K.R. MANGALAM UNIVERSITY
THE COMPLETE WORLD OF EDUCATION

SCHOOL OF MEDICAL & ALLIED SCIENCES

(SMAS)

Programme Handbook
(Programme Structure & Evaluation Scheme)

Diploma In Pharmacy (2025-2027)

Programme Code: 31

TWO-YEAR DIPLOMA PROGRAMME

As per the Pharmacy Council of India

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1. Preface

A warm welcome to all the students for joining the **Diploma in Pharmacy Programme** at the **School of Medical & Applied Sciences**, **K. R. Mangalam University**.

At K. R. Mangalam University, we are dedicated to creating an enriching educational environment that fosters academic excellence and promotes professional growth. Our esteemed faculty members are dedicated to delivering high-quality instruction through lectures, hands-on laboratory sessions, seminars, and academic visits. We are here to guide you every step of the way, providing a supportive and engaging learning experience.

Pharmacy is a vital profession within the healthcare system, requiring a blend of scientific knowledge and ethical responsibility. Our D. Pharm programme is designed to equip you with the essential skills, competencies, and practical training needed to become a responsible and knowledgeable pharmacy professional. Throughout the course, you will explore a wide range of subjects, including Pharmaceutics, Pharmacology, Pharmaceutical Chemistry, Biochemistry, and Pharmacognosy etc.—all crucial to your future role in healthcare delivery.

This programme integrates theoretical knowledge with practical skills to ensure a well-rounded education that prepares you for a successful career in pharmacy. We look forward to supporting your growth and celebrating your achievements as you progress through your studies with dedication and active participation in both academic and practical components.

We are delighted that you have chosen to pursue your studies with us. This handbook has been developed as a comprehensive guide to support your academic journey in the Diploma in Pharmacy. It outlines the programme structure, course content, academic regulations, assessment criteria, and the support services available to you.

We wish you a fulfilling and rewarding journey in the Diploma in Pharmacy programme.

Wish you all the best!

2. University Vision and Mission

Vision

K.R. Mangalam University aspires to become an internationally recognized institution of higher learning through excellence in inter-disciplinary education, research, and innovation, preparing socially responsible life-long learners contributing to nation building.

Mission

- Foster employability and entrepreneurship through a futuristic curriculum and progressive Pedagogy with cutting-edge technology
- Instill a notion of lifelong learning through stimulating research, Outcomes-based education, and innovative thinking
- Integrate global needs and expectations through collaborative programs with premier universities, research centers, industries, and professional bodies.
- Enhance leadership qualities among the youth by having an understanding of ethical values and environmental realities

3. About the School of Medical & Allied Sciences

The **School of Medical & Allied Sciences** is a premier school committed to excellence in health education, research, and clinical training. With a multidisciplinary approach, the School offers a wide range of undergraduate, postgraduate, and doctoral programs in fields such as medical sciences, pharmacy, physiotherapy, and other allied health professions.

Our mission is to prepare competent healthcare professionals who are equipped with strong academic knowledge, clinical skills, and ethical values. We foster an environment that encourages innovation, evidence-based practice, and lifelong learning.

Supported by experienced faculty, state-of-the-art laboratories, and collaborations with various industries, the School empowers students to become leaders in healthcare delivery and biomedical research. Through its holistic and student-centered education model, the School of Medical & Allied Sciences plays a vital role in shaping the future of healthcare both nationally and globally.

Additionally, Our School stands apart through its strong emphasis on industry-academia collaboration, experiential learning, and a future-ready curriculum designed to meet the evolving demands of the healthcare sector.

We provide our students with a competitive edge through expert-led teaching and training, delivered by leading professionals from the pharmaceutical industry. This industry-academia synergy is further enhanced through active participation in national and international conferences, workshops, skill development programs, and structured career guidance sessions, including coaching for competitive exams like the government pharmacist.

Community engagement is a cornerstone of our mission. Students are encouraged to take part in various health camps organized by the School to raise awareness about prevalent health issues such as diabetes, hypertension, and both communicable and non-communicable diseases.

Our strong placement support system connects students with promising career opportunities across government and private laboratories, and in diverse sectors of the pharmaceutical and healthcare industries. We have established valuable collaborations with renowned organizations such as Dabur Research Foundation, Sun Pharma, Arbro Pharma, Indian Pharmacopoeial Commission, Catalyst Clinical Services, Suraksha Pharma, Medicamen Biotech, and Mankind Pharma, among others.

These partnerships open up a wide range of career paths for our diploma, graduate, and post-graduate students in areas including pharmaceutical production, quality control and assurance, sales and distribution, drug information services, medical coding, health insurance, clinical trials, data management, supply chain management, pharmacovigilance, and forensic sciences.

With a focus on academic rigor, practical exposure, and holistic development, the School of Medical & Allied Sciences is committed to shaping skilled, compassionate, and innovative professionals ready to make a meaningful impact in the healthcare ecosystem.

School of Medical & Allied Sciences offers the following courses:

i. Diploma in Pharmacy (D. Pharmacy): Pharmacy Council approved two-year diploma Programme
ii. Bachelor of Pharmacy (B. Pharmacy): Pharmacy Council approved a four-year degree Programme
iii. Master of Pharmacy (M. Pharmacy): Pharmacy Council approved a two-year Master's Programme

- M. Pharmacy (Pharmaceutics)
- M. Pharmacy (Pharmacology)

iv. Doctoral in Pharmaceutical Sciences (Ph.D)

v. B.Sc. (Hons.) Emergency Medical Technology with Academic & Industry support of Emversity (3 yrs + 1 yr Industry Internship)
vi. B.Sc. (Hons.) Respiratory Technology with Academic & Industry support of Emversity (3 yrs + 1 yr Industry Internship)
vii. B.Sc. (Hons.) Cardiovascular Technology with Academic & Industry support of Emversity (3 yrs + 1 yr Industry Internship)

4. School's Vision and Mission

Vision

To become a premier educational institution dedicated to empowering students with the knowledge and skills needed to lead in the pharmaceutical field and enhance healthcare access, thereby making a positive impact on society in India and globally.

Mission

- To empower students to become self-motivated, self-reliant, and socially aware healthcare professionals, effectively addressing the needs of academia, industry, and research.
- To establish a dynamic centre of excellence for learning and research in pharmaceutical and allied health sciences, emphasizing interdisciplinary approaches and fostering collaboration between industry and academia.
- To nurture translational research initiatives that benefit society and improve community health outcomes.
- To integrate pharmaceutical and allied health sciences with interdisciplinary life sciences, promoting innovation and collaboration.
- To offer lifelong learning opportunities in healthcare, equipping professionals with the skills to adapt and excel in a rapidly evolving field.

5. About the Programme

Established in 2013, the Department of Pharmacy under the School of Medical & Allied Sciences (SMAS) at K. R. Mangalam University has been a center of excellence in pharmaceutical education and research. The department is approved by the Pharmacy Council of India (PCI) and began offering the PCI-recognized Diploma in Pharmacy (D. Pharmacy) program in 2017.

The Department is dedicated to nurturing competent pharmacy professionals by integrating strong academic foundations with practical, hands-on learning. We provide students with a unique edge through regular teaching and training by leading experts from the Hospitals & Industries ensuring robust industry-academia collaboration.

To enhance professional development, students are actively encouraged to participate in conferences, workshops, skill development programs, and receive comprehensive career guidance. These initiatives aim to build both knowledge and confidence for a successful professional journey.

In alignment with our social responsibility goals, the department organizes and promotes student participation in various community health camps to raise awareness about prevalent diseases such as diabetes, hypertension, and other communicable and non-communicable diseases. These initiatives not only benefit society but also provide students with valuable field experience.

The Department also offers placement assistance and prepares students for rewarding careers in both the government and private sectors, including retail pharmacies, hospital pharmacies, and healthcare services.

With a strong emphasis on academic excellence, ethical practice, and social commitment, the Department of Pharmacy at K. R. Mangalam University is shaping the future of pharmacy through innovation, compassion, and leadership.

5.1. Definitions

- **Programme Educational Objectives (PEOs)**

Programme Educational Objectives of a diploma programme are the statements that describe the expected achievements in their career, and what the diploma holders are expected to perform and achieve during the first few years after their diploma.

- **Programme Outcomes (POs)**

Programme Outcomes are statements that describe what the students are expected to know and be able to do upon completion of the diploma. These relate to the skills, knowledge, and behaviour that students acquire through the programme.

- **Programme Specific Outcomes (PSOs)**

Programme Specific Outcomes define what the students should be able to do at the time of diploma, and they are programme specific. There are two to four PSOs for a programme.

- **Credit**

Credit refers to a unit of contact hours/tutorial hours per week or 02 hours of lab/practical work per week

5.2. Programme Educational Objectives (PEOs)

The PEOs are delayed outcomes measured a few years after completion of the programme, where the diploma of this program will:

- **PEO-1:** Become professional experts in careers associated with pharmaceutical Sciences, and allied fields, establishing knowledge and compliance.
- **PEO-2:** Emerge as leaders, entrepreneurs, and managers, guiding pharma professionals within the healthcare field.
- **PEO-3:** Maintain morals & ethics in their professional conduct, thereby taking responsible decisions which endorse the reliability of the professional healthcare person.
- **PEO-4:** Support for sustainable practices and engage in environment-friendly methods of dealing with patients in healthcare.
- **PEO-5:** Be as good citizens with high value attributes towards society, demonstrating extraordinary professionalism, as a contribution to the well-being of society.

5.3. Programme Outcomes (POs)

After completion of the course, the student will be capable of

- **PO1 Problem Solving:** Possessing the core and basic knowledge associated with the profession of pharmacy to deal with related issues efficiently.
- **PO2 Thinking Abilities:** Developing critical thinking skills to deal with healthcare issues and integrating relevant drug and patient information to support effective clinical decisions.
- **PO3 Interpersonal Skills:** Developing interpersonal skills to deal with people empathetically, effectively engage with patients, and collaborate with healthcare professionals in a clinical setting.
- **PO4 Leadership Skills:** Acquiring leadership traits and skills through curricular and co-curricular activities and developing skills and abilities that will enable him/her to lead or actively contribute to organizational improvement.
- **PO5 Environment and Sustainability:** Recognizing the impact of the profession on the environment to meet the requirements of the Sustainable Development Goals.
- **PO6 Professional Ethics:** Adhering to ethical principles in professional and social settings while being responsible for the consequences of their decisions.

- **PO 7 Social Responsibility:** Recognizing and explaining the key roles of pharmacists in enhancing public health and community well-being.
- **PO 8 Effective Communication Skills:** Demonstrating effective communication skills to convey pharmaceutical concepts and provide accurate information for enhanced patient care.
- **PO 9 Life-long Learning:** Engaging life-long learning and continuous improvement in the skills and knowledge by incorporating modern techniques in professional development.

5.4. Programme Specific Outcomes

On completion of the programme, the students will be

PSO1: Understanding key concepts in pharmacy, including drug mechanisms of action, therapeutic classifications, formulation techniques, pharmacokinetics, and patient care practices to enhance clinical outcomes.

PSO2: Applying the knowledge gained in formulation techniques, mechanistic studies, and quality assurance for effective prescription handling, accurate labelling, and dispensing processes to ensure safe and efficient patient care.

PSO3: Analysing active pharmaceutical ingredients to assess their purity, safety, and efficacy, and further utilizing the skills in quality control, drug formulation, pharmacological evaluation, and community health practices.

PSO4: Evaluating pharmaceutical products and formulations using analytical techniques, integrating concepts of quality assurance, formulation development, and safety assessment to ensure efficacy and compliance.

PSO5: Observing core techniques in pharmaceutics, pharmaceutical chemistry, and pharmacognosy labs to understand principles of drug formulation, compounding, and natural product analysis.

PSO6: Imitating observed lab practices to build hands-on skills in formulation, chemical analysis, and natural product identification, while upholding ethical standards in pharmacy.

PSO7: Performing key lab techniques to develop skills in drug formulation, chemical analysis, and the assessment of natural products, while applying principles of safety, efficacy, and ethical practices in pharmacy.

5.5 Career Avenues

Students will get themselves registered with the state pharmacy council, and the registered pharmacists can work at drug stores in Government Hospitals, Private Hospitals, Clinics,

Community Health Centers, or Private Drug Stores. They may even start their Pharmacy shop (Entrepreneurship) or online Pharmacy and can also work as Medical Sales Representatives.

5.6 Duration

The program duration of the Diploma in Pharmacy is 2 years (yearly pattern).

6 Criteria for Award of Degree

The criteria for the award of a Diploma in Pharmacy (D. Pharm) degree typically include the following:

6.1 Examinations

Diploma in Pharmacy (theory)- 40% marks in each of the subjects separately, including sessional marks

Diploma in Pharmacy (practical)-at least 40% marks in each of the practical examinations, including sessional marks.

The candidates securing 60% marks or above in aggregate in all subjects in a single attempt at the Diploma in Pharmacy (Part-I) or Diploma in Pharmacy (Part-II) examinations shall be declared to have passed in first class the Diploma in Pharmacy (Part-I) or Diploma in Pharmacy (Part-II) examinations.

Candidates securing 75% marks or above in any subject or subjects shall be declared to have passed with distinction in the subject or those subjects, provided he/she pass in all the subjects in a single attempt.

6.2 Practical Training

After completing the academic course, the candidate must undergo practical training in a hospital, pharmacy, or pharmaceutical manufacturing unit for a stipulated period *(usually 500 hours or not less than 3 months).*

6.3 Attendance

The candidate must meet the minimum attendance requirement (75%) in both theory and practical classes for each subject.

6.4 Submission of Practical Records

The candidate must submit complete and satisfactory practical records and reports of the training period as required by the institution.

7. Students' Structured Learning Experience from Entry to Exit in the Programme

At KRMU, we believe in equipping students with the skills, knowledge, and qualifications necessary to succeed in the job market and achieve financial stability. All the programmes are tailored to meet industry demands, preparing students to enter specific careers and contributing to economic development.

7.1 Learn to Live

The university believes in the holistic development of learners, fostering sensitivity towards society, and promoting a social and emotional understanding of the world. Our aim is to nurture well-rounded individuals who can contribute meaningfully to society, lead fulfilling lives, and engage with the complexities of the human experience.

7.2 University Education Objective

Focus on Employability and Entrepreneurship through Holistic Education using Bloom's Taxonomy. By targeting all levels of Bloom's Taxonomy—remembering, understanding, applying, analysing, evaluating, and creating—students are equipped with the knowledge, skills, and attitudes necessary for the workforce and entrepreneurial success. At KRMU, we emphasize on learners' critical thinking, problem-solving, and innovation, ensuring application of theoretical knowledge in practical settings. This approach nurtures adaptability, creativity, and ethical decision-making, enabling diploma students to excel in diverse professional environments and to innovate in entrepreneurial endeavours, contributing to economic growth and societal well-being.

7.3 Importance of Structured Learning Experiences

Structured learning experiences in a Diploma in Pharmacy (D. Pharm) course are crucial for developing competent pharmacists. They ensure a comprehensive understanding of core subjects, enhance practical skills through hands-on training, and provide essential clinical exposure. This approach promotes professional competency by integrating ethical and legal education, maintaining consistency and standardization, and preparing students for advanced studies and diverse career opportunities. Ultimately, structured learning equips students with

the knowledge, skills, and practical experience needed to excel in various pharmacy roles and contribute effectively to healthcare.

7.4 Educational Planning and Execution

- The educational planning and execution for the Diploma in Pharmacy (D. Pharm) course focuses on creating an effective learning environment through a structured curriculum over two academic years.
- The curriculum includes core subjects such as Pharmacology, Pharmacognosy, Pharmaceutical Chemistry, Pharmaceutics, and Clinical Pharmacy, complemented by practical training and soft skills development like communication and ethics.
- The course is divided into two years, each with three sessional examinations and a final examination to assess student performance. Teaching methods include lectures, seminars, group discussions, hands-on training, case studies, and e-learning resources, catering to various learning styles.
- To monitor and review the educational process, regular assessments, student feedback, and faculty meetings are conducted. Additionally, annual curriculum reviews and faculty development workshops ensure that the program remains current and effective. Through these strategies, the D. Pharm course aims to equip students with the necessary knowledge and skills to excel in the field of pharmacy.

7.5 Course Registration and Scheduling

- **Major and Minor Selection**: The D. Pharm program is typically a diploma course focusing on core pharmaceutical sciences. Unlike degree programs, there are no major and minor selections, as PCI standardizes the curriculum to ensure foundational knowledge in pharmacy.
- **Internships/Projects/Dissertations/Apprenticeships**:
  - **Internships**: The PCI mandates a compulsory practical training for not less than 500 hours spread over not less than 3 months after completing the final year. This training is typically conducted in a hospital, pharmacy, or industry.
  - **Projects/Dissertations**: Projects or dissertations are not a mandatory part of the D. Pharm curriculum, but some institutions may include small projects or case studies to enhance practical learning.
  - **Apprenticeships**: Apprenticeships in a pharmaceutical setting are encouraged to provide real-world experience, aligning with PCI's focus on practical training.

7.6 Academic Support Services (Slow & Advanced Learners):

- **Slow Learners**: Tailored support such as additional tutoring, peer mentoring, and remedial classes may be provided to help slow learners grasp the essential concepts.
- **Advanced Learners**: Opportunities like advanced laboratory work, involvement in research activities, and participation in seminars and workshops are provided to challenge and engage advanced learners.

7.7 Student Support Services

- **Mentor-Mentee System**

A structured mentor-mentee system is typically implemented, where each student is assigned a faculty mentor. The mentor provides guidance on academic, personal, and professional matters, ensuring holistic development.

7.8 Counselling and Wellness Services

Counselling services are provided to students to address their mental and emotional well-being. Wellness services may include workshops on stress management, physical fitness, and healthy lifestyle choices.

7.9 Career Services and Training

Career Services: These services provided by the institution help students with job placements, resume building, interview preparation, and networking with potential employers.

Training: The Institution offers specialized training sessions on soft skills, communication, and industry-specific competencies to prepare students for the workforce.

8 Learning and Development Opportunities

8.1 Laboratories and Practical Learning

PCI mandates that D. Pharm programs be equipped with well-furnished laboratories for subjects like Pharmaceutics, Pharmacology, Pharmacognosy, and Pharmaceutical Chemistry. These labs provide hands-on training essential for understanding drug formulation, analysis, and pharmacological testing.

8.2 Experiential Learning

Practical exposure is a key component, with students engaging in activities such as drug preparation, dispensing, patient counselling, and clinical pharmacy practice during their internship or practical training.

8.3 Case-Based Learning/Problem-Based Learning/Project-Based Learning

- **Case-Based Learning (CBL)**

Students analyze and discuss real-world cases to develop problem-solving skills, particularly in subjects like Pharmacology and Therapeutics.

- **Problem-Based Learning (PBL)**

This method involves students working in groups to solve complex, real-world problems, fostering critical thinking and teamwork. This includes the incorporation of small projects to enhance the practical application of knowledge.

- **Workshops, Seminars, Guest Lectures**

Regular workshops, seminars, and guest lectures by industry professionals and academicians are organized to keep students updated with the latest trends and practices in pharmacy.

8.4 Inside & Outside Classroom Learning

Inside Classroom: It includes providing theoretical knowledge through lectures, interactive sessions, and group discussions.

Outside Classroom: This includes Field visits, community pharmacy practice, health camps, and participation in pharmaceutical events and competitions.

8.5 Holistic Education

The curriculum is designed not only to impart technical knowledge but also to promote overall personal and professional growth. Activities such as sports, cultural events, and community service are encouraged to ensure the development of well-rounded individuals.

9 Assessment and Evaluation

The Pharmacy Council of India (PCI) provides guidelines for the registration and scheduling of courses within the Diploma in Pharmacy (D. Pharm) program. Periodic assessments are scheduled throughout the year to evaluate students' progress.

I) Theory examinations

a) Sessional examinations: The duration of the sessional exam shall be 90 minutes. The highest aggregate of any two performances shall form the basis of calculating the sessional marks. The scheme of the question paper for theory sessional examinations shall be as given below.

I. Long Answers (Answer 3 out of 4)	=	3 x 5 = 15
II. Short Answers (Answer 5 out of 6)	=	5 x 3 = 15
III. Very Short Answers (Answer any 5 out of 6)	=	5 x 2 = 10

Total	=	40 marks
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b) Internal assessment: The marks secured by the students out of the total 40 shall be reduced to 20 in each sessional, and then the internal assessment shall be calculated based on the best two averages for 20 marks.

c) Final Examinations: At the end of each academic year, students must appear for final exams in each subject. The dates for these exams are scheduled in advance and are part of the academic calendar.

The scheme of the question paper for the theory examinations conducted by the examining authority (Board / University) shall be as given below. The duration of the final examination shall be 3 hours.

I. Long Answers (Answer 6 out of 7)	=	6 x 5 = 30
II. Short Answers (Answer 10 out of 11)	=	10 x 3 = 30
III. Very Short Answers (Answer any 10 out of 11)	=	10 x 2 = 20

Total	=	80 marks

II) Practical examination

a) Sessional Examinations

There shall be two or more periodic sessional (internal assessment) practical examinations during each academic year. The duration of the sessional exam shall be three hours. The highest aggregate of any two performances shall form the basis of calculating the sessional marks.

The scheme of the question paper for practical sessional examinations shall be as given below.

I. Synopsis	=	10
II. Experiments	=	50
III. Viva voce	=	10
IV. Practical Record Maintenance	=	10

Total	=	80 marks
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* The marks for the experiments shall be divided into various categories, viz. major experiment, minor experiment, spotters, etc. as per the requirement of the course.

b) Internal assessment

The marks secured by the students out of the total of 80 shall be reduced to 10 in each sessional, and then the internal assessment shall be calculated based on the best two averages for 10 marks from the sessional, and the other 10 marks shall be awarded as per the details given below.

Actual performance in the sessional examination	=	10marks
Assignment marks (Average of three)	=	5marks*
Field Visit Report marks (Average for the reports)	=	5 marks$

Total	=	20 marks
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*, $ Only for the courses given with both assignments and field visit/s

Note:

1. For the courses having either assignments or field visit/s, the assessments of assignments or field visit/s shall be done directly for 10 marks and added to the sessional marks.

2. For the courses not having both an assignment and field visit, the whole 20 marks shall be calculated from the sessional marks.

c) Final Practical Examination

The scheme of question paper for the practical examinations conducted by the examining authority (Board / University) shall be as given below. The duration of the final examination shall be 3 hours.

I. Synopsis	=	10 marks
II. Experiments	=	60* marks
III. Viva voce	=	10 marks
Total	=	80 marks

* The marks for the experiments shall be divided into various categories, viz. major experiment, minor experiment, spotters, etc. as per the requirement of the course.

10. Practical Training and Internships

10.1 Internship Period

After completing the theoretical and practical components of the course, students must undergo a mandatory internship or practical training.

This is typically scheduled after the second academic year, lasting a minimum of 500 hours over not less than 3 months.

10.2 Scheduling Training

The internship schedule is often flexible, depending on the availability of training positions in hospitals, pharmacies, or pharmaceutical companies.

11. Feedback and Continuous Improvement Mechanisms

The university has designed various mechanisms for improvement in the curriculum and related areas, which include

11.1 Student Feedback Mechanisms

Student feedback is collected through surveys, timely evaluations, and focus groups to identify areas for improvement in course delivery and content.

11.2 Faculty Feedback and Peer Review

Faculty should be actively engaged in self-assessment, peer reviews, and regular departmental meetings to refine teaching practices and enhance course effectiveness.

11.3 Industry and Alumni Feedback

Feedback from industry professionals, alumni, and employers is also collected from time to time, which helps in ensuring that the curriculum remains relevant to current industry standards and prepares students for the workforce.

11.4 Academic Performance Monitoring

Student progress is tracked and analysed through exam results to identify academic challenges and adjust instructional methods accordingly.

11.5 Curriculum Review and Revision

Regular review and updation in the curriculum is done at the school level to incorporate the latest advancements in pharmaceutical sciences and educational best practices.

11.6 Professional Development for Faculty

Faculty are encouraged to participate in workshops, seminars, and continuous learning programs to stay current with teaching methodologies and industry trends.

11.7 Student Support and Development

Remedial programs are incorporated for struggling students, and enrichment opportunities are provided to the advanced learners based on feedback and performance data.

12. Academic Integrity and Ethics

Academic integrity and ethics are fundamental principles in the D Pharmacy course, ensuring that students conduct themselves with honesty, responsibility, and respect for the academic process. Upholding these values is crucial for fostering a culture of trust and professionalism, essential in the pharmaceutical field where ethical decision-making directly impacts patient care and public health. Students are expected to avoid academic misconduct, such as plagiarism, cheating, and falsification of data, and are encouraged to engage in fair and transparent practices in their studies and research. The course emphasizes the importance of ethical behaviour not only in academic work but also in future professional practice, preparing students to be responsible and ethical pharmacists.

13. Scheme of Studies of D. Pharmacy

SMAS	D. PHARMACY (Scheme of Studies)			
YEAR	**Subject Code**	**Course Title**	**L**	**P**
FIRST	**ER20-11T**	Pharmaceutics – Theory	4	-
	ER20-11P	Pharmaceutics – Practical	-	3
	ER20-12T	Pharmaceutical Chemistry – Theory	4	-
	ER20-12P	Pharmaceutical Chemistry – Practical	-	3
	ER20-13T	Pharmacognosy – Theory	4	-
	ER20-13P	Pharmacognosy – Practical	-	3
	ER20-14T	Human Anatomy & Physiology – Theory	4	-
	ER20-14P	Human Anatomy & Physiology – Practical	-	3
	ER20-15T	Social Pharmacy – Theory	4	-
	ER20-15P	Social Pharmacy – Practical	-	3
Course offered by KRMU		Self-Awareness	1	
		Total	**20**	**15**
SECOND	**ER20-21T**	Pharmacology –Theory	4	-
	ER20-21P	Pharmacology –Practical	-	2
	ER20-22T	Community Pharmacy & Management	4	-
	ER20-22P	Community Pharmacy & Management – Practical	-	3
	ER20-23T	Biochemistry & Clinical Pathology – Theory	4	-
	ER20-23P	Biochemistry & Clinical Pathology – Practical	-	2
	ER20-24T	Pharmacotherapeutics	4	-
	ER20-24P	Pharmacotherapeutics– Practical	-	1
	ER20-25T	Hospital & Clinical Pharmacy – Theory	4	-
	ER20-25P	Hospital & Clinical Pharmacy – Practical	-	1
	ER20-26T	Pharmacy Law & Ethics	4	-
Course offered by KRMU		Managing People & Organizations	1	-
		Total	**24**	**9**

14. Detailed Syllabus of D. Pharmacy

Diploma in Pharmacy I Year

ER 20-11T	**Pharmaceutics**	**L**	**T**	**P**	**C**
Version	2.0	**3**	**1**	**0**	**0**
Category of Course	Theory				
Total Contact Hours	75 hours				
Pre-Requisites/ Co-Requisites	Pharmaceutics				

(L – Lecture T – Tutorial P – Practical C – Credits)

Course Perspective: This course equips students with essential skills in pharmaceutical formulation, preparation, and dispensing, ensuring a solid foundation for careers in the pharmaceutical industry. It will also provide an understanding of medication-compounding and management techniques and their quality control. Theoretical knowledge gained will be helpful in applying for both immediate employment and advanced studies in pharmacy. Effective communication and patient safety are emphasized throughout the course.

Course Outcomes: Upon successful completion of this course, the students will be able to

CO1: Understanding the basics of dosage forms, drug interactions, calculations, and proper medication handling in a healthcare setting.

CO2: Applying knowledge to distinguish between quality control and quality assurance while preparing conventional formulations with proper techniques.

CO3: Analyzing the characteristics and performance of various dosage forms to assess their appropriateness for diverse therapeutic applications in pharmacy.

Course Content

Unit 1 **7 Hrs**

- History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations.
- Pharmacy as a career
- Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia

Unit 2 **5 Hrs**

Packaging materials: Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials.

Unit 3 **3 Hrs**

Pharmaceutical aids: Organoleptic (Colouring, flavouring, and sweetening) agents Preservatives: Definition, types with examples and uses.

Unit 4 **9 Hrs**

- **Unit operations:** Definition, objectives/applications, principles, construction, and workings of:
- **Size reduction:** hammer mill and ball mill
- **Size separation:** Classification of powders according to IP, Cyclone separator, Sieves and standards of sieves.
- **Mixing:** Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer.
- **Filtration:** Theory of filtration, membrane filter and sintered glass filter.
- **Drying:** working of the fluidized bed dryer and process of freeze drying.
- **Extraction:** Definition, Classification, method, and applications.

Unit 5 **41 Hrs**

- **Tablets** – Coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, multilayered, etc.)
- **Capsules** - hard and soft gelatine capsules.
- **Liquid oral preparations** - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution.
- **Topical preparations** - ointments, creams, pastes, gels, liniments and lotions, suppositories, and pessaries.
- Nasal preparations, Ear preparations.
- **Powders and granules** - Insufflations, dusting powders, effervescent powders, and effervescent granules.
- **Sterile formulations** – Injectables, eye drops and eye ointments.
- **Immunological products**: Sera, vaccines, toxoids, and their manufacturing methods.

Unit 6 **5 Hrs**

Basic structure, layout, sections, and activities of pharmaceutical manufacturing plants Quality control and quality assurance: Definition and concepts of quality control and quality assurance, current good manufacturing practice (cGMP), Introduction to the concept of calibration and validation.

Unit 7 **5 Hrs**

Novel drug delivery systems: Introduction, Classification with examples, advantages, and challenges

Learning Experience

- Lectures and Demonstrations: Interactive lectures using visual aids and real-world examples will be used to teach key ideas.
- Hands-On Learning: Opportunities for hands-on learning will be offered through virtual simulations and practical lab sessions.
- Assignments and Assessments: Regular quizzes, practical assignments, and comprehensive exams will assess understanding and application of course material.
- Support and Feedback: During class hours, instructors will provide extra assistance, and students are encouraged to ask for aid and work with others.

Textbooks

1. Pharmaceutics: V. N. Raje, for first-year diploma by CBS Publisher.
2. Pharmaceutics-I by R. M. Mehta

Suggested Readings

1.Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems by Loyd V. Allen, Nicholas G. Popovich and Howard C. Ansel.
2. Aulton's Pharmaceutics by Kevin M.G. Taylor & Michael E. Aulton

Open Educational Resources (OER)

- Books
- PPT
- Notes
- Videos

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II and III	90 Minutes	20	
2	End term examination	180 Min	80	
Total			100	

ER 20-11 P	Pharmaceutics-Practical	L	T	P	C
Version	2.0	**0**	**0**	**3**	**0**
Category of Course	Practical				
Total Contact Hours	75 hours				
Pre-Requisites/ Co-Requisites	-				

Course Perspective: This course provides hands-on experience in preparing and evaluating various dosage forms. It helps in learning formulation techniques, stability, and efficacy evaluation processes. The course emphasizes quality control testing and develops essential teamwork and documentation skills. The practical learnings of this course are helpful in achieving the best career opportunities in the pharmaceutical industry and healthcare settings.

Course Outcomes: Upon completion of the course, the learner will be able to:

CO1: Understanding by observing and calculating working formulas from official master formulas to ensure accurate formulation.

CO2: Applying the knowledge gained in the preparation of various dosage forms based on calculated working formulas to demonstrate practical application.

CO3: Adapting product labels to include essential information for both the product and the patient, enhancing safety and compliance.

CO4: Performing basic quality control tests on common dosage forms to evaluate their quality and efficacy.

Course Content

1. Handling and referring to the official references: Pharmacopoeias, Formularies, etc. for retrieving formulas, procedures, etc.
2. Formulation of the following dosage forms as per monograph standards and dispensing with appropriate packaging and labeling

- Liquid Oral: Simple syrup, Piperazine citrate elixir, Aqueous Iodine solution
- Emulsion: Castor oil emulsion, Cod liver oil emulsion
- Suspension: Calamine lotion, Magnesium hydroxide mixture
- Ointment: Simple ointment base, Sulphur ointment
- Cream: Cetrimide cream
- Gel: Sodium alginate gel
- Liniment: Turpentine liniment, White liniment BPC

- Dry powder: Effervescent powder granules, Dusting powder
- Sterile Injection: Normal Saline, Calcium Gluconate Injection
- Hard Gelatine Capsule: Tetracycline capsules
- Tablet: Paracetamol tablets

3. Formulation of at least five commonly used cosmetic preparations – e.g. cold cream, shampoo, lotion, toothpaste etc
4. Demonstration on various stages of tablet manufacturing processes
5. Appropriate methods of usage and storage of all dosage forms including special dosage such as different types of inhalers, spacers, insulin pens
6. Demonstration of quality control tests and evaluation of common dosage forms viz. tablets capsules, emulsion, sterile injections as per the monographs

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Various systems of measures commonly used in prescribing, compounding and dispensing practices

2. Market preparations (including Fixed Dose Combinations) of each type of dosage forms, their generic name, minimum three brand names and label contents of the dosage forms mentioned in theory/practical

3. Overview of various machines / equipments / instruments involved in the formulation and quality control of various dosage forms / pharmaceutical formulations.

4. Overview of extemporaneous preparations at community / hospital pharmacy vs. manufacturing of dosage forms at industrial level

5. Basic pharmaceutical calculations: ratios, conversion to percentage fraction, alligation, proof spirit, isotonicity

Field Visit

The students shall be taken for an industrial visit to pharmaceutical industries to witness and understand the various processes of manufacturing of any of the common dosage forms viz. tablets, capsules, liquid orals, injectables, etc. Individual reports from each student on their learning experience from the field visit shall be submitted.

Learning Experience

- Hands-On Learning: Opportunities for hands-on learning will be offered through virtual simulations and practical lab sessions.
- Assignments and Assessments: Regular quizzes, practical assignments, and comprehensive exams will assess understanding and application of course material.

Textbooks

- A Text book of Pharmaceuticals Formulation by B.M. Mithal, Vallabh Prakashan.
- Bentleys' Text book of Pharmaceutics, Editor E.A. Rawlins, Elsevier Int.
- The Theory and Practice of Industrial Pharmacy. Leon Lachman, Herbert Lieberman and Joseph Kanig, Editors, Lea and Febiger, Philadelphia. Varghese Publishing House

Suggested Readings:

- Indian Pharmacopoeia, Govt. of India Publication
- Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems by Loyd V. Allen Nicholas G. Popovich, and Howard C. Ansel.
- Aulton's Pharmaceutics by Kevin M.G. Taylor & Michael E. Aulton

Open Educational Resources (OER)

https://www.youtube.com/playlist?list=PLtEqsPSBZlXvvyG09oEF5kgOKCf0WWacG

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination I, II, and III	180 min	20	
2	End term examination	180 min	80	
Total			100	

ER 20-12 T	Pharmaceutical Chemistry	L	T	P	C
Version	2.0	**3**	**1**	**0**	**0**
Category of Course	Theory				
Total Contact Hours	75 hours				
Pre-Requisites/ Co-Requisites	Chemistry, Organic Chemistry, and Physical Chemistry				

Course Perspective: This course focuses on providing a thorough understanding of theoretical concepts of pharmaceutical chemistry. It covers foundational principles, advanced theories, and their interrelationships within the field. It is helpful in gaining the knowledge necessary for effective drug development and therapeutic application, thereby ensuring safer and more effective pharmaceutical care.

Course Outcomes: Upon successful completion of this course, the students will be able to

CO1: Understanding the basic concepts of pharmaceutical chemistry.

CO2: Applying pharmaceutical chemistry knowledge to identify and select appropriate chemical classes of drugs.

CO3: Analysing results of impurity testing of the chemical substances given in the official monographs.

CO4: Evaluating the pharmacological uses, dosage regimen, stability issues and storage conditions of all such chemical substances commonly used as drugs.

Course Content:

Unit 1 **8 Hrs**

Introduction to Pharmaceutical Chemistry

- Scope and objectives
- Sources and types of errors: Accuracy, precision, significant figures
- Impurities in pharmaceuticals: Source and effect of impurities in pharmacopeial substances, importance of limit tests, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals, and arsenic

Unit 2 **8 Hrs**

Volumetric and Gravimetric Analysis

- Fundamentals of volumetric analysis
- Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration

- Gravimetric analysis: Principle and method

Unit 3 **7 Hrs**

Inorganic Pharmaceuticals

Pharmaceutical formulations, market preparations, storage conditions and uses of

● Haematinics: Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron

● Antacids: Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate

● Anti-microbial agents: Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate

● Dental products: Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes

● Medicinal gases: Carbon dioxide, nitrous oxide, oxygen

Unit 4 **2 Hrs**

Nomenclature of Organic Chemical Systems

- Introduction to nomenclature with a focus on heterocyclic compounds containing up to three rings

Unit 5 **9 Hrs**

Drugs Acting on the Central Nervous System

Anaesthetics: Thiopental Sodium*, Ketamine Hydrochloride*, Propofol

Sedatives and Hypnotics: Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital*

Antipsychotics: Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone

Anticonvulsants: Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine

Anti-Depressants: Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine

Unit 6 **9 Hrs**

Drugs Acting on the Autonomic Nervous System

- **Sympathomimetic Agents: Direct Acting:** Nor Epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline.
- **Indirect Acting Agents:** Hydroxy Amphetamine, Pseudoephedrine.
- **Agents With Mixed Mechanism:** Ephedrine, Metaraminol

● **Adrenergic Antagonists:** Alpha Adrenergic Blockers: Tolazoline, Phentolamine ● Phenoxybenzamine, Prazosin.

Beta Adrenergic Blockers: Propranolol*, Atenolol*, Carvedilol

● **Cholinergic Drugs and Related Agents:** Direct Acting Agents: Acetylcholine*, Carbachol, And Pilocarpine.

- **Cholinesterase Inhibitors:** Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide

● **Cholinergic Blocking Agents:** Atropine Sulphate*, Ipratropium Bromide Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*

Unit 7 **5 Hrs**

Drugs Acting on the Cardiovascular System

- Anti-Arrhythmic Drugs: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone, and Sotalol

● Anti-Hypertensive Agents: Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, ● Antianginal Agents: Isosorbide Dinitrate

Unit 8 **2 Hrs**

Diuretics

Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone

Unit 9 **3 Hrs**

Hypoglycemic Agents

Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins

Unit 10 **3 Hrs**

Analgesic and Anti-Inflammatory Agents

Morphine Analogues, Narcotic Antagonists; Nonsteroidal Anti Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac

Unit 11 **8 Hrs**

Anti-Infective Agents

- **Antifungal Agents:** Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride
- **Urinary Tract Anti-Infective Agents:** Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin
- **Anti-Tubercular Agents:** INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid*
- **Antiviral Agents:** Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir
- **Antimalarials:** Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin
- **Sulfonamides:** Sulfanilamide, Sulfadiazine, Sulfametho xazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*

Unit 12 **8 Hrs**

Antibiotics

Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, Tetracyclines: Doxycycline, Minocycline, Macrolides: Erythromycin, Azithromycin, Miscellaneous: Chloramphenicol* Clindamycin

Unit 13 **3 Hrs**

Anti-Neoplastic Agents

- Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate s

Textbooks

1. Chatwal G.R., Pharmaceutical inorganic chemistry, Edition 2021, Volume 1, Himalaya Publishing House.
2. Singh H.K., Kapoor V.K., Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan.

Suggested Readings:

- Wilson and Gisvold, "Organic, medicinal, and Pharmaceutical chemistry", Wolter Kluwer India Pvt. Ltd.

Evaluation Scheme:			
Evaluation Component	**Duration**	**Weightage (%)**	**Date, Time & Venue**
Sessional examination-I, II and III	90 Minutes	20	
End term examination	180 Min	80	
Total		100	

ER20-12P	Pharmaceutical Chemistry Practical	L	T	P	C
		0	0	3	0
Version	2.0				
Category of course	Practical				
Total Contact Hours	75 hours				
Pre-Requisites/ Co-Requisites	Pharmaceutical chemistry/ Analytical chemistry				

Course Perspective: This course provides detailed knowledge of the identification, analysis, and synthesis of compounds with therapeutic potential. It develops a deep understanding of the chemical structures, properties, and interactions of pharmaceuticals, alongside mastering the analytical methodologies employed to ascertain purity, safety, and efficacy of the active moiety.

Course Outcomes: Students of School of Medical and Allied Science at the time of graduation will be capable of:

CO1: Understanding and performing the limit tests for various inorganic elements.

CO2: Applying the knowledge to prepare standard solutions using different analytical techniques.

CO3: Analyzing the purity of the selected compounds against the monograph standards.

CO4: Evaluating qualitative tests to systematically identify the unknown chemical substances.

CO5: Synthesizing chemical substances in the laboratory by observing and imitating the theoretical procedures.

Course Content **No. of Hours: 75 hours**

1 Limit test for

- Chlorides; Sulphate; Iron; heavy metals

2 Identification tests for Anions and Cations as per the Indian Pharmacopoeia

3 Fundamentals of Volumetric Analysis

Preparation of standard solution and standardization of Sodium Hydroxide, Potassium Permanganate

4 Assay of the following compounds

- Ferrous sulphate- by redox titration

- Calcium gluconate by complexometric
- Sodium chloride by Modified Volhard's method
- Ascorbic acid by iodometry
- Ibuprofen by alkalimetry

5 Fundamentals of preparative organic chemistry

Determination of Melting point and boiling point of organic compounds

6 Preparation of organic compounds

- Benzoic acid from Benzamide
- Picric acid from Phenol

7 Identification and test for the purity of pharmaceuticals

Aspirin, Caffeine, Paracetamol, Sulfanilamide

9 Systematic Qualitative analysis experiments (4 substances)

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Different monographs and formularies available and their major contents
2. Significance of quality control and quality assurance in pharmaceutical industries
3. Overview on Green Chemistry
4. Various software programs available for computer aided drug discovery
5. Various instrumentations used for characterization and quantification of drug

Textbooks:

1. Pharmaceutical Chemistry Lab Manual By Amrita Parle, Second Edition
2. Organic Chemistry by I.L. Finar, Volume I
3. Organic Chemistry by P.L.Soni
4. Introduction to Organic Laboratory Techniques by Pavia, Lampman, and Kriz.
5. Vogel's Inorganic Analysis
6. Organic Chemistry by Morrison and Boyd.
7. Heterocyclic Chemistry by T.L. Gilchrist.

Suggested Readings:

1. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.

2. Practical Organic Chemistry by Mann and Saunders.
3. Heterocyclic Chemistry by Raj K. Bansal

Open Educational Resources (OER):

- https://ww w.youtube.c om/watch?v=nSGr1Dg nrCE
- https://www.youtube.com/watch?v=sn1CNpH hnmU
- https://www.youtube.com/c/DrPuspendraClasses

Evaluation Scheme:

	Evaluation Component	**Duration**	**Weightage (%)**	**Date**
2	Sessional I/II Examination (Practical Examination)	180 Minutes	20	
3	End Term Examination (Practical Examination)	180 Minutes	80	
Total			**100**	

ER20-13T	Pharmacognosy Theory	L	T	P	C
Version	2.0	3	1	0	0
Category of Course	Theory				
Total Contact Hours	75 hrs				
Pre-Requisites/ Co-Requisites	Remedial Biology				

Course Perspective: This course provides a foundation that can enhance career opportunities in various fields such as pharmaceuticals, herbal medicine, and natural product industries. It helps in equipping the skills needed for roles in quality control, research and development and product formulation. The course also opens doors to opportunities in regulatory affairs, where knowledge of natural substances is crucial for ensuring product safety and compliance. It also aligns with growing trends in industries seeking eco-friendly solutions and increasing employability in emerging pharmaceutical sectors.

Course Outcomes (COs): Upon successful completion of this course, the students will be capable

CO1: Understanding fundamental principles of pharmacognosy and their applications to pharmaceuticals

CO2: Applying this knowledge in the identification, cultivation, and application of various herbs in health food prescribing for solving various health issues.

CO3: Analysing various processes and latest techniques for identification of phytoconstituents.

Course Content

Unit 1: Definition, history, present status, and scope of Pharmacognosy **2 Hrs.**

Unit 2: Classification of drugs: **4 Hrs.**

- Alphabetical
- Taxonomical
- Morphological
- Pharmacological
- Chemical

● Chemo-taxonomical

Unit 3: Quality control of crude drugs: **6 Hrs.**

● Different methods of adulteration of crude drugs

● Evaluation of crude drugs

Unit 4: Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity, and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins, and resins. **6 Hrs.**

Unit 5: Biological source, chemical constituents, and therapeutic efficacy of the following categories of crude drugs. **34 Hrs.**

- **Laxatives:** Aloe, Castor oil, Ispaghula, Senna
- **Cardiotonic:** Digitalis, Arjuna
- **Carminatives and G.I. regulators:** Coriander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon
- **Astringents:** Myrobalan, Black Catechu
- **Drugs acting on nervous system:** Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca
- **Anti-hypertensive:** Rauwolfia
- **Anti-tussive:** Vasaka, Tolu Balsam
- **Anti-rheumatics:** Colchicum seed
- **Anti-tumour:** Vinca, Podophyllum
- **Antidiabetics:** Pterocarpus, Gymnema
- **Diuretics:** Gokhru, Punarnava
- **Anti-dysenteric:** Ipecacuanha
- **Antiseptics and disinfectants:** Benzoin, Myrrh, Neem, Turmeric
- **Antimalarials:** Cinchona, Artemisia
- **Oxytocic:** Ergot
- **Vitamins:** Cod liver oil, Shark liver oil
- **Enzymes:** Papaya, Diastase, Pancreatin, Yeast
- **Pharmaceutical Aids:** Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine

- **Miscellaneous:** Squill, Galls, Pale catechu, Ashwagandha, Vasaka, Tulsi, Guggul

Unit 6: Plant fibres used as surgical dressings: Cotton, silk, wool and regenerated fibres Sutures – Surgical Catgut and Ligatures **3 Hrs.**

Unit 7: Basic principles involved in the traditional systems of medicine like: Ayurveda, Siddha, Unani and Homeopathy

● **Method of preparation of Ayurvedic formulations like:** Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma **8 Hrs.**

Unit 8: Role of medicinal and aromatic plants in national economy and their export potential **2 Hrs.**

Unit 9: Herbs as health food: **4 Hrs.**

Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic

Unit 10: Introduction to Herbal Formulations **4 Hrs.**

Unit 11: Herbal cosmetics: Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of: Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oil **4 Hrs.**

Unit 12: Phytochemical investigation of drugs **2 Hrs.**

Textbooks

1.Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

2. Textbook of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.

Reference Books/Materials

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

2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.

3. Textbook of Pharmacognosy by T.E. Wallis

	Evaluation Component	**Duration**	**Weightage (%)**
1	Average of best two Sessional examination-I, II and III	90 Minutes	20
2	End term examination	180 Min	80
Total			**100**

ER20-13P	Pharmacognosy – Practical	L	T	P	C
Version	2.0	0	0	3	0
Category of Course	Practical				
Total Contact Hours	75 hrs				
Pre-Requisites/ Co-Requisites	Pharmaceutics and Pharmacognosy				

Course Perspective: This course focuses on understanding and identifying various medicinal plants by examining their physical traits and microscopic characteristics. It involves hands-on evaluations of natural substances using established methods. Through the study of plant materials, analytical skills are enhanced, fostering an appreciation for the internal structures and potential health benefits of these plants. Ultimately, the course provides essential knowledge for effectively using and ensuring the quality of medicinal plants in professional contexts.

Course Outcomes: Upon completion of the course, the learner will be capable of

CO1: Understanding the physical and internal features of medicinal plants for identification.

CO2: Applying various tests to evaluate the quality and purity of natural substances.

CO3: Analyzing cross-sections of plant materials to observe microscopic traits for classification.

CO4: Assessing the therapeutic potential and quality standards of medicinal plants for use in formulations.

Course Content

- **Morphological Identification of the following drugs:**
  Ispaghula, Senna, Coriander, Fennel, Cardamom, Ginger, Nutmeg, Black Pepper, Cinnamon, Clove, Ephedra, Rauwolfia, Gokhru, Punarnava, Cinchona, Agar.
- **Gross anatomical studies (Transverse Section) of the following drugs:**
  Ajwain, Datura, Cinnamon, Cinchona, Coriander, Ashwagandha, Liquorice, Clove, Curcuma, Nux vomica, Vasaka
- **Physical and chemical tests for evaluation of any FIVE of the following drugs:** Asafoetida, Benzoin, Pale catechu, Black catechu, Castor oil, Acacia, Tragacanth, Agar, Guar gum, Gelatine.

Learning Experience

- **Plant Identification:** Accurately identify and classify medicinal plants and natural substances using morphological and anatomical features.
- **Extraction Techniques:** Perform various extraction methods to isolate active compounds from plant materials, evaluating their purity and effectiveness.
- **Phytochemical Screening:** Conduct tests to analyze the presence of phytochemicals, assessing their potential therapeutic properties.
- **Quality Control:** Implement quality control procedures to ensure the authenticity and standardization of herbal products and natural remedies.

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Market preparations of various dosage forms of Ayurvedic, Unani, Siddha, Homeopathic (Classical and Proprietary), indications, and their labelling requirements
2. Market preparations of various herbal formulations and herbal cosmetics, indications, and their labelling requirements
3. Herb-Drug interactions documented in the literature and their clinical significances

Field Visit

The students shall be taken in groups to a medicinal garden to witness and understand the nature of various medicinal plants discussed in theory and practical courses. Additionally, they shall be taken in groups to the pharmacies of traditional systems of medicines to understand the availability of various dosage forms and their labelling requirements. Individual reports from each student on their learning experience from the field visit shall be submitted.

Textbooks

1. Text book of Pharmacognosy by C. K. Kokate, S. B. Gokhale, A.P. Purohit, Nirali Prakashan.
2. Text book of Pharmacognosy by C.S. Shah and J. S. Qadry, CBS Publishers & Distributors Pvt. Ltd.
3. Text Book of Pharmacognosy by T. E. Wallis. CBS Publishers & Distributors Pvt. Ltd.

Suggested Readings

1. Study of crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
2. Powder crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
3. Anatomy of crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
4. Augmented Textbook of Homeopathic Pharmacy by Dr. D. D. Banerjee, Jain Publishers (P) Ltd.

Open Educational Resources (OER)

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4629281/
2. https://diabit.blogspot.com/2020/04/chapter-8-gross-anatomical-studies-id.html
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4542405/

Evaluation Scheme

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date
1	Sessional examination-I, II and III	180 Minutes	20	
2	End term examination	180 Minutes	80	
Total			**100**	

ER20-14T	Human Anatomy And Physiology	L	T	P	C
Version	2.0	3	1	0	0
Category of Course	Theory				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	Biology				

Course Perspective: This course imparts a foundational understanding of the human body's structure and functional mechanisms, focusing on the balance maintained within various systems. It explores the interaction between these systems and provides insights into how they operate collectively. The course enhances the ability to identify and address imbalances and conditions, enabling informed responses to practical situations. This course helps in developing a deeper comprehension of essential bodily processes and their significance in maintaining overall well-being.

Course Outcomes: Upon completion of the course, the learner will be able to:

CO1: Understanding the working of different systems and structures in the body
CO2: Applying this knowledge to assess bodily functions and identify abnormalities and irregularities.
CO3: Analyzing key physiological indicators and their roles in maintaining health

Course Content

Unit 1: Scope of Anatomy and Physiology **2 Hrs.**

- Definition of various terminologies

Unit 2: Structure of Cell: Components and its functions **2 Hrs.**

Unit 3: Tissues of the human body: Epithelial, Connective, Muscular and Nervous tissues – their sub-types and characteristics. **4 Hrs.**

Unit 4: Osseous system: structure and functions of bones of axial and appendicular skeleton Classification, types and movements of joints, disorders of joints **6 Hrs.**

Unit 5: Haemopoietic system **8 Hrs.**

- Composition and functions of blood
- Process of Hemopoiesis 8
- Characteristics and functions of RBCs, WBCs, and platelets
- Mechanism of Blood Clotting
- Importance of Blood Groups

Unit 6: Lymphatic system **3 Hrs.**

- Lymph and lymphatic system, composition, function, and its formation.
- Structure and functions of spleen and lymph node.

Unit 7: Cardiovascular system **8 Hrs.**

- Anatomy and Physiology of heart
- Blood vessels and circulation (Pulmonary, coronary and systemic circulation)
- Cardiac cycle and Heart sounds, Basics of ECG
- Blood pressure and its regulation

Unit 8: Respiratory system **4 Hrs.**

- Anatomy of respiratory organs and their functions.
- Regulation Mechanism of respiration.
- Respiratory volumes and capacities – definitions

Unit 9: Digestive system **8 Hrs.**

- Anatomy and Physiology of GIT
- Anatomy and functions of accessory glands
- Physiology of digestion and absorption

Unit 10: Skeletal muscles **2 Hrs.**

- Histology
- Physiology of muscle contraction
- Disorder of skeletal muscles

Unit 11: Nervous system **8 Hrs.**

- Classification of nervous system
- Anatomy and physiology of cerebrum, cerebellum, mid brain

- Function of hypothalamus, medulla oblongata and basal ganglia
- Spinal cord-structure and reflexes
- Names and functions of cranial nerves.
- Anatomy and physiology of sympathetic and parasympathetic nervous system (ANS)

Unit 12: Sense organs - Anatomy and physiology of **6 Hrs.**

- Eye
- Ear
- Skin
- Tongue
- Nose

Unit 13: Urinary system **4 Hrs.**

- Anatomy and physiology of urinary system
- Physiology of urine formation 4
- Renin - angiotensin system
- Clearance tests and micturition

Unit 14: Endocrine system (Hormones and their functions) **6 Hrs.**

- Pituitary gland
- Adrenal gland
- Thyroid and parathyroid gland
- Pancreas and gonads

Unit 15: Reproductive system **4 Hrs.**

- Anatomy of male and female reproductive system
- Physiology of menstruation 4
- Spermatogenesis and Oogenesis
- Pregnancy and parturition

Learning Experience

- **Lectures and Demonstrations:** Core concepts will be taught through interactive lectures with visual aids and real-life examples.

- **Hands-On Learning:** Practical lab sessions and virtual simulations will provide experiential learning opportunities.
- **Assignments and Assessments:** Regular quizzes, practical assignments, and comprehensive exams will assess understanding and application of course material.
- **Support and Feedback:** Instructors will provide additional support through scheduled academic hours, and students will be encouraged to seek help and collaborate with their peers.

Textbooks

- Ross and Wilson Anatomy and Physiology in Health and Illness
- Human Anatomy and Physiology by Tortora, Gerard J

Suggested Readings

- anatomy and physiology ross and wilson - Search (bing.com)
- (PDF) Principles of Anatomy and Physiology 14e with Atlas of the Skeleton Set by Gerard J. Tortora | Paula C - Academia.edu

Open Educational Resources (OER)

- Books
- PPT
- Notes
- Videos

Evaluation Scheme

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II and III	90 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER20-14P	Human Anatomy And Physiology-Practical	L	T	P	C
Version	2.0	0	0	3	0
Category of Course	Practical				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	Biology				

Course Perspective: The course provides hands-on experience to reinforce theoretical concepts related to the human body's structure and functions. It involves a practical exploration of various body systems. Laboratory exercises enhance the ability to identify and address physiological conditions. This course emphasizes the application of knowledge in real-world scenarios, promoting critical thinking and problem-solving capabilities.

Course Outcomes: Upon completion of the course, the learner will be capable of

CO1: Understanding essential concepts related to human body and their importance through hands-on observation.

CO2: Applying the knowledge gained by performing practicals and monitoring various indicators to assess overall health.

CO3: Analysing the findings to recognize patterns and make informed decisions about health.

Course Content:

1. Study of a compound microscope
2. General techniques for the collection of blood
3. Microscopic examination of Epithelial tissue, Cardiac muscle, Smooth muscle, Skeletal muscle, Connective tissue, and Nervous tissue of ready / pre-prepared slides.
4. Study of Human Skeleton- Axial skeleton and appendicular skeleton
5. Determination of

a. Blood group

b. ESR

c. Haemoglobin content of blood

d. Bleeding time and Clotting time

6. Determination of the WBC count of blood

7. Determination of the RBC count of blood
8. Determination of the Differential count of blood
9. Recording of Blood Pressure in various postures, different arms, before and after exertion, and interpreting the results
10 Recording of Body temperature (using mercury, digital, and IR thermometers at various locations), Pulse rate/ Heart rate (at various locations in the body, before and after ' exertion), and Respiratory Rate
11. Recording Pulse Oxygen (before and after exertion)
12. Recording the force of air expelled using the Peak Flow Meter
13. Measurement of height, weight, and BMI
14. Study of various systems and organs with the help of charts, models, and specimens

a) Cardiovascular system
b) Respiratory system
c) Digestive system
d) Urinary system
e) Endocrine system
f) Reproductive system
g) Nervous system
h) Eye
i) Ear
j) Skin

Learning Experience

- **Hands-on Skills:** These practicals offer real-world experience in handling equipment, conducting experiments, and performing clinical measurements, vital for healthcare practice.
- **Deeper Understanding:** Observing tissues, organs, and physiological functions enhances theoretical knowledge with tangible, visual learning.
- **Critical Analysis:** Engaging with tasks like blood testing, body measurements, and system studies fosters analytical thinking and precision.
- **Clinical Relevance:** The experiments connect directly to healthcare practices, building foundational skills for diagnostics and patient care.

- **Holistic Learning:** The comprehensive scope covers multiple systems of the body, helping to integrate and apply knowledge across different areas of anatomy and physiology.

Textbooks

- S.R. Kale and R.R. Kale, Textbook of Practical Anatomy and Physiology
- Goyal R.K., Natvar M.P. and Shah S.A., Practical Anatomy, Physiology and Biochemistry, Experimental Physiology

Open Educational Resources (OER)

- Books
- PPT
- Charts/Models
- Videos

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II, and III	180 Minutes	20	
4	End term examination	180 Minutes	80	
Total			100	

ER20-15T	Social Pharmacy (Theory)	L	T	P
Version	2.0	3	1	0
Category of course	Theory			
Total Contact Hours	75 hrs.			
Pre-requisites/Exposure	Social Sciences			
Co-requisites	Pharmaceutics			

Course Perspectives: This course is designed to align academic knowledge with career and professional development goals. By focusing on public health, preventive care, nutrition, microbiology, and health systems, it prepares students for a variety of roles in pharmacy and public health. It also equips them with the skills needed for career advancement and professional growth, ensuring they can contribute effectively to community health and the broader healthcare system.

Course Outcomes (COs): On completion of this course, the student will be capable of:

CO1: Understanding various sources of health hazards and preventive measures for diseases.

CO2: Applying knowledge for the successful implementation of various national health programs and engaging in discussions about the roles of pharmacists in these programs.

CO3: Analysing various healthcare issues related to food and nutritional substances.

Course Content

Unit 1: Introduction to Social Pharmacy **9 Hrs.**

- Definition and Scope. Social Pharmacy as a discipline and its scope in improving public health. Role of Pharmacists in Public Health. (2)
- Concept of Health - WHO Definition, various dimensions, determinants, and health indicators. (3)
- National Health Policy – Indian perspective (1)
- Public and Private Health System in India, National Health Mission (2)
- Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals (1)

Unit 2: Preventive healthcare – Role of Pharmacists in the following: 18 Hrs.

- Demography and Family Planning (3)
- Mother and child health, importance of breastfeeding, ill effects of infant milk
- substitutes and bottle feeding (2)
- Overview of Vaccines, types of immunity and immunization (5)
- Effect of Environment on Health – Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste
- disposal, occupational illnesses, Environmental pollution due to pharmaceuticals (6)
- Psychosocial Pharmacy: Drugs of misuse and abuse – psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours (2)

Unit 3: Nutrition and Health 10 Hrs.

- Basics of nutrition – Macronutrients and Micronutrients (3)
- Importance of water and fibres in diet (1)
- Balanced diet, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food (3)
- Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods (1)
- Dietary supplements, nutraceuticals, food supplements – indications, benefits, Drug-Food Interactions (2)

Unit 4: Introduction to Microbiology and Common Microorganisms (3) **28 Hrs.**

- **Epidemiology:** Introduction to the terms Epidemiology, its applications, terms such as epidemic, pandemic, endemic, mode of transmission, quarantine, isolation, incubation period, and contact tracing. (2)
- Causative agents, epidemiology, and clinical presentations and Role of Pharmacists in educating the public in the prevention of the following communicable diseases:
    - Respiratory infections – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola (7)
    - Intestinal infections – poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning (7)

- Arthropod-borne infections - dengue, malaria, filariasis and, chikungunya (4)
- Surface infections – trachoma, tetanus, leprosy (2)
- STDs, HIV/AIDS (3)

Unit 5: Introduction to health systems and all ongoing National health programs in India, their objectives, functioning, outcome and the role of pharmacists. 8 Hrs.

Unit 6: Pharmacoeconomics - basics, Health Insurance, Health Maintenance Organizations (HMOs), Health spending, Out of-pocket expenses. 2 Hrs.

Learning Experience (Theory Focus)

- **Hands-on Skills**
  Engage in case studies and simulations that provide practical applications of theoretical concepts, such as disease prevention, health policies, and nutrition.
- **Deeper Understanding**
  Explore the definitions and dimensions of health, and the role of various determinants and indicators, through in-depth discussions and analyses of real-world examples.
- **Critical Analysis**
  Analyze national health policies and programs, assessing their effectiveness and relevance to public health challenges through group projects and presentations.
- **Clinical Relevance**
  Relate theoretical knowledge of diseases and health systems to current healthcare practices, emphasizing the pharmacist's role in public health initiatives.

- **Holistic Learning**
  Integrate knowledge across various subjects, such as microbiology, nutrition, and epidemiology, to understand the interconnectedness of health issues and their impact on community health.

Text Books

- Social Pharmacy: Tayler, Geoffrey. Pharmaceutical Press. London.
- S Khurana, P Suresh and R Kalsi. Health Education & Community Pharmacy. S Vikas & Co.

- Textbook by Dandiya PC, Zafer ZYK, Zafer A. Health education & Community Pharmacy. Vallabh Prakashan.

Reference Books/OERs

- Social Pharmacy – Innovation and development. Geoff Harding, Sarah Nettleton and Kevin Taylor. The Pharmaceutical Press.
- Websites of Ministry of Health and Family Welfare, National Health Portal
- Various WHO publications www.who.int

Evaluation Scheme:

Sr. No.	Evaluation Component	Duration	Weightage (%)
1	Sessional examination-I, II and III	90 Minutes	20
2	End term examination	180 min	80
Total			100

ER20-15P	Social Pharmacy (Practical)	L	T	P	C
Version	2.0	0	0	3	0
Category of course	Practical				
Total Contact Hours	75 hrs.				
Pre-requisites/Exposure	Social Sciences				
Co-requisites	Pharmaceutics				

Course Perspectives: This course is designed to imparting hands-on knowledge and skills essential for public health improvement. It covers diverse areas including immunization schedules, reproductive and child health, and family planning devices. It provides insights into practical knowledge related to personal and public hygiene. The course also emphasizes on health communication, water purification, and dietary counselling, providing students with the ability to educate the public on health, hygiene, and nutrition.

Course Outcomes: On completion of this course, the student will be capable of:

CO1: Understanding and explaining social pharmacy principles and their importance in healthcare.

CO2: Applying the knowledge gained in demonstrating hands-on skills using pharmacy tools and equipment.

CO3: Analysing community health data and conducting needs assessment with real-world cases requiring interdisciplinary problem-solving.

CO4: Evaluating the outcomes of health interventions on community health and engaging in self-assessment and peer feedback sessions to identify areas in need of improvement.

Course content

1. National immunization schedule for children, adult vaccine schedule, Vaccines not included in the National Immunization Program.
2. RCH – reproductive and child health – nutritional aspects
3. Family planning devices
4. Microscopical observation of different microbes (readymade slides)
5. Oral Health and Hygiene
6. Personal hygiene and etiquettes – hand washing techniques, Cough and sneeze etiquettes.
7. Various types of masks, PPE gear, wearing/using them, and disposal.
8. Menstrual hygiene, products used

9. First Aid – Theory, basics, demonstration, hands on training, audio-visuals, and practice, BSL (Basic Life Support) Systems [SCA - Sudden Cardiac Arrest, FBAO - Foreign Body Airway Obstruction, CPR, Defibrillation (using AED) (Includes CPR techniques, First Responder).

10. Emergency treatment for all medical emergency cases viz. snake bite, dog bite, insecticide poisoning, fractures, burns, epilepsy etc.

11. Role of Pharmacist in Disaster Management.

12. Marketed preparations of disinfectants, antiseptics, fumigating agents, antilarval agents, mosquito repellents, etc.

13. Health Communication: Audio / Video podcasts, Images, Power Point Slides, Short Films, etc. in regional language(s) for mass communication / education / Awareness on 5 different communicable diseases, their signs and symptoms, and prevention.

14. Water purification techniques, use of water testing kit, calculation of Content/percentage of $KMnO_4$, bleaching powder to be used for wells/tanks

15. Counselling children on junk foods, balanced diets – using Information, Education and Communication (IEC), counselling, etc. (Simulation Experiments).

16. Preparation of various charts on nutrition, sources of various nutrients from Locally available foods, calculation of caloric needs of different groups (e.g. child, mother, sedentary lifestyle, etc.). Chart of glycemic index of foods.

17. Tobacco cessation, counselling, identifying various tobacco containing products through charts/pictures

Assignment

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. An overview of Women's Health Issues

2. Study the labels of various packed foods to understand their nutritional contents

3. Breastfeeding counselling, guidance – using Information, Education and Communication (IEC)

4. Information about the organizations working on de-addiction services in the region (city / district, etc.)

5. Role of a pharmacist in disaster management – A case study

6. Overview on the National Tuberculosis Elimination Programme (NTEP)

7. Drug disposal systems in the country, at industry level and citizen level
8. Various Prebiotics or Probiotics (dietary and market products)
9. Emergency preparedness: Study of local Government structure with respect to Fire, Police departments, health department
10. Prepare poster/presentation for general public on any one of the Health Days. e.g. Day, AIDS Day, Handwashing Day, ORS day, World Diabetes Day, World Heart Day, etc.
11. List of home medicines, their storage, safe handling, and disposal of unused medicines
12. Responsible Use of Medicines: From Purchase to Disposal
13. Collection of newspaper clips (minimum 5) relevant to any one topic and its submission in an organized form with collective summary based on the news items
14. Read a minimum of one article relevant to any theory topic, from Pharma /Science/ or other Periodicals and prepare summary of it for submission
15. Potential roles of pharmacists in rural India

Field Visits

The students shall be taken in groups to visit any THREE of the following facilities to witness and understand the activities of such centres/facilities from the perspectives of the topics discussed in theory and/or practical courses. Individual reports from each student on their learning experience from the field visits shall be submitted.

1. Garbage Treatment Plant
2. Sewage Treatment Plant
3. Bio-medical Waste Treatment Plant
4. Effluent Treatment Plant
5. Water purification plant
6. Orphanage / Elderly-Care-Home / School and or Hostel/Home for persons with disabilities
7. Primary health care centre

Learning Experience

1. **Leadership in Health Awareness**: The course empowers students to take leadership roles in promoting public health awareness, from vaccinations to tobacco cessation campaigns.
2. **Proficiency in First Aid and Emergency Response**: Gaining skills in CPR, defibrillation, and emergency treatment significantly enhances students' capabilities in life-saving interventions and first-responder responsibilities.

3. **Competency in Health Education**: Through health communication exercises, students develop strong communication and interpersonal skills, allowing them to educate diverse populations on critical health issues.
4. **Critical Thinking in Disease Prevention**: Understanding microbiology, disease prevention techniques, and epidemiology equips students with critical thinking abilities essential for tackling healthcare challenges.
5. **Professional Ethics and Social Responsibility**: Engaging in activities such as menstrual hygiene and disaster management fosters a sense of social responsibility and ethical professional behavior in pharmacy practice.

Text Books

- Social Pharmacy: Tayler, Geoffrey. Pharmaceutical Press. London.
- S Khurana, P Suresh and R Kalsi. Health Education & Community Pharmacy. S Vikas & Co.

Reference Books/OERs

- Websites of Ministry of Health and Family Welfare, National Health Portal
- Various WHO publications www.who.int

Sr. No.	Evaluation Component	Duration	Weightage (%)
1	Sessional examination-I, II and III	180 Minutes	20
2	End term examination	180 min	80
Total			100

SELF AWARENESS

Total Contact Hours: 30 Hours **1 Lecture Per Week**

Course Perspective: The Self-Awareness course is a transformative journey designed to cultivate self-understanding, emotional intelligence, and purposeful living among students. Anchored in reflective practices and psychological frameworks, the course helps learners explore their identity, values, emotional triggers, cognitive biases, personality traits, and motivation patterns.

Using tools such as the Johari Window, MBTI, Habit Loops, and the Growth Mindset model, students engage in interactive activities like reflective journaling, personality assessments, emotional diaries, and vision board creation. The course aligns with the university's mission by fostering employability, ethical leadership, lifelong learning, and a mindset oriented toward innovation, mindfulness, and global readiness.

Course Outcomes (COs): Upon successful completion of the course, students will be able to:

CO1: Identify and articulate their self-concept, personal values, and belief systems using structured models like the Johari Window and self-efficacy theory.

CO2: Recognize emotional triggers and cognitive distortions and apply emotional regulation strategies to enhance personal and interpersonal effectiveness.

CO3: Demonstrate key components of emotional intelligence-awareness, empathy, and social skills—through self-assessments and real-life applications.

CO4: Apply behavior-change tools such as habit trackers, coping style inventories, and mindset theory to develop resilience and adaptability.

CO5: Formulate a purpose-driven vision using SMART goals and reflective exercises, contributing to ethical leadership and lifelong personal growth.

Course Content:

Unit I: Foundations of Self & Identity **8 Hrs.**

- Session 1: Introduction to Self-Awareness

- Session 2: Self-concept & Identity
- Session 3: Values and Beliefs
- Session 4: Johari Window & Self-Disclosure

Unit II: Emotional Intelligence & Thought Patterns 8 Hrs.

- Session 5: Emotions and Triggers
- Session 6: Cognitive Biases
- Session 7: Emotional Intelligence
- Session 8: Personality Frameworks

Unit III: Behavior, Mindset & Perception 8 Hrs.

- Session 9: Habit Loops & Derailers
- Session 10: Coping & Defense Mechanisms
- Session 11: Perception, Attitude and Attribution
- Session 12: Growth vs Fixed Mindset

Unit IV: Purpose, Mindfulness & Goal Setting 6 Hrs.

- Session 13: Motivation Drives & Purpose
- Session 14: MSC Model & Mindfulness
- Session 15: Goal Setting & Visioning

Assessment Plan

Component	Weightage
Reflective Journal (Weekly)	20%
Personality & EQ Assessments	20%
Class Participation / Peer Feedback	10%
Self-Development Plan Presentation	30%
Final Quiz / Viva	20%

Note: ***A certificate will be provided on completion of the above course.***

Suggested Readings & Resources

Core Books & Texts

1. **Daniel Goleman** – *Emotional Intelligence: Why It Can Matter More Than IQ*
   Foundational text for emotional intelligence and social-emotional learning.

2. **Stephen R. Covey** – *The 7 Habits of Highly Effective People*
   Focuses on personal values, self-regulation, goal-setting, and proactive living.

3. **Carol S. Dweck** – *Mindset: The New Psychology of Success*
   Essential for understanding growth vs. fixed mindset, motivation, and resilience.

4. **Rick Hanson** – *Hardwiring Happiness*
   Explores neuroscience, habit-building, and reframing thoughts for well-being.

5. **Marshall B. Rosenberg** – *Nonviolent Communication*
   Helps in developing empathy, communication, and self-awareness in interactions

Recommended Readings

6. **Susan David** – *Emotional Agility*
   Useful for managing thoughts and feelings aligned with values and purpose.

7. **James Clear** – *Atomic Habits*
   Applies directly to “Habit Loops & Derailers” and behavioral transformation.

8. **Ryan Holiday** – *The Obstacle Is the Way*
   Practical guidance on mindset, purpose, and emotional control under stress.

9. **Deborah Tannen** – *You Just Don't Understand*
   Insights into perception, communication styles, and attribution biases.

10. **Christopher Germer** – *The Mindful Path to Self-Compassion*
    Explores mindfulness, selflessness, and compassion—aligned with MSC model.

Articles, Journals & Online Tools

- **Harvard Business Review** articles on:
  - Self-awareness
  - Emotional intelligence in leadership
  - Personal productivity and purpose
- **Personality Assessment Tools**:
  - MBTI (Myers–Briggs Type Indicator) – www.16personalities.com
  - Big Five Personality Traits – IPIP-NEO Test
  - EQ tests and coping inventories – Psychology Tools
- **TED Talks**:
  - *"The Power of Vulnerability"* – Brené Brown
  - *"Grit: The Power of Passion and Perseverance"* – Angela Duckworth
  - *"What Makes a Good Life?"* – Robert Waldinger

D. Pharmacy II Year

ER20-21 T	Pharmacology – Theory	L	T	P	C
Version	2.0	3	1	0	0
Category of Course	Core				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	Human Anatomy and Physiology				

Course Perspective: This course offers a foundational understanding of drug interactions and their effects on the body, developing key skills for applying pharmacological principles in practical settings. As the course progresses, it deepens theoretical knowledge, preparing individuals for roles in pharmacy practice, healthcare, and regulatory sectors. It provides a strong base for future career growth in the pharmaceutical and healthcare industries.

Course Outcomes (Cos): Upon completion of the course, the learner will be capable of
CO1: Explaining fundamental pharmacological concepts and principles, detailing how drugs interact with biological systems.
CO2: Applying the knowledge gained so far using case studies related to drug interactions and their implications in health outcomes.
CO3: Analyzing theoretical scenarios related to drug distribution and patient care to identify challenges and propose evidence-based solutions.

Course Content:

Unit 1: General Pharmacology **10 Hrs.**

- Introduction and scope of Pharmacology
- Various routes of drug administration - advantages and disadvantages
- Drug absorption - definition, types, factors affecting drug absorption
- Bioavailability and the factors affecting bioavailability
- Drug distribution - definition, factors affecting drug distribution
- Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms
- Excretion of drugs - Definition, routes of drug excretion

- General mechanisms of drug action and factors modifying drug action

Unit 2: Drugs Acting on the Peripheral Nervous System 11 Hrs.

- Steps involved in neurohumoral transmission
- Definition, classification, pharmacological actions, dose, indications, and contraindications of

a) Cholinergic drugs

b) Anti-Cholinergic drugs

c) Adrenergic drugs

d) Anti-adrenergic drugs

e) Neuromuscular blocking agents

f) Drugs used in Myasthenia gravis

g) Local anaesthetic agents

h) Non-Steroidal Anti-Inflammatory drugs (NSAIDs)

Unit 3: Drugs Acting on the Eye 2 Hrs.

Definition, classification, pharmacological actions, dose, indications, and contraindications of

- Miotics
- Mydriatics
- Drugs used in Glaucoma

Unit 4: Drugs Acting on the Central Nervous System 8 Hrs.

Definition, classification, pharmacological actions, dose, indications, and contraindications of

- General anaesthetics
- Hypnotics and sedatives
- Anti-Convulsant drugs
- Anti-anxiety drugs
- Anti-depressant drugs
- Anti-psychotics
- Nootropic agents
- Centrally acting muscle relaxants
- Opioid analgesics

Unit 5: Drugs Acting on the Cardiovascular System 6 Hrs.

Definition, classification, pharmacological actions, dose, indications, and contraindications of

- Anti-hypertensive drugs
- Anti-anginal drugs
- Anti-arrhythmic drugs
- Drugs used in atherosclerosis and
- Congestive heart failure
- Drug Therapy for Shock

Unit 6: Drugs Acting on Blood and Blood Forming Organs 4 Hrs.

Definition, classification, pharmacological actions, dose, indications and contraindications of

- Hematinic agents
- Anti-coagulants
- Anti-platelet agents
- Thrombolytic drugs

Unit 7: Definition, classification, pharmacological actions, dose, indications and contraindications of 2 Hrs.

- Bronchodilators
- Expectorants
- Anti-tussive agents
- Mucolytic agents

Unit 8: Drugs Acting on the Gastrointestinal Tract 5 Hrs.

Definition, classification, pharmacological actions, dose, indications and contraindications of

- Anti-ulcer drugs
- Anti-emetics
- Laxatives and purgatives
- Anti-diarrheal drugs

Unit 9: Drugs Acting on the Kidney 2 Hrs.

Definition, classification, pharmacological actions, dose, indications, and contraindications of

- Diuretics
- Anti-Diuretics

Unit 10: Hormones and Hormone Antagonists 8 Hrs.

Physiological and pathological role and clinical uses of

- Thyroid hormones
- Anti-thyroid drugs
- Parathormone
- Calcitonin
- Vitamin D
- Insulin
- Oral hypoglycemic agents
- Estrogen
- Progesterone
- Oxytocin
- Corticosteroids

Unit 11: Autocoids 3 Hrs.

- Physiological role of Histamine, 5 HT and Prostaglandins
- Classification, clinical uses and adverse effects of antihistamines and 5 HT antagonists

Unit 12: Chemotherapeutic Agents: Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication, and contraindications of drugs belonging to 12 Hrs.

- Penicillins
- Cephalosporins
- Aminoglycosides
- Fluoroquinolones
- Macrolides
- Tetracyclines
- Sulphonamides

- Anti-tubercular drugs
- Anti-fungal drugs
- Anti-viral drugs
- Anti-amoebic agents
- Anthelmintics
- Anti-malarial agents
- Anti-neoplastic agents

Unit 13: Biologicals **2 Hrs.**

Definition, types, and indications of biological agents with examples

Learning Experience

- **Experimental Design:** Develop skills in designing and conducting experiments to study drug effects and interactions.
- **Analytical Methods:** Use laboratory techniques such as chromatography, spectrophotometry, and bioassays to analyze drug properties and effects

Textbooks

1. K.D. Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
2. Pharma Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics

Suggested Readings

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale‟s Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

Open Educational Resources (OER)

1. PubMed research papers related to disease/ pathway

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date
1	Sessional examination-I, II and III	90Minutes	20	
2	End Term Examination (Written Examination)	180 Minutes	80	
Total			100	

ER20-21 P	Pharmacology – Practical	L	T	P	C
Version	2.0	0	0	2	0
Category of Course	Core				
Total Contact Hours	50				
Pre-Requisites/ Co-Requisites	Human Anatomy and Physiology				

Course Perspective: The practical pharmacology learning experience enhances students' technical skills in lab techniques and equipment use, teaches them experimental design and data analysis, and deepens their understanding of drug mechanisms. Through hands-on practice, students observe drug interactions with biological systems, explore dose-response relationships, and apply pharmacological principles to real-world scenarios.

Course Outcomes: Upon completion of the course, the learner will be able to:

CO1: Studying and reporting the local anesthetic, mydriatic, and miotic effects of the given drug on the rabbit eye.

CO 2: Choosing an appropriate animal experiment model to study the effects of drugs acting on the central nervous system and submitting the report.

CO 3 Performing experiments with given (simulated) tissues on isolated organs/tissues and interpreting the results.

CO 4: Interpreting the dose-dependent responses of drugs in various animal experiment models.

Course Content

- Introduction to experimental pharmacology
- Study of laboratory animals (a) Mice; (b) Rats; (c) Guinea pigs; (d) Rabbits
- Commonly used instruments in experimental pharmacology
- Different routes of administration of drugs in animals
- Types of pre-clinical experiments: In-Vivo, In-Vitro, Ex-Vivo, etc. 6. Techniques of blood collection from animals
- Study of local anaesthetics on rabbit eye
- Study of Mydriatic effect on rabbit eye
- Study of Miotic effect on rabbit eye
- Effect of analgesics using Analgesiometer

- Study of analgesic activity by writhing test
- Screening of anti-convulsant using Electro Convulsiometer
- Screening of Muscle relaxants using Rota-Rod apparatus
- Screening of CNS stimulants and depressants using Actophotometer
- Study of anxiolytic activity using elevated plus maze method
- Study of effect of drugs (any 2) on isolated heart
- Effect of drugs on ciliary motility on frog's buccal cavity
- Pyrogen testing by rabbit method

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Introduction to Allergy Testing
2. Introduction to Toxicity Studies
3. Drug Facts Labels of US FDA
4. Pre-clinical studies in new drug development
5. Medicines and meals: Before or After food
6. Pre-clinical studies in new drug development
7. Drugs available as paediatric formulations
8. Drug information apps

Textbooks

1. K. D. Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
2. Pharma Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics

Suggested Readings

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

Open Educational Resources (OER)

PubMed research papers related to disease/ pathway

Learning Experience

A. Drug Mechanisms:

- **Pharmacodynamics:** Understand how drugs exert their effects on the body, including receptor interactions, signal transduction pathways, and the molecular basis of drug action.
- **Pharmacokinetics:** Learn about the processes of drug absorption, distribution, metabolism, and excretion (ADME), and how these processes affect drug efficacy and safety.

B. Drug Classification and Use:

- **Drug Classes:** Study different classes of drugs, their therapeutic uses, mechanisms of action, and side effects.
- **Therapeutic Applications:** Gain knowledge about how drugs are used to treat various diseases and conditions, including their indications, contraindications, and potential interactions.

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date
1	Mid Term Examination (Written Examination)	90Minutes	20	
2	End Term Examination (Written Examination)	180 Minutes	80	
Total			100	

ER20-22T	Community Pharmacy & Management – Theory	L	T	P	C
Version	2.0	**3**	**1**	**0**	**0**
Category of Course	Core				
Total Contact Hours	75 hrs				
Pre-Requisites/ Co-Requisites	Pharmaceutics				

Course Perspective: This course provides the essential skills needed to excel in community pharmacy practice, emphasizing patient care, communication, and operational management. It focuses on developing leadership, ethical compliance, and practical pharmacy skills. The training prepares individuals to manage pharmacy operations, deliver personalized patient care, and contribute to public health. Upon completion, readiness for successful careers in community pharmacy and healthcare administration can be achieved.

Course Outcomes: Upon completion of the course, the learner will be able to:

CO1: Describe the establishment, legal requirements, and effective administration of a community pharmacy

CO2: Professionally handle prescriptions and dispense medications

CO3: Counsel patients about the disease, prescription, and or non-prescription drugs

CO4: Perform basic health screening on patients and interpret the reports in the community pharmacy settings

Course Content

Unit 1: Community Pharmacy Practice **2 Hrs.**

Definition, history, and development of community pharmacy – International and Indian scenarios

Unit 2 **3 Hrs.**

- Professional responsibilities of community pharmacists
- Introduction to the concept of Good Pharmacy Practice and SOPs**.**

Unit 3: Prescription and Prescription Handling **7 Hrs.**

- Definition, parts of prescriptions, legality of prescriptions, prescription handling, labeling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage
- Dispensing process, Good Dispensing Practices, dispensing errors, and strategies to minimize them

Unit 4: Communication skills **6 Hrs.**

- Definition, types of communication skills
- Interactions with professionals and Patients
- Verbal communication skills (one-to-one, over the telephone)
- Written communication skills
- Body language
- Patient interview techniques

Unit 5: **10 Hrs.**

Patient counseling- Definition and benefits of patient counseling

Stages of patient counseling - Introduction, counseling content, counseling process, and closing the Counseling session

Barriers to effective counseling - Types and strategies to overcome the barriers

Patient counseling points for chronic diseases/disorders - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS Patient

Package Inserts - Definition, importance and benefits, Scenarios of PPI use in India and other countries

Patient Information leaflets - Definition and uses

Unit 6: Medication Adherence **2 Hrs.**

Definition, factors influencing non-adherence, strategies to overcome non-adherence

Unit 7: Health Screening Services in Community Pharmacy **5 Hrs.**

Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, and referral of undiagnosed cases

Unit 8: Over The Counter (OTC) Medications **15 Hrs.**

- Definition, need, and role of Pharmacists in OTC medication dispensing
- OTC medications in India, counseling for OTC products
- Self-medication and the role of pharmacists in promoting safe practices during self-medication
- Responding to symptoms, minor ailments, and advice for self-care in conditions such as – Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling)

Unit 9: Community Pharmacy Management **25 Hrs.**

- Legal requirements to set up a community pharmacy
- Site selection requirements
- Pharmacy designs and interiors
- Vendor selection and ordering
- Procurement, inventory control methods, and inventory management
- Financial planning and management
- Accountancy in community pharmacy – Day book, Cash book
- Introduction to pharmacy operation softwares – usefulness and availability
- Customer Relation Management (CRM)
- Audits in Pharmacies
- SOP of Pharmacy Management
- Introduction to Digital Health, mHealth and Online pharmacies

Learning Experience

- Practical Training: Hands-on experience in community pharmacy settings, learning medication dispensing, patient counselling, and pharmacy operations through real-world scenarios and simulations.
- Clinical Placement: Internships or co-op programs in pharmacies, providing practical experience in medication management, patient interaction, and application of pharmaceutical knowledge in clinical environments.
- Management Skills: Understanding pharmacy management techniques, including inventory control, financial planning, and regulatory compliance, with practical applications in pharmacy operations and administration disease.

Textbooks

1. Health Education and Community Pharmacy by N.S. Parmar.
2. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical Press
3. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams and Wilkins.

Suggested Readings

1. Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India
2. Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA
3. Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications.
4. Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org /publications
5. Community Pharmacy Practice around the Globe: Part One: www.ipapharma.org /publications

Open Educational Resources (OER)

1. **https://www.news-medical.net/health/Community-Pharmacy.aspx**
2. **https://www.sciencedirect.com/topics/medicine-and-dentistry/community-pharmacy**
3. **https://ipapharma.org/community-pharmacy-division/**

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date
1	Sessional examination-I, II and III	90 Minutes	20	
2	End term examination	180 Minutes	80	
Total			**100**	

ER20-22P	Community Pharmacy & Management – Practical	L	T	P	C
Version	2.0	**0**	**0**	**3**	**0**
Category of Course	Practical				
Total Contact Hours	75 hrs				
Pre-Requisites/ Co-Requisites	Pharmaceutics				

Course Perspective: This practical course offers hands-on experience essential for excelling in community pharmacy practice. Emphasizing real-world applications, it focuses on developing skills in patient care, communication, and operational management. Participants engage in activities that foster leadership and ethical compliance while honing practical pharmacy skills. This training prepares individuals to effectively manage pharmacy operations, provide personalized patient care, and contribute to public health. Completion of this practical experience ensures readiness for successful careers in community pharmacy and healthcare administration.

Course Outcomes: Upon completion of the course the learner will be capable of

CO1: Understanding the principles of handling and reviewing prescriptions for accuracy and safety.

CO2: Applying knowledge of patient health assessment techniques to monitor and record vital signs.

CO3: Analyzing potential drug interactions and taking appropriate actions to ensure patient safety.

CO4: Evaluating the effectiveness of medication use and counselling in improving patient health outcomes**.**

Course Content

1. Handling of prescriptions with professional standards, reviewing prescriptions, checking for legal compliance and completeness (minimum 5)
2. Identification of drug-drug interactions in the prescription and follow-up actions (minimum 2)
3. Preparation of dispensing labels and auxiliary labels for the prescribed medications (minimum 5)

4. Providing the following health screening services for monitoring patients/detecting new patients (one experiment for each activity)

Blood Pressure Recording, Capillary Blood Glucose Monitoring, Lung function assessment using Peak Flow Meter and incentive spirometer, recording capillary oxygen level using Pulse Oximeter, BMI measurement

5. Providing counselling to simulated patients for the following chronic diseases/disorders including education on the use of devices such as insulin pen, inhalers, spacers, nebulizers, etc. where appropriate (one experiment for each disease)

Type 2 Diabetes Mellitus, Primary Hypertension, Asthma, Hyperlipidaemia, Rheumatoid Arthritis

6. Providing counselling to simulated patients for the following minor ailments (any three)

Headache, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhoea, constipation), Worm infestations, Pyrexia, Upper Respiratory Tract infections, Skin infections, Oral and dental disorders.

7. Appropriate handling of dummy dosage forms with correct administration techniques - oral liquids with measuring cup/cap/dropper, Eye Drops, Inhalers, Nasal drops, Insulin pen, nebulizers, different types of tablets, patches, enemas, suppositories

8 Use of Community Pharmacy Software and Digital Health Tools

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. SOPs for various activities in Community Pharmacy (as discussed in Theory and Practical)
2. List out the various abbreviations, short forms used in prescriptions and their interpretation
3. Patient Information Leaflet for a given chronic disease/disorder
4. Patient Information Leaflet for prescription / non-prescription medicines
5. Preparation of window / shelf display materials for the model community pharmacy
6. Overview of Software available for retail pharmacy management including billing, inventory, etc.
7. Dosage / Medication Reminder Aids
8. Overview on the operations and marketing strategies of various online pharmacies
9. Overview on the common fixed dose combinations
10. Overview on the medications requiring special storage conditions

11. Role of Community Pharmacists in preventing Antimicrobial Resistance
12. Jan Aushadhi and other Generic Medicine initiatives in India
13. Global Overview of Online Pharmacies
14. Community Pharmacy Practice Standards: Global Vs. Indian Scenario
15. Overview of pharmacy associations in India

Field Visit

The students shall be taken in groups to visit community pharmacies and medicine distributors to understand and witness the professional activities of the community pharmacists, and the supply chain logistics. Individual reports from each student on their learning experience from the field visit shall be submitted.

Learning Experience

- Prescription Handling: Review and verify prescriptions for accuracy, completeness, and compliance with legal standards.
- Drug Interactions: Identify and address drug-drug interactions, implementing necessary follow-up actions to ensure patient safety.
- Patient Counselling: Provide effective counselling for managing chronic diseases (e.g., diabetes, hypertension) and minor ailments (e.g., headaches, GI issues).
- Dosage Form Handling: Demonstrate correct techniques for administering various dosage forms, including liquids, tablets, and inhalers.

Textbooks

1. Health Education and Community Pharmacy by N.S. Parmar.
2. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical Press
3. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams and Wilkins.

Suggested Readings

1. Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India
2. Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA
3. Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications.
4. Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org /publications

5. Community Pharmacy Practice around the Globe: Part One: www.ipapharma.org /publications

Open Educational Resources (OER)

- **https://www.news-medical.net/health/Community-Pharmacy.aspx**
- **https://www.sciencedirect.com/topics/medicine-and-dentistry/community-pharmacy**
- **https://ipapharma.org/community-pharmacy-division/**

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date
1	Sessional examination-I, II and III	180 Minutes	20	
2	End term examination	180 Minutes	80	
Total			**100**	

ER 20-23T	Biochemistry and Clinical Pathology – Theory	L	T	P	C
Version:	2.0	**3**	**1**	**0**	**0**
Category of Course	Theory				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	Pharmaceutical Chemistry				

Course Perspective: This course provides a comprehensive understanding of the biochemical foundations of life, emphasizing the role of biomolecules in health and disease. The knowledge gained enables informed decision-making based on biochemical principles. It fosters critical thinking and analytical skills essential for careers in healthcare and research. The course provides insights into real-world contexts, contributing to advancements in health and disease management.

Course Outcomes (COs): Upon completion of the course, the learner will be capable of

CO1: Understanding the various properties and functions of biomolecules and enzymes.
CO2: Understanding the metabolic pathways of biomolecules in both physiological and pathological conditions.
CO3: Applying the principles of organ function tests and their clinical significance.
CO4: Analyzing the biomolecules/metabolites in the given samples, both qualitatively and quantitatively.

Course Content:

Unit 1: Introduction to biochemistry **2 Hrs.**

Scope of biochemistry in pharmacy; Cell and its biochemical organization.

Unit 2: Carbohydrates **5 Hrs.**

- Definition, classification with examples, chemical properties
- Monosaccharides - Structure of glucose, fructose, and galactose
- Disaccharides - structure of maltose, lactose, and sucrose
- Polysaccharides - chemical nature of starch and glycogen
- Qualitative tests and the biological role of carbohydrates

Unit 3: Proteins **5 Hrs.**

- Definition, classification of proteins based on composition and solubility with examples
- Definition, classification of amino acids based on chemical nature and nutritional requirements with examples
- Structure of proteins (four levels of organization of protein structure)
- Qualitative tests and biological role of proteins and amino acids
- Diseases related to malnutrition of proteins.

Unit 4: Lipids **5 Hrs.**

- Definition, classification with examples
- Structure and properties of triglycerides (oils and fats)
- Fatty acid classification - Based on chemical and nutritional requirements with examples
- Structure and functions of cholesterol in the body
- Lipoproteins - types, composition and functions in the body
- Qualitative tests and functions of lipids

Unit 5: Nucleic acids **4 Hrs.**

- Definition, purine and pyrimidine bases
- Components of nucleosides and nucleotides with examples
- Structure of DNA (Watson and Crick model), RNA and their functions

Unit 6: Enzymes **5 Hrs.**

- Definition, properties, and IUB and MB classification
- Factors affecting enzyme activity
- Mechanism of action of enzymes, Enzyme inhibitors
- Therapeutic and pharmaceutical importance of enzymes

Unit 7: Vitamins **6 Hrs.**

- Definition and classification with examples
- Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat- and water-soluble vitamins

Unit 8: Metabolism (Study of cycle/pathways without chemical structures) **20 Hrs.**

- Metabolism of Carbohydrates: Glycolysis, TCA cycle, and glycogen metabolism, regulation of blood glucose level. Diseases related to the abnormal metabolism of Carbohydrates
- Metabolism of lipids: Lipolysis, β-oxidation of Fatty acid (Palmitic acid), ketogenesis, and ketolysis. Diseases related to abnormal metabolism of lipids, such as Ketoacidosis, Fatty liver, and Hypercholesterolemia
- Metabolism of Amino Acids (Proteins): General reactions of amino acids and their significance–Transamination, deamination, Urea cycle, and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria, and Jaundice.
- Biological oxidation: Electron transport chain and Oxidative phosphorylation

Unit 9: Minerals: **5 Hrs.**

Types, Functions, Deficiency diseases, recommended dietary requirements of calcium, phosphorus, iron, sodium and chloride

Unit 10: Water and Electrolytes **5 Hrs.**

- Distribution, functions of water in the body
- Water turnover and balance
- Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance
- Dehydration, causes of dehydration and oral rehydration therapy

Unit 11: Introduction to Biotechnology **1 Hr.**

Unit 12: Organ function tests **6 Hrs.**

- Functions of the kidney and routinely performed tests to assess the functions of kidney and their clinical significances
- Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances
- Lipid profile tests and its clinical significances

Unit 13: Introduction to Pathology of Blood and Urine **6 Hrs.**

- Lymphocytes and Platelets, their role in health and disease
- Erythrocytes - Abnormal cells and their significance
- Normal and Abnormal constituents of Urine and their significance

Learning Experience

This course will be conducted through a blend of lectures, hands-on laboratory sessions during practical course, and interactive group work to provide a comprehensive learning experience. Instructional methods will include detailed lectures on qualitative analysis of biomolecules, reinforced by multimedia presentations and virtual lab simulations to illustrate complex concepts. Students will engage in hands-on experiments, such as qualitative analysis of biomolecules and metabolites of urine and blood, to apply theoretical knowledge practically. Group activities, including case studies and collaborative problem-solving exercises, will enhance peer learning and teamwork skills. Assignments will involve real-world applications, challenging students to analyze data and draw meaningful conclusions.

To support learning, regular feedback through will be provided through assessments, quizzes, and one-on-one consultations. The course in charge will be available for additional guidance, encouraging students to seek help when needed. Collaborative learning will be emphasized, with opportunities for students to work together, exchange ideas, and conduct peer reviews, ensuring a participatory and engaging educational experience.

Text Books

1. Essentials of Biochemistry by U. Satyanarayana, Books and Allied (P) Ltd.
2. Biochemistry By: Rao, P. Gundu
3. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwel

Reference Books/Materials

- Principles of Biochemistry by Lehninger

Open Educational Resources (OER)

Swayam course: **https://onlinecourses.nptel.ac.in/noc22_cy06/preview**

Evaluation Scheme:				
	Evaluation Component	**Duration**	**Weightage (%)**	**Date, Time & Venue**
1	Sessional examination-I, II and III	90 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER 20-23P	Biochemistry and Clinical Pathology – Practical	L	T	P	C
Version:	2.0	**0**	**0**	**2**	**0**
Category of Course	Practical				
Total Contact Hours	50				
Pre-Requisites/ Co-Requisites	Pharmaceutical Chemistry				

Course Perspective: This course aims to enhance understanding and develop skills related to the qualitative testing of various biomolecules, as well as the analysis of biological samples to identify both normal and abnormal constituents.

Course Outcomes: Upon successful completion of this course, the students will be able to
CO1: Understanding the principles of qualitative testing for biomolecules and biological samples.
CO2: Applying knowledge to conduct qualitative tests and interpret results for normal and abnormal constituents.
CO3: Evaluating test results to assess their implications for health and disease.
CO4: Analyzing case studies on qualitative testing to draw evidence-based conclusions.

Course Content

List of Experiments **50 Hrs**

1. Qualitative analysis of carbohydrates (4 experiments)
2. Qualitative analysis of Proteins and amino acids (4 experiments)
3. Qualitative analysis of lipids (2 experiments)
4. Qualitative analysis of urine for normal and abnormal constituents
(4 experiments)
5. Determination of constituents of urine (glucose, creatinine, chlorides) (2 experiments)
6. Determination of constituents of blood/serum (simulated) (Creatine, glucose, cholesterol, Calcium, Urea, SGOT/SGPT) (5 experiments)
7. Study the hydrolysis of starch from acid and salivary amylase enzyme (1 experiment)

Assignments

The students shall be asked to submit written assignments on Various Pathology Lab Reports (One assignment per student per sessional period, i.e., a minimum of THREE assignments per student)

Learning Experience

This course will be conducted through a blend of lectures, hands-on laboratory sessions during practical course, and interactive group work to provide a comprehensive learning experience. Instructional methods will include detailed lectures on qualitative analysis of biomolecules, reinforced by multimedia presentations and virtual lab simulations to illustrate complex concepts. Students will engage in hands-on experiments, such as qualitative analysis of biomolecules and metabolites of urine and blood, to apply theoretical knowledge practically. Group activities, including case studies and collaborative problem-solving exercises, will enhance peer learning and teamwork skills. Assignments will involve real-world applications, challenging students to analyze data and draw meaningful conclusions.

To support learning, regular feedback through will be provided through assessments, quizzes, and one-on-one consultations. The course in charge will be available for additional guidance, encouraging students to seek help when needed. Collaborative learning will be emphasized, with opportunities for students to work together, exchange ideas, and conduct peer reviews, ensuring a participatory and engaging educational experience.

Text Books

1. Essentials of Biochemistry by U. Satyanarayana, Books and Allied (P) Ltd.
2. Biochemistry By: Rao, P. Gundu
3. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwel
4. Biochemistry by Kulkarni, M.V. et.al
5. Biochemistry and Clinical Pathology Practical Manual by Kale RR & Kale SR

Reference Books/Materials

- Principles of Biochemistry by Lehninger

Open Educational Resources (OER)

- Swayam course: **https://onlinecourses.nptel.ac.in/noc22_cy06/preview**

Evaluation Scheme:

	Evaluation Component	**Duration**	**Weightage (%)**	**Date, Time & Venue**
1	Sessional examination-I, II and III	120 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER20-24T	Pharmacotherapeutics	L	T	P	C
Version	2.0	3	1	0	0
Category of Course	Theory				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	-				

Course Perspective: Pharmacotherapeutics is a foundational subject in pharmacy education that bridges the gap between pharmacology and clinical practice. It focuses on the **rational and evidence-based use of medications** for the prevention, diagnosis, and treatment of diseases.

Course Outcomes: Upon successful completion of this course, the students will be able to

CO1: Understanding pharmacotherapeutic principles, rational drug use, evidence-based medicine and standard treatment gudelines.

CO2: Analyzing diseases according to the organ systems affected and design both non-pharmacological and pharmacological management plans.

CO3: Evaluating drug therapy decisions in complex clinical conditions by analyzing comorbidities, contraindications and individual patient factors.

CO4: Understanding current treatment strategies and propose evidence-based recommendations to enhance patient outcomes.

Content:

Unit 1: Pharmacotherapeutics **8 Hrs.**

- Pharmacotherapeutics-Introduction, scope, and objectives.
- Rational use of Medicines, Evidence-Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs)

Unit 2: Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with

(a) Cardiovascular System **8 Hrs.**

- Hypertension
- Angina and Myocardial infarction

- Hyperlipidaemia
- Congestive Heart Failure

(b) Respiratory System **4 Hrs.**

- Asthma
- COPD

(c) Endocrine System **5 Hrs.**

- Diabetes
- Thyroid disorders- Hypo and Hyperthyroidism

(d) Central Nervous System **8 Hrs.**

- Epilepsy
- Parkinson's disease
- Alzheimer's disease
- Stroke
- Migraine

(e) Gastrointestinal Disorders **8 Hrs.**

- Gastro oesophageal reflux disease
- Peptic Ulcer Disease
- Alcoholic liver disease
- Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)

(f) Haematological disorders **4 Hrs.**

- Iron deficiency anaemia
- Megaloblastic anaemia

(g) Infectious diseases **12 Hrs.**

- Tuberculosis
- Pneumonia
- Urinary tract infections
- Hepatitis

- Gonorrhoea and Syphilis
- Malaria
- HIV and Opportunistic infections
- Viral Infections (SARS, CoV2)

(h) Musculoskeletal disorders **3 Hrs.**

- Rheumatoid arthritis
- Osteoarthritis

(i) Dermatology **3 Hrs.**

- Psoriasis
- Scabies
- Eczema

(j) Psychiatric Disorders **4 Hrs.**

- Depression
- Anxiety
- Psychosis

(k) Ophthalmology **2 Hrs.**

- Conjunctivitis (bacterial and viral)
- Glaucoma

(l) Anti-microbial Resistance **2 Hrs.**

(m) Women's Health **4 Hrs.**

- Polycystic Ovary Syndrome
- Dysmenorrhea
- Premenstrual Syndrome

Learning Experience

This course provides students with a practical understanding of the therapeutic use of medicines in the management of common diseases. It integrates knowledge of disease pathophysiology with pharmacological and non-pharmacological treatment approaches.
Students engage in case-based learning, discussions on Standard Treatment Guidelines (STGs), and explore concepts like rational use of medicines, essential drugs, and evidence-based medicine. Focused study on system-wise disorders enhances clinical decision-making and critical thinking skills.The subject prepares students to optimize drug therapy, promote rational prescribing, and contribute effectively to patient care in real-world healthcare settings.

Text Books.

- Chouhan, D. (2022). Textbook of Pharmacotherapeutics for Diploma in Pharmacy Students: 2nd Year. Indore: MyPustak Publications.
- Sharma, A. (2021). Pharmacotherapeutics: As per PCI Syllabus ER 2020. New Delhi: Astitva Prakashan.
- Tara, G. (2021). Tara's Textbook Series: Pharmacotherapeutics as per PCI Syllabus. Delhi: Tara Publishing House.

Reference Books/Materials

Murugesh, N., & Christina, A. J. M. (2021). *Pharmacotherapeutics* (As per PCI ER-2021, Second Year Diploma in Pharmacy). Chennai: Sathya Publishers. ISBN: 978-93-87444-55-1

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II and III	90 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER 20-24P	Pharmacotherapeutics– Practical	L	T	P	C
Version:	2.0	**0**	**0**	**1**	**0**
Category of Course	Practical				
Total Contact Hours	25				
Pre-Requisites/ Co-Requisites	-				

Course Perspective: This course is designed to train students in the basic skills required to support the pharmaceutical care services for selected common disease conditions.

Course Objective: This course will train the students on

1. How to prepare a SOAP (Subjective, Objective, Assessment and Plan) note for clinical cases of selected common diseases
2. Patient counselling techniques/methods for common disease conditions

Course Outcomes:

Upon successful completion of this course, the students will be able to

CO1: Write the SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases

CO2: Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications and monitoring parameters.

Course Content:

List of Experiments **25 Hrs**

I Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for at least SIX clinical cases (real / hypothetical) of the following disease conditions.

1. Hypertension
2. Angina Pectoris
3. Myocardial Infarction
4. Hyperlipidaemia
5. Rheumatoid arthritis
6. Asthma
7. COPD

8. Diabetes
9. Epilepsy
10. Stroke
11. Depression
12. Tuberculosis
13. Anaemia (any one type as covered in theory)
14. Viral infection (any one type as covered in theory)
15. Dermatological conditions (any one condition as covered in theory)

II. Patient counselling exercises using role plays based on the real / hypothetical clinical case scenarios. The students are expected to provide counselling on disease condition, medications, life-style modifications, monitoring parameters, etc. and the same shall be documented. (Minimum 5 cases)

III. Simulated cases to enable dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions. (Minimum 4 cases).

Learning Experience

Students will develop clinical reasoning skills by preparing and discussing SOAP notes for six diverse disease cases, enhancing their ability to collect and interpret patient information systematically. Through patient counseling role plays, they will improve communication skills essential for effective medication counseling and lifestyle guidance. Additionally, dose calculation exercises for pediatric and geriatric patients will strengthen their practical understanding of individualized drug dosing under various clinical conditions.

Text Books

- Murugesh, N. (Year). *Practical Pharmacotherapeutics*. Chennai: Sathya Publishers.
- Sharma, M. P. (Year). *Practical Pharmacotherapeutics*. New Delhi: CBS Publishers.

Reference Books/Materials

- Goyal, R. N. (Year). *A Textbook of Practical Pharmacotherapeutics*. New Delhi: CBS Publishers.
- Gupta, P. K. (Year). *Pharmacotherapeutics Practical Manual for D.Pharm*. New Delhi: CBS Publishers.

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II and III	120 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER20-25T	Hospital And Clinical Pharmacy	L	T	P	C
Version	2.0	3	1	0	0
Category of Course	Theory				
Total Contact Hours	75				
Pre-Requisites/ Co-Requisites	-				

Course Perspective: This course provides essential knowledge and skills for effective participation in hospital and clinical pharmacy services. It highlights the roles and responsibilities of clinical pharmacists within healthcare settings. Through practical experiences with experienced professionals, it helps in gaining insights into pharmacy workflow and patient care.

Course Outcomes: Upon completion of the course the learner will be capable of

CO1: Understanding the essential roles and competencies required for effective pharmacy practice in healthcare settings.

CO2: Applying information resources to enhance patient care and address medication-related challenges.

CO3: Evaluating the efficiency of pharmacy operations to ensure optimal service delivery and patient safety.

Course Content:

Unit 1: Hospital Pharmacy **6 Hrs.**

- Definition, scope, national and international scenario
- Organisational structure
- Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships
- Good Pharmacy Practice (GPP) in hospital
- Hospital Pharmacy Standards (FIP Basel Statements, AHSP)
- Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists

Unit 2: Different Committees in the Hospital **4 Hrs.**

- Pharmacy and Therapeutics Committee - Objectives, Composition and functions

- Hospital Formulary - Definition, procedure for development and use of hospital formulary
- Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance

Unit 3: Supply Chain and Inventory Control 14 Hrs.

- Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics
- Procedures of Drug Purchases – Drug selection, short term, long term and tender/e-tender process, quotations, etc.
- Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc.
- Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms)
- FEFO, FIFO methods
- Expiry drug removal and handling, and disposal methods. Disposal of Narcotics, cytotoxic drugs
- Documentation - purchase and inventory

Unit 4: Drug distribution 7 Hrs.

- Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method.
- Distribution of drugs to ICCU/ICU/NICU/Emergency wards.
- Automated drug dispensing systems and devices
- Distribution of Narcotic and Psychotropic substances and their storage

Unit 5: Compounding in Hospitals. Bulk compounding, IV admixture services and incompatibilities, Total parenteral nutrition 4 Hrs.

Unit 6: Radio Pharmaceuticals - Storage, dispensing and disposal of radiopharmaceuticals 2 Hrs.

Unit 7: Application of computers in Hospital Pharmacy Practice, Electronic health records, Software used in hospital pharmacy 2 Hrs.

Unit 8: Clinical Pharmacy: Definition, scope and development - in India and other countries.

Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc.

Daily activities of clinical pharmacists: Definition, goal and procedure of

- Ward round participation
- Treatment Chart Review
- Adverse drug reaction monitoring
- Drug information and poisons information
- Medication history
- Patient counselling
- Interprofessional collaboration

- Pharmaceutical care: Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care

- Medication Therapy Management, Home Medication Review

Unit 9: Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results 10 Hrs.

- Haematological, Liver function, Renal function, thyroid function tests
- Tests associated with cardiac disorders
- Fluid and electrolyte balance
- Pulmonary Function Tests

Unit 10: Poisoning: Types of poisoning: Clinical manifestations and Antidotes 6 Hrs.

- Drugs and Poison Information Centre and their services –
- Definition, Requirements, Information resources with examples, and their advantages and disadvantages

Unit 11: Pharmacovigilance **2 Hrs.**

- Definition, aim and scope
- Overview of Pharmacovigilance

Unit 12: Medication errors: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP **6 Hrs.**

- Drug Interactions: Definition, types, clinical significance of drug interactions

Learning Experience

- **Lectures and Demonstrations:** Core concepts will be taught through interactive lectures with visual aids and real-life examples.
- **Hands-On Learning:** Practical lab sessions and virtual simulations will provide experiential learning opportunities.
- **Assignments and Assessments:** Regular quizzes, practical assignments, and comprehensive exams will assess understanding and application of course material.
- **Support and Feedback:** Instructors will offer additional support through academic hours, and students will be encouraged to seek help and collaborate with peers.

Textbooks

- A Textbook of Clinical Pharmacy Practice - Essential concepts and skills - Parthasarathi G, Karin Nyfort-Hansen and Milap Nahata. Orient Longman Pvt. Ltd. Hyderabad
- Text Book of Hospital and Clinical Pharmacy by Dr. Pratibha Nand and Dr. Roop K Khar, Birla publications, New Delhi.
- Gupta B.K and Gupta R.N., GPP in Hospital Pharmacy, Vallabh Prakashan.
- Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc
- Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia

Open Educational Resources (OER)

- Books

- PPT
- Notes
- Videos

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II and III	90 Minutes	20	
4	End term examination	180 Min	80	
Total			**100**	

ER20-25P	HOSPITAL AND CLINICAL PHARMACY -PRACTICAL	L	T	P	C
Version		**0**	**0**	**1**	**0**
Category of Course					
Total Contact Hours	25				
Pre-Requisites/ Co-Requisites	**Biology**				

Course Perspective: This course provides a comprehensive education that combines drug information management and clinical skills with practical techniques. It bridges theoretical knowledge and real-world experience, preparing individuals for challenges in clinical and pharmacy settings. The focus on optimizing drug therapy and managing adverse reactions enhances essential skills for effective healthcare delivery. Emphasizing accuracy in drug administration promotes patient safety and precision in practice.

Course Outcomes: Upon completion of the course the learner will be able to:

CO1: Observing and understanding the integration of drug information management and clinical skills in real-world pharmacy practice.

CO2: Imitating and applying hands-on techniques learned in practical sessions to enhance proficiency in drug administration and patient care.

CO3: Adapting and analysing clinical knowledge and skills to optimize drug therapy and manage adverse drug reactions effectively in various healthcare settings.

Course Content:

1. Systematic approach to drug information queries using primary/secondary/tertiary resources of information (2 cases)
2. Interpretation of laboratory reports to optimize the drug therapy in a given clinical case (2 cases)
3. Filling up IPC's ADR Reporting Form and perform causality assessments using various scales (2 cases)
4. Demonstration / simulated/hands-on experience on the identification, types, use / application /administration of

- Orthopaedic and Surgical Aids such as knee cap, LS belts, abdominal belt, walker, walking sticks, etc.

- Different types of bandages such as sterile gauze, cotton, crepe bandages, etc.
- Needles, syringes, catheters, IV set, urine bag, RYLE's tube, urine pots, colostomy bags, oxygen masks, etc.

5. Case studies on drug-drug interactions (any 2 cases)
6. Wound dressing (simulated cases and role play – any 2 cases)
7. Vaccination and injection techniques (IV, IM, SC) using mannequins (5 activities)
8. Use of Hospital Pharmacy Software and various digital health tools.

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Typical profile of a drug to be included in the hospital formulary
2. Brief layout and various services of the Central Sterile Supplies Department (CSSD)
3. Various types of sterilizers and sterilization techniques used in hospitals
4. Fumigation and pesticide control in hospitals
5. Role of Pharmacists in Transition of Care: Discharge cards, post hospitalization care, medicine reconciliation activities in developed countries
6. Total parenteral nutrition and IV admixtures and their compatibility issues
7. Concept of electronic health records
8. Invasive and Non-invasive diagnostic tests - HRCT, MRI, Sonography, 2D ECHO, X-rays, Mammography, ECG, EMG, EEG
9. Home Diagnostic Kits - Pregnancy Test, COVID testing etc
10. Measures to be taken in hospitals to minimize Antimicrobial Resistance
11. Role and responsibilities of a pharmacist in public hospital in rural parts of the country
12. Safe waste disposal of hospital waste

Field Visit

The students shall be taken in groups to visit a Government / private healthcare facility to understand and witness the various hospital and clinical pharmacy services provided. Individual reports from each student on their learning experience from the field visit shall be submitted.

Learning Experience

- **Resource Utilization:** Learn to systematically use primary, secondary, and tertiary resources for drug information queries, improving research and problem-solving skills.
- **Lab Report Interpretation:** Develop the ability to interpret laboratory reports to optimize drug therapy, enhancing clinical decision-making.
- **ADR Reporting:** Gain expertise in filling out ADR reporting forms and performing causality assessments, crucial for monitoring drug safety.
- **Practical Skills:** Acquire hands-on experience with orthopaedic aids, bandages, and medical equipment for effective patient care.
- **Injection Techniques and Drug Interactions:** Master vaccination and injection techniques, and analyze drug-drug interactions to improve clinical practice and patient safety.

Textbooks

- Gupta B.K and Gupta R.N., GPP in Hospital Pharmacy, Vallabh Prakashan.
- Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.

Open Educational Resources (OER)

- Books
- PPT
- Videos

Evaluation Scheme:

	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue
1	Sessional examination-I, II, and III	180 Minutes	20	
4	End term examination	180 Minutes	80	
Total			**100**	

ER 20-26T	Pharmacy Law and Ethics (Theory)	**L**	**T**	**P**	**C**
Version	2.0	**3**	**1**	**0**	**0**
Category of Course	Pharmacy Law and ethics				
Total Contact Hours	75 Hours				
Pre-Requisites/Co-Requisites	-				

Course Perspective

This course provides a foundational understanding of the legal and ethical principles essential for pharmacy professionals. It emphasizes on the skills to navigate regulations and make informed decisions impacting patient care. By emphasizing critical thinking and ethical reasoning, it prepares participants for real-world challenges in their careers and fosters a commitment to integrity and professionalism in the pharmacy field.

Course Outcomes: Upon completion of the course the learner will be capable of

CO1 Understanding the objectives, structures, and key provisions of national laws and regulatory frameworks applicable to pharmacy practice.

CO2 Understanding the ethical, professional, and legal responsibilities of pharmacists in various practice settings.

CO3 Applying regulatory guidelines, licensing norms, and ethical principles in community, hospital, and industrial pharmacy scenarios.

CO4 Analyzing the impact of legal, regulatory, and policy changes on pharmaceutical services, drug availability, and public health outcomes.

Course Content

Chapter 1: General Principles of Law, History, and various Acts related to Drugs and Pharmacy. **2 Hrs.**

Chapter 2: Pharmacy Act-1948 and Rules: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of Pharmacists, Offences and Penalties.

- Pharmacy Practice Regulations 2015. **5 Hrs.**

Chapter 3: Drugs and Cosmetics Act 1940 and Rules 1945 and New Amendments: Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. **Manufacture of drugs** – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

- Study of schedule C and C1, G, H, H1, K, P, M, N, and X.
- Sale of Drugs – Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy
  Drugs Prohibited for manufacture and sale in India
- Administration of the Act and Rules – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors. **23 Hrs.**

Chapter 4: Narcotic Drugs and Psychotropic Substances Act 1985 and Rules: Objectives, Definitions, Authorities and Officers, Prohibition, Control and Regulation, Offences and Penalties. **2 Hrs.**

Chapter 5: Drugs and Magic Remedies (Objectionable Advertisements) Act 1954: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties. **2 Hrs.**

Chapter 6: Prevention of Cruelty to Animals Act-1960: Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties. **2 Hrs.**

Chapter 7: Poisons Act-1919: Introduction, objective, definition, possession, possession for sales and sale of any poison, import of poisons. **2 Hrs.**

Chapter 8: FSSAI (Food Safety and Standards Authority of India) Act and Rules: brief overview and aspects related to manufacture, storage, sale, and labelling of Food Supplements. **2 Hrs.**

Chapter 9: National Pharmaceutical Pricing Authority: Drug Price Control Order (DPCO) – 2013: Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM) **5 Hrs.**

Chapter 10: Code of Pharmaceutical Ethics: Definition, ethical principles, ethical problem solving, registration, code of ethics for Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath. **5 Hrs.**

Chapter 11: Medical Termination of Pregnancy Act and Rules: Basic understanding, salient features, and Amendments **2 Hrs.**

Chapter 12: Role of all the government pharma regulator bodies – Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC) **1 Hr.**

Chapter 13: Good Regulatory practices (documentation, licenses, renewals, e-governance) in Community Pharmacy, Hospital pharmacy, Pharma Manufacturing, Wholesale business, inspections, import, export of drugs and medical devices. **3 Hrs.**

Chapter 14: Introduction to BCS system of classification, Basic concepts of Clinical Trials, ANDA, NDA, New Drug development, New Drugs and Clinical Trials Rules, 2019. Brand v/s Generic, Trade name concept, Introduction to Patent Law and Intellectual Property Rights, Emergency Use Authorization **3 Hrs.**

Chapter 15: Blood bank – basic requirements and functions **2 Hrs.**

Chapter 16: Clinical Establishment Act and Rules – Aspects related to Pharmacy **2 Hrs.**

Chapter 17: Biomedical Waste Management Rules 2016 – Basic aspects, and aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals. **2 Hrs.**

Chapter 18: Bioethics - Basic concepts, history and principles. Brief overview of ICMR's National Ethical Guidelines for Biomedical and Health Research involving human participants. **2 Hrs.**

Chapter 19: Introduction to the Consumer Protection Act **1 Hr.**

Chapter 20: Introduction to the Disaster Management Act **1 Hr.**

Chapter 21 Medical Devices – Categorization, basic aspects related to manufacture and sale

2 Hrs.

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Requirements for Ayurvedic, Homeopathic manufacturing, sale, and licensing requirements

2. Layout and contents of official websites of various agencies regulating the profession of pharmacy in India: e.g., CDSCO, SUGAM portal, PCI, etc.

3. Licenses required, application processes (online/offline), drug regulatory office website of the respective state

4. Case studies – actions taken on violation of any act / rule related to pharmacy

5. Schedule H1 drugs and its implementation in India

6. Counterfeit / Spurious medicines

7. Drug Testing Labs in India

8. Overview of Pharma marketing practices

9. Generic Medicines

Learning experience

The course on Regulatory Affairs and Ethics in Pharmacy is designed to foster a dynamic and engaging learning experience through various innovative instructional methods. It incorporates interactive lectures with multimedia tools, expert insights, and facilitated discussions to deepen understanding of complex legal and ethical concepts. Students will

engage in practical learning through case studies, simulations, and hands-on activities, enhancing their problem-solving skills and ethical decision-making capabilities. Additionally, the course emphasizes collaboration through group projects and peer reviews, complemented by industry visits and guest lectures to provide real-world perspectives. Continuous assessment and feedback will ensure students stay engaged and supported throughout their learning journey.

Textbooks

1. Textbook of Forensic Pharmacy by B.M. Mithal
2. Forensic Pharmacy by B. Suresh
3. A textbook of Forensic Pharmacy by N.K. Jain

Suggested Readings

1. A text book of Forensic Pharmacy by N.K. Jain
2. Text book of Forensic Pharmacy by B.M. Mithal

Open Educational Resources (OER)

1. https://www.indiacode.nic.in/bitstream/123456789/6838/1/pharmacy_act_1948.pdf
2.https://cdsco.gov.in/opencms/export/sites/CDSCO_WEB/Pdfdocuments/acts_rules/2016DrugsandCosmeticsAct1940Rules1945.pdf
3. https://www.indiacode.nic.in/bitstream/123456789/13675/1/the_poisons_act_1919.pdf

Evaluation Scheme:

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4	End term examination	180 Minutes	80	
Total			**100**	

Managing People & Organizations

Total Contact Hours: 30 **1 Lecture/week**

Course Perspective: This course is designed to empower students with the essential people-management, interpersonal, and behavioral skills required to succeed in academic, professional, and entrepreneurial settings. The curriculum blends psychological theories, communication models, and organizational behavior principles with experiential learning through activities like simulations, roleplays, team-building exercises, and diagnostics.

The course integrates futuristic pedagogy and global practices to enhance employability, ethical leadership, and lifelong adaptability. It encourages students to build emotional intelligence, foster team dynamics, navigate conflicts, and lead people effectively in diverse organizational settings.

Course Outcomes: In alignment with the university's mission, upon successful completion, students will be able to:

CO1: Apply psychological models such as Transactional Analysis and Johari Window to understand interpersonal behavior and self-awareness in a workplace context.
CO2: Demonstrate assertive and empathetic communication while building trust, managing conflicts, and promoting team synergy.
CO3: Evaluate and adapt motivational strategies and feedback systems to improve collaboration and employee engagement.
CO4: Analyze and influence organizational culture, foster psychological safety, and lead ethically through emotional intelligence.
CO5: Negotiate and persuade effectively using structured frameworks like BATNA and ZOPA, preparing for leadership roles in diverse environments.

Course Content:

Unit I: Foundations of Interpersonal Effectiveness **8 Hrs.**

- Session 1: Introduction to People Skills
- Session 2: Transactional Analysis (TA) Basics

- Session 3: Strokes & Life Positions
- Session 4: Assertive vs Aggressive

Unit II: Communication & Relationship Building **8 Hrs.**

- Session 5: Interpersonal Communication
- Session 6: Relationships & Social Behavior
- Session 7: Group & Team Dynamics
- Session 8: Effective Teams & Feedback

Unit III: Conflict, Influence & Motivation **8 Hrs.**

- Session 9: Conflict Styles & Resolution
- Session 10: Influence & Trust
- Session 11: Collaboration & Motivation
- Session 12: Psychological Safety

Unit IV: Organizational Behavior & Leadership **6 Hrs.**

- Session 13: Organizational Culture
- Session 14: Leadership & Change
- Session 15: Negotiation & Persuasion

Assessment Structure

Component	Weightage
Peer Feedback & Team Activities	20%

Conflict Case Analysis	15%
Communication Skills Practical	15%
Organizational Behavior Reflection	20%
Final Simulation (Leadership or Negotiation)	30%

Note: A Certificate will be provided on qualifying for this examination.

Suggested Readings & Resources

- **Essential Texts**

1. **Eric Berne** – *Games People Play*
   Foundational resource for understanding Transactional Analysis, ego states, and interpersonal behavior patterns.

2. **Dale Carnegie** – *How to Win Friends and Influence People*
   Timeless strategies for building rapport, assertive communication, and relationship management.

3. **Patrick Lencioni** – *The Five Dysfunctions of a Team*
   Explores team dynamics, trust issues, and conflict management with direct relevance to group and team behavior.

4. **Harvard Business Review Series** – *On Emotional Intelligence* | *On Teams*
   Insightful articles on leadership, psychological safety, and team collaboration in organizational contexts.

Recommended Books

5. **Stephen P. Robbins & Timothy A. Judge** – *Organizational Behavior*
   A comprehensive textbook covering motivation, leadership, communication, and organizational culture.

6. **Daniel Goleman** – *Working with Emotional Intelligence*
   In-depth focus on empathy, self-regulation, and emotional insight critical to managing people.

7. **Adam Grant** – *Give and Take*
   Explores trust, influence, reciprocity, and collaborative culture in high-performing organizations.

8. **Roger Fisher, William Ury & Bruce Patton** – *Getting to Yes: Negotiating Agreement Without Giving In*
   Core reading for negotiation techniques, BATNA, ZOPA, and conflict resolution.

◇ **Articles & Multimedia Resources**

- **HBR Articles**:
  - What Makes Teams Work?
  - The Feedback Fallacy
  - How to Handle Conflict at Work
  - Psychological Safety and the Learning Organization
- **TED Talks**:
  - *Simon Sinek – Start With Why* (Leadership and purpose-driven teams)
  - *Brené Brown – The Power of Vulnerability* (Trust and authenticity)
  - *Amy Edmondson – Building a Psychologically Safe Workplace*

Tools & Models Referenced in Course

- Johari Window – Self and peer-awareness tool
- Thomas-Kilmann Conflict Mode Instrument (TKI)
- Maslow's Hierarchy of Needs
- Herzberg's Two-Factor Theory
- Tuckman's Stages of Team Development
- BATNA & ZOPA (Harvard Negotiation Frameworks)