Malcolm Rowland and Thomas, N. Tozen, 1995, Lea and Febrger, Philadelphia, .
3. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) , Adeboye Adejare , 3, Elsevier Academic Press .
4. Pharmaceutics- The science of dosage form design by M.E.Aulton , Aulton , 5, Elsevier Academic Press .

26PY6405T - BIO PHARMACEUTICS AND PHARMACOKINETICS-T (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6405T	BIO PHARMACEUTICS AND PHARMACOKINETICS-T	BPPK-T	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the concepts of biopharmaceutics	2	PO1, PO2
CO2	Understand the process of metabolism and excretion	2	PO1, PO2
CO3	Understand the concept of pharmacokinetics with the use of one compartment open model.	2	PO1, PO2
CO4	Understand the concept of pharmacokinetics with the use of multi compartment analysis	2	PO1, PO2
CO5	understand the Non-linear and non-compartmental kinetics	2	PO1, PO2
CO6	Understand the concepts of bioavailability and bioequivalence	2	PO1, PO2

Syllabus

Biopharmaceutics Introduction to Biopharmaceutics 1. Absorption 2. Distribution 3. Metabolism 4. Elimination

Pharmacokinetics: Introduction to Pharmacokinetics. 1. Mathematical model 2. Drug levels in blood. 3. Pharmacokinetic model 4. Compartment models 5. Pharmacokinetic study.

One compartment open model. 1. Intravenous Injection (Bolus) 2. Intravenous infusion.

Multicompartment models. 1. Two compartment open model. 2. IV bolus, IV infusion and oral administration Multiple-Dosage Regimens. 1. Repetitive Intravenous injections- One Compartment Open Model 2. Repetitive Extravascular dosing- One Compartment Open model 3. Multiple Dose Regimen- Two Compartment Open Model

Nonlinear Pharmacokinetics. 1. Introduction 2. Factors causing non-linearity. 3. Michaelis-Menten method of estimating parameters. Noncompartmental Pharmacokinetics. 1. Statistical Moment Theory. 2. MRT for various compartment models. 3. Physiological Pharmacokinetic model

Bioavailability and Bioequivalence. 1. Introduction. 2. Bioavailability study protocol. 3. Methods of Assessment of Bioavailability

Reference Books

1. Pharmacokinetics, Milo Glbaldi Donald, R., 10, Mercel Dekker Inc..
2. Bio pharmaceutics and Pharmacokinetics-A Treatise, , D. M. Brahmankar and Sunil B.Jaiswal,, 15, Vallabh Prakashan Pitampura, Delhi .
3. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) , Adeboye Adejare , 3, Elsevier Academic Press .
4. Pharmaceutics- The science of dosage form design by M.E.Aulton , Aulton , 5, Elsevier Academic Press .

26PY6406T - CLINICAL TOXICOLOGY (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6406T	CLINICAL TOXICOLOGY	CT	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the mechanism of action of common poisons and antidotes	2	PO1, PO2
CO2	Understand the concepts of Toxicokinetics	2	PO1, PO2
CO3	Understand the etiology of acute poisoning and its management by various therapeutic agents	2	PO1, PO2
CO4	Understand the etiology of chronic poisoning and its management by various therapeutic agents	2	PO1, PO2
CO5	Understand the poisoning caused by plant and animal sources	2	PO1, PO2
CO6	Understand the etiology and management of substance abuse	2	PO1, PO2

Syllabus

General principles involved in the management of poisoning 2. Antidotes and the clinical applications. 3. Supportive care in clinical Toxicology. 4. Gut Decontamination. 5. Elimination Enhancemen

Toxicokinetics- Detailed kinetics of poison

Clinical symptoms and management of acute poisoning with the following agents Pesticide poisoning: organophosphorus compounds, carbamates, organochlorines, pyrethroids. 1. Opiates overdose. 2. Antidepressants 3. Barbiturates and benzodiazepines. 4. Alcohol: ethanol, methanol. 5. Paracetamol and salicylates. Non-steroidal anti-inflammatory drugs

Hydrocarbons: Petroleum products and PEG. 2. Caustics: inorganic acids and alkali. Radiation poisoning 1. Clinical symptoms and management of chronic poisoning with the following agents Heavy metals: Arsenic, lead, mercury, iron, copper

Venomous snake bites: Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries. 2. Plants poisoning. Mushrooms, Mycotoxins. 3. Food poisonings 4. Envenomations Arthropod bites and stings

Substance abuse: Signs and symptoms of substance abuse and treatment of dependence 1. CNS stimulants: amphetamine 2. Opioids 3. CNS depressants 4. Hallucinogens: LSD 5. Cannabis group 6. Tobacco

Reference Books

1. Medical Toxicology Diagnosis And Treatment of Poisoning, Matthew J Ellenhorn. Ellenhorns, 2nd edition (1996), Williams and Willkins publication .
2. Handbook of Forensic Medicine and Toxicology , V V Pillay, 20th edition (2023), Paras Publication.
3. The Toxicology Handbook, Jason Armstrong, Ovidiu Pascu, 4th edition (2022), Elsevier.
4. Case Studies in Medical Toxicology, Leslie R. Dye (Editor-in-Chief), Christine Murphy, Diane P. Calello, Michael D. Levine, Aaron Skolnik, 1st edition (2017), From the American College of Medical Toxicology.

26PY6501T - CLINICAL RESEARCH (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6501T	CLINICAL RESEARCH	CR	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the various approaches for a new drug discovery	2	PO2, PO4
CO2	Understand the principles and phases in clinical trial of drug	2	PO2, PO4
CO3	Understand the various guidelines associated with clinical trials	2	PO2, PO4
CO4	Understand the various regulatory requirements in India and other countries to conduct clinical trials	2	PO2, PO4
CO5	Understand recognise differing roles and obligations of the Investigator, Sponsor and Institutional Review Board	2	PO2, PO4
CO6	Understand the various documents associated with clinical trials	2	PO2, PO4

Syllabus

Drug development process: Introduction Various Approaches to drug discovery 1. Pharmacological 2. Toxicological 3. IND Application 4. Drug characterization 5. Dosage form

Introduction to Clinical trials 1. Various phases of clinical trial. 2. Methods of post marketing surveillance 3. Abbreviated New Drug Application submission

Good Clinical Practice ICH, GCP, Central drug standard control organisation (CDSCO) guidelines 2. Challenges in the implementation of guidelines 3. Ethical guidelines in Clinical Research 4. Composition, responsibilities, procedures of IRB / IEC

Overview of regulatory environment in USA, Europe and India

Role and responsibilities of clinical trial personnel as per ICH GCP 1. Sponsor 2. Investigators 3. Clinical research associate 4. Auditors 5. Contract research coordinators 6. Regulatory authority

Designing of clinical study documents (protocol, CRF, ICF, PIC with assignment) Informed consent Process Data management and its components Safety monitoring in clinical trials.

Reference Books

1. Central Drugs Standard Control Organization. Good Clinical Practices Guidelines for Clinical Trials on Pharmaceutical Products in India , Ministry of Health: New Delh, 5th edition (2001), Ministry of Health: New Delhi.
2. Textbook of Clinical Trials, David Machin, Simon Day and Sylvan Greenc, 2nd edition (2010), John Wiley and Sons.
3. Clinical Data Management, R K Rondels, S A Varley, C F Webbs, 2nd edition (2000), Wiley Publications.
4. Essential Concepts In Clinical Research With Access Code , Schulz K F, 2nd edition (2018), Elsevier.

26PY6502T - PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6502T	PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS	PE&PE	R	3	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the scope, need, origin and evaluation of Pharmacoepidemiology	2	PO2, PO7
CO2	understand the importance of Measurement of outcomes in Pharmacoepidemiology	2	PO2, PO7
CO3	understand the method for measuring the outcome of Pharmacoepidemiology for a disease	2	PO2, PO7
CO4	understand the appropriate Pharmaco-epidemiological method for a given drug and address the risks associated with Pharmaco-epidemiological study	2	PO2, PO7
CO5	Understand the basic principles, role and relevance of Pharmacoeconomics in the development of a new drug	2	PO2, PO7
CO6	understand and justify an appropriate evaluation method for Pharmacoeconomics study of a disease	2	PO2, PO7

Syllabus

Pharmacoepidemiology Definition and scope, Origin and evaluation of pharmacoepidemiology need for pharmacoepidemiology, aims and applications. Measurement of outcomes in Pharmacoepidemiology Outcome measure and drug use measures, Prevalence, incidence and incidence rate. Monetary units, number of prescriptions, units of drugs dispensed, defined daily doses and prescribed daily doses, medication adherence measurement.

Concept of risk in Pharmacoepidemiology Measurement of risk, attributable risk and relative risk, timerisk relationship and odds ratio. Pharmacoepidemiological methods Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods, Drug utilization review, case reports, case series, surveys of drug use, cross sectional studies, cohort studies, case control studies, case cohort studies, meta analysis studies, spontaneous reporting, prescription event monitoring and record linkage system.

Sources of data for pharmacoepidemiological studies, Ad Hoc data sources and automated data systems. bSelected special applications of Pharmacoepidemiology, Studies of vaccine safety, hospital pharmacoepidemiology, pharmacoepidemiology and risk management, drug induced birth defects

Pharmoeconomics Definition, history, needs of Pharmacoeconomic evaluations, Role in formulary management decisions, Pharmacoeconomic evaluation Outcome assessment and types of evaluation, Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods Cost minimization, costbenefit, cost effectiveness, cost utility. Applications of Pharmacoeconomics Software and case studies

pharmacoeconnomicsprovides an introduction to pharmacoeconomics, emphasizing its importance and application in the drug development process. By the end of this module, students will understand the basic principles of pharmacoeconomics, its role in healthcare decision-making, and its relevance in the various stages of developing a new drug.

understanding of the various evaluation methods used in pharmacoeconomic studies, focusing on their application in the context of different diseases. By the end of this module, students will be able to select and apply appropriate pharmacoeconomic evaluation methods based on the specific characteristics of a disease and its treatment options.

Reference Books

1 PHARMACOEPIDEMIOLOGY, Brian L.storm, 3rd edition, 2000, John Wiley and sons.

2 PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS CONCEPTS AND PRACTICE, K.G.Revi kumar, 1st edition, 2016, Pharmamedpress.

3 Pharmacoepidemiology and pharmacoeconomics : concepts and practice, Revikumar, K.G, 2nd edition, 2023, Hyderabad : PharmaMed Press, 2023..

4 Concept Of Pharmacoepidemiology And Pharmacoeconomics, Dr. Aditya Parashar, 1st edition, 2020, Evincepub Publishing.

26PY6503T - CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY6503T	CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING	CP-PDM	R	2	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Discuss the pharmacokinetic principles to individualize drug therapy in patient care situations	2	PO1, PO2
CO2	Understand the methods to calculate various dosage regimens	2	PO1, PO2
CO3	Understand the principles of pharmacokinetics to analyse and predict drug interactions	2	PO1, PO2
CO4	Understand the concepts of therapeutic drug monitoring	2	PO1, PO2
CO5	Understand the dose adjustment in renal and hepatic disorders	2	PO1, PO2
CO6	Understand the concepts of population pharmacokinetics	2	PO1, PO2

Syllabus

Introduction to Clinical pharmacokinetics. Design of dosage regimens: Nomograms and Tabulations in designing dosage regimen, Conversion from intravenous to oral dosing, Determination of dose and dosing intervals, Drug dosing in the elderly and pediatrics and obese patients

Pharmacokinetics of Drug Interaction: a. Pharmacokinetic drug interactions b. Inhibition and Induction of Drug metabolism c. Inhibition of Biliary Excretion. 4Therapeutic Drug monitoring: a. Introduction b. Individualization of drug dosage regimen Variability Genetic, Age and Weight, disease, Interacting drugs. c. Indications for TDM. Protocol for TDM. d. Pharmacokinetic/Pharmacodynamic Correlation in drug therapy TDM of drugs used in the following disease conditions: cardiovascular disease, Seizure disorders, Psychiatric conditions, and Organ transplantations

Dosage adjustment in Renal and hepatic Disease. a. Renal impairment b. Pharmacokinetic considerations c. General approach for dosage adjustment in Renal disease. d. Measurement of Glomerular Filtration rate and creatinine clearance. e. Dosage adjustment for uremic patients. f. Extracorporeal removal of drugs. g. Effect of Hepatic disease on pharmacokinetics. Population Pharmacokinetics. a. Introduction to Bayesian Theory. b. Adaptive method or Dosing with feed back. c. Analysis of Population pharmacokinetic Data

Pharmacogenetics a. Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes. b. Genetic Polymorphism in Drug Transport and Drug Targets. c. Pharmacogenetics and Pharmacokinetics/Pharmacodynamic considerations

Reference Books

1. Clinical Pharmacology and Therapeutics , JAMES M RITTER LIONEL D LEWIS Hodder Arnold, an imprint of Hodden Education, part of , 6, 2008, Hachette Livre UK .
2. Clinical Pharmacokinetics: Concepts and Applications, John E. Murphy, 4, 2021, American Society of Health-System Pharmacists.
3. Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications, Malcolm Rowland, Thomas N. Tozer, 5, 2009, Wolters Kluwer Health.
4. Applied Clinical Pharmacokinetics, Larry A. Bauer, 3, 2014, McGraw-Hill Education.

26PY650N4 - CLERKSHIP (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY650N4	CLERKSHIP	CS	R	0	1	0	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understand the role of Pharmacist in clinical pharmacy services	2	PO2, PO10, PO12
CO2	Applying the skills of a clinical Pharmacist	3	PO4, PO10, PO12
CO3	Understand the available therapeutic options in the management of diseases	2	PO2, PO10, PO12
CO4	Understand and prepare a pharmaceutical care plan for a given case	2	PO2, PO10, PO12
CO5	analyse the case and report medication errors	4	PO4, PO10, PO12
CO6	analyse the case and report drug interactions	4	PO4, PO10, PO12

Syllabus

pharmacists contribute to clinical care through specialized services, Uncover how pharmacists work within healthcare teams to optimize medication use

The key capabilities of clinical pharmacists. Delve into the essential competencies of a clinical pharmacist. Uncover the skillset that makes a clinical pharmacist effective. Discover what it takes to be a successful clinical pharmacist

The treatment choices available for managing your health condition. Specific disease: Investigate the treatment approaches

pharmaceutical care plan to ensure optimal medication management for a particular case. Comprehend the structure and purpose of a pharmaceutical care plan as it applies to a specific patient scenario.

medication mistakes in the cases will be Identify and avoid potential problems when taking multiple medications.Uncover how medicines might work together or against each other. Break down how drugs can influence each others effects.

Medications can affect each other. Identify and avoid potential problems when taking multiple medications. Learn about interactions between drugs to ensure safe and effective use. Uncover how medicines might work together or against each other. Break down how drugs can influence each others effects.

Reference Books

1 Australian drug information - Procedure manual., The Society of Hospital Pharmacists of Australia, 1st edition, 1996, The Society of Hospital Pharmacists of Australia..

2 A text book of Clinical Pharmacy Practice, Dr.G.Parthasarathi etal, 2nd edition, 2012, Universities Press (india) Private Limited.

3 Clinical Pharmacokinetics, Rowland and Tozer, 5th edition,2019, Williams and Wilkins.

4 Pharmacoepidemiology and pharmacoeconomics : concepts and practice, Revikumar, K.G, 2nd edition, 2023, Hyderabad : PharmaMed Press, 2023..

26PY660N1 - INTERNSHIP (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY660N1	INTERNSHIP	ITS	R	0	0	40	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	To apply the acquired proficiency of knowledge on each case management and involve in patient care	3	PO1, PO2, PO6, PO11
CO2	To apply the competency and skills expected for providing Clinical Pharmacy Services	3	PO1, PO2, PO6, PO11
CO3	Make advantage of health care specialists and participate in conversations and research related to patient care	3	PO1, PO2, PO6, PO11

Syllabus

General Medicine SIX MONTHS COMPULSORY Related to all ailemnts, such as Fever, Hypertension, pains. etc..

Remaining 6 months from TWO MONTHS EACH IN ANY THREE OF THE following DEPARTMENTS, General Surgery, Paediatrics, Obstetrics and gynaecology, Psychiatry, Dermatology and Venereology, Orthopedics

Remaining 6 months from TWO MONTHS EACH IN ANY THREE OF THE following DEPARTMENTS, General Surgery, Paediatrics, Obstetrics and gynaecology, Psychiatry, Dermatology and Venereology, Orthopedics

Remaining 6 months from TWO MONTHS EACH IN ANY THREE OF THE following DEPARTMENTS, General Surgery, Paediatrics, Obstetrics and gynaecology, Psychiatry, Dermatology and Venereology, Orthopedics

Reference Books

1. Davidson's Principles and Practice of Medicine,, Ian Penman, Stuart H. Ralston, et al, International Edition, 24e, Elsevier Health Sciences.
2. Standard Treatment Guidelines - A Manual of Medical Therapeutics,, by GR Sethi Sangeeta Sharma , 6, 2021, Wolters Kluwer.
3. Competency Based Logbook Of General Medicine For All Phases Of Mbbs, Neeraj Mahajan, 1, 2021, CBS Publication.
4. A Comprehensive Book of Objective Structured Clinical Examination OSCE in General Medicine , Sondra Zabar, Elizabeth Kachur, Adina Kalet, Kathleen Hanley, 2013, Springer.



Y26: Pharm. D

Category: Project Research And Internship (PRI)

26PY650E5 - PROJECT WORK (SIX MONTHS) (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
26PY650E5	PROJECT WORK (SIX MONTHS)	PW	R	0	0	20	0	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Appyl & Address a problem related to Pharmacy practice in hospital, community service or clinical set up with a wider perspective and generality	3	PO2, PO4, PO9, PO11
CO2	Apply & address and translate the problem into a statement of aim,	3	PO2, PO4, PO9, PO11
CO3	Apply objectives, scope and plan for the project	3	PO2, PO4, PO9, PO11
CO4	Apply & Preparation of report an information survey and take account of findings in executing project	3	PO2, PO4, PO9, PO11
CO5	Apply relevant theories and techniques from the full range of courses studied using conceptual models and frameworks to enhance depth of understanding	3	PO2, PO4, PO9, PO11
CO6	Apply & Select appropriate methodology for investigative work, taking into account the pros and cons of the alternatives available and develop solution proposals based on reasoned judgement	4	PO2, PO4, PO9, PO11

Syllabus

Decide the topic for project and protocol Preparation - Preparing a protocol for a project involves several key steps to ensure that the project is well-planned, clearly defined, and feasible

Zeroth review - It includes project planning process. It involves assessing the foundational elements of the project to ensure everything is set up correctly before moving forward. This review helps identify potential issues early and sets the stage for a successful project.

first review - a formal assessment conducted after the initial phases of the project have been completed. It focuses on evaluating the progress, identifying any deviations from the plan, and ensuring that the project is on track to meet its objectives. This review is crucial for maintaining momentum and addressing any issues early in the project lifecycle.

The second review in project work typically occurs at a mid-point or significant milestone in the project lifecycle. This review is more detailed than the first review and focuses on deeper analysis of progress, performance, and potential adjustments needed to ensure the project\'s successful completion

The third review in project work typically occurs as the project approaches its final stages. This review focuses on ensuring that all deliverables are completed, objectives are met, and the project is on track for successful closure. It is also an opportunity to address any remaining issues and prepare for project handover or transition

Submitting project work involves compiling and presenting all completed deliverables, documentation, and reports in an organized manner to relevant stakeholders. This final step is crucial for ensuring the project\'s outcomes are clearly communicated, properly archived, and transitioned smoothly to the client or operational team

Reference Books

1 Pathologic basis of disease , Robins SL, 11th edition (2023), W.B.Saunders publication.

2 Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice , Green and Harris, 3rd edition (2008), Chapman and Hall publication. .

3 Clinical Pharmacy and Therapeutics , Eric T. Herfindal, 5th edition (1992), Williams and Wilkins Publication.

4 Avery s Drug Treatment, TrevorM speight Nicholas H.G.Holford, 4th edition (2011), wiley india.



Y26: Pharm. D

Category: Value Added Courses (VAC)

25CC3016 - BASE SAS (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
25CC3016	BASE SAS	BSAS	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply the role of SAS Programming for Biotechnology	3	PO1, PO2
CO2	Apply the concepts of SAS Programming for Biotechnology Applications	3	PO1, PO2

Syllabus

Introduction to SAS, Data Import and Export, Data Step Processing, Data Manipulation and Cleaning, Introduction to PROC Steps, Basic Data Visualization

Advanced Data Step Techniques, Advanced PROC Procedures, Macro Programming, Data Analysis and Interpretation, Clinical Trials and Biostatistics, Case Studies and Project

Reference Books

1 The Little SAS Book: A Primer, Lora D. Delwiche, Susan J. Slaughter, 2019, SAS Institute.

2 Learning SAS by Example: A Programmer's Guide, Ron Cody, 2018, SAS Institute.

3 SAS Certification Prep Guide: Base Programming for SAS 9, SAS Institute, 2011, SAS Institute.

4 SAS Programming for Researchers and Social Scientists, Paul D. Allison, 2010, SAS Institute.

25CC3069 - PHARMACOVIGILANCE (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
25CC3069	PHARMACOVIGILANCE	PCV	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply pharmacovigilance principles and methodologies to monitor and assess the safety of pharmaceutical products throughout their lifecycle, implementing the foundational principles of pharmacovigilance	3	PO1, PO6, PO11
CO2	Apply the concept of adverse drug reactions (ADRs) and assess their potential impact on public health, regulatory decisions, and patient care, nature, classification, and evaluation of adverse drug reactions (ADRs).	3	PO1, PO6, PO11

Syllabus

Introduction to Pharmacovigilance Overview of Pharmacovigilance Principles: Introduction to the field of pharmacovigilance, including the definition, objectives, and importance of monitoring drug safety throughout the lifecycle of medications. Regulations in Pharmacovigilance: Examination of global and regional regulations governing pharmacovigilance practices, including guidelines from agencies such as the FDA, EMA, and ICH.

Adverse Drug Reaction Monitoring and Analysi: In-depth study of adverse drug reactions (ADRs), including their identification, assessment, and reporting procedures. Detailed examination of methods for identifying ADRs, including patient interviews, clinical observations, and the use of safety reporting systems.Techniques for assessing the causality, severity, and outcome of ADRs, including the use of assessment scales, causality algorithms, and severity grading systems.

Reference Books

1. "Pharmacovigilance: Principles and Practice", Patrick Waller , 2011, John Wiley & Sons.
2. "Practical Aspects of Signal Detection in Pharmacovigilance", Harald Herkner, Klemens Wallner, 2018, Springer.
3. "Introduction to Pharmacovigilance", Patrick Waller , 2012, Pharmaceutical Press.
4. Textbook of Pharmacovigilance: Ensuring the Safe Use of Medicines, SK Gupta, 2022, Jaypee Brothers Medical Publishers.

25CC3077 - REGULATORY AFFAIRS (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
25CC3077	REGULATORY AFFAIRS	RGA	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply the roles and functions of major regulatory agencies	3	PO1, PO8, PO12
CO2	Apply the regulatory environment and key legislation that governs pharmaceuticals, biologics, and medical devices	3	PO1, PO8, PO12
CO3	Apply the concepts of quality control and assurance processes to ensure trial integrity and compliance	3	PO1, PO8, PO12

Syllabus

Fundamentals of Regulatory Affairs: Introduction to Regulatory Affairs, Regulatory Bodies and Legislation, Drug Development and Approval Process, Clinical Trials and Good Clinical Practice (GCP), Regulatory Submissions and Documentation, Quality Assurance and Compliance, Post-Market Surveillance and Pharmacovigilance

Advanced Topics in Regulatory Affairs: International Regulatory Affairs, Medical Devices and Combination Products, Biologics and Biosimilars, Regulatory Affairs in Emerging Markets, Orphan Drugs and Rare Diseases, Over-the-Counter (OTC) Products and Dietary Supplements, Advanced Regulatory Strategies and Project Management

Reference Books

1 Fundamentals of US Regulatory Affairs, Regulatory Affairs Professionals Society (RAPS), 2019, Regulatory Affairs Professionals Society (RAPS).

2 FDA Regulatory Affairs: A Guide for Prescription Drugs, Medical Devices, and Biologics, Douglas J. Pisano, David S. Mantus, 2014, CRC Press.

3 European Regulatory Affairs: Guide for Successful Registration of Medicinal Products in Europe, Regulatory Affairs Professionals Society (RAPS), 2010, Regulatory Affairs Professionals Society (RAPS).

4 Essentials of Pharmaceutical Regulatory Affair, Douglas Pisano, David Mantus, 2003, CRC Press.



Y26: Pharm. D

Category: Audit Courses (AUC)

CADCOML1V1 - CAREER ADVANCEMENT:COMPETITIVE EXAM TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CADCOML1V1	CAREER ADVANCEMENT:COMPETITIVE EXAM TRAINING	CAD: COM	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Enhance critical thinking and problem-solving skills to analyze and solve complex problems effectively.	3	PO4
CO2	Apply strategic test-taking techniques to improve performance and manage exam-related stress.	3	PO4

Syllabus

Introduction to Critical Thinking: covering the definition, importance, and key components; Logical Reasoning: focusing on types of reasoning (deductive and inductive) and common logical fallacies; Data Interpretation: analyzing graphs, charts, and statistical information; and Problem-Solving Techniques: emphasizing creative problem-solving methods and structured frameworks.

Practice Sessions through case studies and group discussions. It also explores Understanding Exam Formats, providing an overview of common competitive exams such as GRE, GMAT, and UPSC, along with types of questions encountered. Students will learn Time Management Techniques for prioritizing questions and allocating time efficiently, alongside Effective Study Habits to create study schedules and utilize resources. The syllabus includes Stress Management Strategies, focusing on mindfulness and relaxation techniques, and concludes with Mock Exams and Feedback to assess performance and identify areas for improvement.

Reference Books

1 Critical Thinking: A Beginner's Guide, Gail McDonald, Springer, 2018.

2 The 7 Habits of Highly Effective People, Stephen R. Covey, Free Press, 2020.

CADCORL1V1 - CAREER ADVANCEMENT: TRAINING IN CORE DOMAIN (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CADCORL1V1	CAREER ADVANCEMENT: TRAINING IN CORE DOMAIN	CAD: TICD	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply advanced domain-specific concepts and emerging trends to address industry challenges and innovations.	3	PO3, PO4
CO2	Apply advanced problem-solving and strategic decision-making techniques to manage complex projects within the core domain.	3	PO3, PO4

Syllabus

Core Concepts, theories, and frameworks of the specific domain (e.g., finance, IT, healthcare, engineering), Advanced Domain-Specific Tools, innovations and their impact on the core domain, Real-world examples of how new trends are being applied within the domain

Domain specific challenges, Practical exercises to resolve complex issues in the domain, best practices for managing projects within the domain, Case Studies and Simulations.

CADENTL1V1 - CAREER ADVANCEMENT:ENTREPRENEURIAL CAREER PATHWAY TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CADENTL1V1	CAREER ADVANCEMENT:ENTREPRENEURIAL CAREER PATHWAY TRAINING	CAD: ECPT	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	apply essential entrepreneurial qualities such as resilience, innovation, and risk-taking, enabling them to pursue entrepreneurial career paths in various contexts, including startups, corporate roles, and freelancing.	3	PO5, PO10
CO2	Develop the skills to recognize potential business opportunities, conduct thorough market research, and validate ideas by addressing customer needs and evaluating feasibility, preparing them to create sustainable business solutions.	3	PO5, PO10

Syllabus

Defining entrepreneurship: What it means to be an entrepreneur; The distinction between entrepreneurial and traditional career paths; The entrepreneurial mindset: resilience, risk-taking, innovation, and adaptability; Exploring entrepreneurial career pathways in startups, corporate environments, freelancing, and social ventures.

Spotting opportunities: How to find unmet needs and gaps in the market; Market research: Tools and techniques for understanding trends and customer needs; Idea validation: Testing the feasibility of your business idea; Problem-solving for innovation: Leveraging customer pain points and inefficiencies.

Reference Books

1 The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Eric Ries, 1st (2011), Crown Business.

2 The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company, Steve Blank, Bob Dorf, 2nd (2020), K&S Ranch Press.

3 Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Alexander Osterwalder, Yves Pigneur, 1st (2010), Wiley.

4 The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, Clayton M. Christensen, 1st (1997), Harvard Business Review.

CADUPSL1V1 - CAREER ADVANCEMENT: UPSC-CIVIL SERVICES EXAM TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CADUPSL1V1	CAREER ADVANCEMENT: UPSC-CIVIL SERVICES EXAM TRAINING	CAD: UPSC	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Understanding the basics of Indian History and it\'s evolution	2	PO1
CO2	Understanding the basics of Indian Geography	2	PO1
CO3	Understanding the Evolution of Indian Constitution.	2	PO1
CO4	Understanding the evolution of Indian Economy	2	PO1

Syllabus

Ancient Indian History- IVC,Rig Vedic, Later Vedic, Buddhism, Jainism, Mahajanapadas, Mouryan Empire, Guptan Empire, Harshavardhana empire, Sangam Age.

Exploring The Physical and Social Geography of India: The Universe, Big Bang Theory, Solar system, Geological Time Scale, Earth\'s Interior, Earth\'s Magnetic Feild.

Indian Polity and Constitution: Sailent featuresof Indian constitution, Preamble, Fundamental RIghts, Directrive Principles of State Policy, Fundamental Duties , Indian Parliament.

Understanding India\'s Economy - Indian Economic Development, National Income, Public Finance, Indian Budget.

Reference Books

1 Indian Polity, M. Laxmikanth, 7, Tata Mc Graw Hill.

2 Indian Economy, Nitin Singhania, 5, Mc Graw Hill.

3 Ancient and Medieval India, Poonam Dalal Dahiya, 3, Mc Graw Hill.

4 Fundamentals of Physical Geography, Husain Majid, 5, Mc Graw Hill.

CRTCODL1V1 - CAMPUS RECRUITMENT: LOGIC BUILDING SKILLS TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTCODL1V1	CAMPUS RECRUITMENT: LOGIC BUILDING SKILLS TRAINING	CRT: LBST	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply logical principles and critical thinking skills to analyze and evaluate arguments, solve problems, and make informed decisions.	3	PO2, PO8
CO2	Identify various logical reasoning techniques to solve complex problems, identify patterns, and draw valid conclusions	3	PO2, PO8

Syllabus

Introduction to Logic and Critical Thinking: fundamentals of logic, including the concepts of statements, propositions, truth values, logical connectives (AND, OR, NOT, IF-THEN, IF-AND-ONLY-IF), truth tables, and logical equivalence. Students will learn to identify and analyze different types of arguments, including deductive and inductive reasoning. They will also develop critical thinking skills, such as evaluating evidence, identifying assumptions, and recognizing fallacies

Logical Reasoning and Problem-Solving: applying logical reasoning techniques to solve various types of problems. Students will learn about different problem-solving strategies, including problem decomposition, pattern recognition, working backward, and using analogies. They will practice solving logic puzzles, brain teasers, and real-world problems that require logical thinking. Additionally, students will explore the concepts of syllogisms, Venn diagrams, and conditional reasoning to enhance their problem-solving abilities

Reference Books

1 Introduction to Logic, Irving M. Copi, Carl Cohen, Victor Rodych, 2014, Routledge.

2 Critical Thinking, Richard Paul, Linda Elder, 2019, Pearson.

3 The Art of Logical Thinking; Or, The Laws of Reasoning, William Walker Atkinson, 2013, Public domain in the

4 Symbolic logic and The game of logic, Carroll, Lewis, 1958, Dover Publications.

CRTCSSL1V1 - CAMPUS RECRUITMENT: COMMUNICATION SKILLS TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTCSSL1V1	CAMPUS RECRUITMENT: COMMUNICATION SKILLS TRAINING	CRT: CST	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	apply knowledge of communication of different types and techniques while analyzing body language and tone to enhance overall communication effectiveness.	3	PO10
CO2	apply active listening and feedback techniques, and analyzing effective participation in group discussions, while exploring roles in teamwork and strategies for managing conflicts, alongside professional communication practices such as writing emails and conducting meetings.	3	PO10

Syllabus

Communication: Basics, significance, types, verbal & non-verbal communication techniques, effective speaking and presentation skills tone and pacing in verbal interactions

Interpersonal skills, listening skills, feedback techniques, group communication and dynamics, group discussion, conflict management in professional communication, E-mail writing, report writing, presentations, interview skills.

Reference Books

1. Business Communication: A Problem-Solving Approach, Louis E. Boone & David L. Kurtz, 3rd Edition, McGraw Hill Education.
2. The Complete Guide to Business School Presentations", Jennifer D. D. McDonald, 2nd Edition, Pearson.
3. Listening: The Forgotten Skill", Geoffrey M. Cohen, 1st Edition, University Press of America.
4. Business Communication: Process and Product", Mary Ellen Guffey & Dana Loewy, 8th Edition, Cengage Learning.
5. Effective Communication Skills" Author, John Adair, 2nd Edition, Pan Macmillan.

CRTCSSL2V2 - CAMPUS RECRUITMENT: SOFT SKILLS TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTCSSL2V2	CAMPUS RECRUITMENT: SOFT SKILLS TRAINING	CRT: SST	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	applyi and practice empathy, critical thinking, problem-solving, decision-making, effective communication, and interpersonal skills through real-life scenarios and interactive activities.	3	PO3, PO11
CO2	apply group discussion techniques, interview skills, and mock interviews through practical exercises, encouraging learners to practice and refine these skills in realistic settings.	3	PO3, PO11

Syllabus

Critical thinking, problem soving, decision making, communication skills, interpersonal skills

Grooming, group discussions, story narrations, interview skills, mock interviews

Reference Books

1 Personality Development and Soft Skills", Barun K. Mitra, 2nd Edition, Oxford University Press.

2 Communication Skills for Engineers", C. Muralikrishna & Sunita Mishra, 1st Edition, Pearson Education.

3 Developing Soft Skills", Robert L. Katz, 1st Edition, McGraw Hill Education.

CRTVQRL1V1 - CAMPUS RECRUITMENT: VERBAL APTITUDE TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTVQRL1V1	CAMPUS RECRUITMENT: VERBAL APTITUDE TRAINING	CRT: VAT	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	apply and practice grammatical concepts like sentence formation, identifying odd words, using one-word substitutions, while enhancing understanding of idioms, phrases, spellings, and structures.	3	PO10, PO12
CO2	apply concepts like paragraph formation, sentence completion, reading comprehension, sentence correction, and correcting jumbled sentences, while enhancing word selection and sentence structure accuracy.	3	PO10, PO12

Syllabus

Synonyms, Antonyms, odd words, parts of speech, idioms and phrases, one word substitutions, odd words, formation of sentences

sentence completion, sentence correction, jumbled sentences, paragraph formation, reading comprehension, and sentence selection

Reference Books

1 The Pearson Guide to Verbal Ability and Logical Reasoning for the CAT", Nishit K. Sinha, 2nd Edition, Pearson.

2 Objective General English", S.P. Bakshi, 3rd Edition, Arihant Publications.

3 English Grammar in Use", Raymond Murphy, 5th Edition, Cambridge University Press.

CRTVQRL2V2 - CAMPUS RECRUITMENT: QUANTITATIVE APTITUDE TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTVQRL2V2	CAMPUS RECRUITMENT: QUANTITATIVE APTITUDE TRAINING	CRT: QAT	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply principles of quantitative techniques to solve problems on Simple Equations, Simple & Compound Interest etc	3	PO2
CO2	Apply principles of quantitative techniques to solve problems on Divisibility, Functions, Surds & Indices etc	3	PO2

Syllabus

Simple Equations, Problem on Ages, Ratio & Proportion, Variation& Partnership, Percentages, Profit, Loss& Discounts, Simple & Compound Interest, Averages & Allegations or Mixtures

Numbers, Divisibility, Decimal Fractions, LCM & HCF, Simplification, Sequence, Series & Progressions, Linear Algebra, Quadratic Equations & Inequalities, Theory of Equations. Sets, Relations & Functions, Surds & Indices, Logarithms

Reference Books

1 Quantitative Aptitude by R.S. Agarwal, SCHAND Publications, R.S. Agarwal, 2021, SCHAND Publications.

2 A Modern Approach to Verbal Reasoning by R.S. Agarwal, SCHAND Publications, R.S. Agarwal, 2021, SCHAND Publications.

CRTVQRL3V3 - CAMPUS RECRUITMENT: REASONING APTITUDE TRAINING (R)

CourseCode	Course Title	Acronym	Mode	L	T	P	S	CR
CRTVQRL3V3	CAMPUS RECRUITMENT: REASONING APTITUDE TRAINING	CRT: RAT	R	0	0	0	8	0

Course Outcomes

CO#	CO Description	BTL	PO/PSO
CO1	Apply principles of deductive logic to solve problems on syllogisms, Venn diagrams, etc	3	PO10
CO2	Apply principles of inductive logic to solve problems on assumptions and conclusions	3	PO10

Syllabus

Syllogism, Number& letter series, Number, letter & word Analogy, Odd man out, coding & decoding, Cubes & Dice, Logical Venn Diagrams

Statements & conclusions, statements & Arguments (Critical Reasoning), statements & Assumptions, logical connectives, Binary logic

Reference Books

1 A Modern Approach to Verbal Reasoning, R.S. Agarwal, 2022, SCHAND Publications.

2 Logical Reasoning for CAT, Arun Sharma, 2021, McGraw Hills.