Academic Programme Guide
of
Master of Pharmacy

Pharmacy Practice
(2 Year Course)

Based on Choice Based Credit System (CBCS) / Elective Course System

w.e.f.
Academic Year: 2024-2025

Approved by the 26th Academic Council vide agenda item AC 26.4a dated 10th August 2024

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Chitkara University

Vision and Mission

Vision	To be a globally recognized organization promoting academic excellence through interdisciplinary applied research and to expand realms of knowledge through innovation.
Mission	• To carry out the academic processes in accordance with global standards through active teacher-student-industry participation.
	• To promote research, innovation and entrepreneurship in collaboration with industry, research laboratories and academic institutions of global repute.
	• To inculcate high moral, ethical and professional values amongst our students, faculty & staff.
	• To contribute in building skillful society.

Institute Vision and Mission

Vision	To excel as a premiere Centre of Excellence in Pharmaceutical Education, Research, Development & Innovation with Global Interaction.
Mission	• To contribute in building skilful society by preparing competent pharmacist.
	• To prepare globally recognized pharmaceutical professionals who can effectively contribute in new molecule research, formulation, preclinical and clinical growth and regulatory submissions.
	• To prepare efficient leaders providing academic and other interactions in various stages of pharmaceutical operations, marketing and distribution.
	• To provide applied, industry relevant pharmaceutical education relevant globally.
	• To enhance and impart innovation, entrepreneurship, and social skills.

1. General Information

The academic program Guide is a comprehensive document detailing course scheme, associated credits per course and the distribution of each course in lecture, tutorial and Practical hours. It also details the eligibility criteria for admission, for award of degree, the assessment and evaluation procedures along with a glimpse of the pedagogical aspects of the programs. This Guide is to be used in association with the Academic Regulations of the University to make a complete rule set. The course schemes given in this document are approved by respective Board of Studies in line with regulations of Pharmacy council of India and the Academic Council of Chitkara University, Punjab.

Programme Objectives: The objectives of the M. Pharm. Pharmacy Practice program are as follows:

1. To train pharmacists in advanced clinical skills to optimize patient care and therapeutic outcomes.
2. To develop expertise in pharmacotherapy and evidence-based practice for effective medication management.
3. To foster proficiency in patient counseling, drug information dissemination, and health education.
4. To equip professionals with the ability to collaborate with healthcare teams in diverse clinical settings.
5. To enhance competencies in pharmacovigilance and the monitoring of adverse drug reactions.
6. To prepare graduates for leadership roles in hospital and community pharmacy practice.
7. To promote research capabilities in evaluating pharmaceutical care and improving healthcare delivery systems.

2. Programme Outcomes (PO's) M. Pharm (Pharmacy Practice)

The M. Pharm. Pharmacy Practice programme aims to produce highly skilled pharmacists capable of delivering advanced pharmaceutical care and improving patient outcomes. Graduates will possess expertise in pharmacotherapy, patient counseling, and pharmacovigilance, enabling them to collaborate effectively within interdisciplinary healthcare teams. The programme fosters leadership, research, and evidence-based practice skills, preparing professionals to excel in hospital and community pharmacy settings while contributing to the enhancement of healthcare delivery systems.

The student outcomes for the M. Pharmacy Pharmacy Practice Program are the following:

PO1: Provide pharmaceutical care including, but not limited to, medication Therapy Management (MTM), vaccinations and drug therapy monitoring in all practice areas (e.g., inpatient, ambulatory and community practice)

PO2: Patient-centred care: Provide patient-centred care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, foster

patient support and empowerment, implement, monitor and adjust plans, and document activities).

PO3: Medication use systems management: Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems.

PO4: Health and wellness: Design prevention, intervention, and educational strategies for individuals and communities to manage disease and improve health and wellness.

PO5: Population-based care: Describe the way in which population-based care influences patient-centred care and influences the development of practice guidelines and evidence-based best practices

PO6: Problem Solving: Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution.

PO7: Educator: Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.

PO8: Patient Advocacy: Assure that patients' best interests are represented.

PO9: Interprofessional collaboration: Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.

PO10: Cultural Sensitivity: Recognize social determinants of health to diminish disparities and inequities in access to quality care.

PO11: Innovation and Entrepreneurship: Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.

Mission:

M1: To carry out the academic processes in accordance with global standards through active teacher-student-industry participation.

M2: To promote research, innovation and entrepreneurship in collaboration with industry, research laboratories and academic institutions of global repute.

M3: To inculcate high moral, ethical and professional values amongst our students, faculty & staff.

M4: To contribute in building skilful society by preparing competent pharmacist.

M5: To prepare globally recognized pharmaceutical professional who can effectively contribute in new molecule research, formulation, preclinical and clinical growth and regulatory submissions.

M6: To become efficient leaders providing academic and other interactions in various stages of pharmaceutical operations, marketing and distribution.

The mapping of POs with University Mission is shown in Table 1.

PO No.	**PO Statement**	**Mission Statement**	**Vision Statement**
PO1:	Provide pharmaceutical care including, but not limited to, medication Therapy Management (MTM), vaccinations and drug therapy monitoring in all practice areas (e.g., inpatient, ambulatory and community practice)	M4	To be a globally recognized organization promoting academic excellence through interdisciplinary applied research and to expand realms of knowledge through innovation.
PO2:	Patient-centred care: Provide patient-centred care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, foster patient support and empowerment, implement, monitor and adjust plans, and document activities).	M2, M4, M5	
PO3:	Medication use systems management: Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems.	M1, M4, M5	
PO4:	Health and wellness: Design prevention, intervention, and educational strategies for individuals and communities to manage disease and improve health and wellness.	M2, M4, M5	
PO5:	Population-based care: Describe the way in which population-based care influences patient-centred care and influences the development of	M4, M5, M6	

	practice guidelines and evidence-based best practices		
PO6:	Problem Solving: Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution.	M4, M6	
PO7:	Educator: Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.	M2, M3	
PO8:	Patient Advocacy: Assure that patients' best interests are represented.	M2, M4	
PO9:	Interprofessional collaboration: Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.	M2, M4, M6	
PO10:	Cultural Sensitivity: Recognize social determinants of health to diminish disparities and inequities in access to quality care.	M1, M2	
PO11:	Innovation and Entrepreneurship: Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.	M1, M2, M4, M5	

The programme outcome in M. Pharmacy (Pharmacy Practice) are well-designed based on the mission of providing the graduating students with knowledge and for expertise required for professional practices in Health and pharmaceutical services. The graduating students are prepared for demonstrating knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, health behaviour, social and administrative sciences, health policy and legal issues in the practice of pharmacy. Each year, experts from different universities and pharmaceutical industry across the globe visits Chitkara College of Pharmacy, Chitkara University, Punjab to provide international exposure to students.

Aiming at developing student's personality through community service, NSS activities are offered to students to in still the idea of social welfare and to provide service to society without bias. To enrich student's interpersonal skills, variety of extracurricular activities have been inculcated in the course curriculum in the form of national level technical and cultural festivals such as Pharma-fest, International Pharmacist Day and National Pharmacy Week respectively on a yearly basis under the student club CHAMP (Chitkara House of Aspirants and Multitalented Pharmacists). A vital role is played by CHAMP for overall progress & grooming of the student through organizing industrial visits, workshops, debate, technical quizzes and research project paper presentation competitions in events like Pharma tech Trends, Pharmacy Practice Module and international conferences. The students are motivated to participate or organize such events. These value-added activities have been designed taken into account various Programme Objectives (POs) such as PO3, PO8, PO9, PO10 and PO11.

The main aim of service training with focus on good health and well-being is accomplished by delivering sport-related events, NSS and NCC. The programme also aims to develop professional with awareness of international standards as of global health has transcended beyond the idea of confining the pharmacist's work to a specific geographical location and broadened it to the global level. PO1, PO2, PO3, PO4, PO5, PO6 and PO7 promotes development of skills in graduates for pharmaceutical formulations, analytical experts, regulatory and dispensing skills for good practices in global health system.

Pharmacists have the opportunity to play an important role in both public health and global health. In particular, pharmacists can look at the varied global health practices established in medicine and use this as a framework to understand the potential role of the pharmacist within global health practice and program delivery, research, and policy. According to the Consortium of Universities for Global Health, global health should refer to the scope of a wider problem rather than a geographical location. The scope of work of pharmacists in diverse settings faces challenges of global health such as self-care & self-medication, management of diseases through medication therapy management, resistance to existing drugs or recreational drugs being abused, medicines supplied through unregistered online pharmacies, online advertising of prescription drugs, direct-to-consumer websites and the distribution of substandard & spurious, falsely-labeled, falsified or counterfeit medicines. POs are designed and oriented to meet the mission of university in professional ethics. It ensures that the graduating students are well equipped with strong fundamental concepts and high technical competence in pharmaceutical sciences who shall be able to use the tools in pharmaceutical arena for success. POs helps to develop a sense of teamwork and awareness amongst students towards the importance of interdisciplinary approach for developing competence in solving complex problems in the area of Pharmaceutical Sciences. The POs helps to train the students to contribute towards health care system and encourage the students to participate in life-long learning process for a highly productive career, and to relate the concepts of Pharmaceutical Sciences towards serving the betterment of the society.

3. Eligibility for Admission, Exit and Migration

3.1 A Pass in the following examinations

a) B. Pharm Degree examination of an Indian university established by law in India from an institution approved by Pharmacy Council of India and has scored not less than 55 % of the maximum marks (aggregate of 4 years of B.Pharm.)

b) Every student, selected for admission to post graduate pharmacy programme in any PCI approved institution should have obtained registration with the State Pharmacy Council or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled. Note: It is mandatory to submit a migration certificate obtained from the respective university where the candidate had passed his/her qualifying degree (B.Pharm.)

3.2 Migration/Credit Transfer Policy

The following procedures will be followed for credit transfer for student under migration, studied in other Universities in India and Abroad:

"The credits earned by the student from the other universities in India or abroad shall be transferred as such. The Degree shall only be awarded to candidate subject to the condition that student earned the minimum no. of credit defined by Academic Regulation/APG of the Programme run by the Chitkara University." In case a student undergoes international exchange programme or internship for 1 semester/ 1 year, then the courses, credits and grades earned by the student in abroad during that period should be reflected on the grade card issued by the Chitkara University. The courses will be marked as (*) on the grade card/transcript. The description of the (*) will be "credits and grades as adopted university/institute name . . . . . during international exchange programme. The minimum credit points required for the award of M. Pharm. degree is 100. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 105 credit points. If consolidated credits are less than 100 credits, then the student has to earn extra credits to attain minimum credits requirement for M. Pharmacy degree. The instructions regarding this will be informed to the students by the department from time to time.

4. Programme Duration

The program of study for M. Pharmacy shall extend over a period of four semesters (two academic years). The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4.1. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

4.2. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from the month of December/January to May/June in every calendar year.

5. Pedagogical Aspects

Each course will be taught for 52-65 hrs. Everyday there will be three to four lecture sessions of three to four courses of 1 hours each and twelve hour practical divided into two days (pre-lunch and post-lunch). Activity and project hours will be other than these lecture hours depending upon the subject and relevance of the project. At least one week prior to the commencement of a particular course, the concerned faculty member or the course coordinator will circulate among the students the following pertaining to the course:

a) The course outlines containing the syllabus along with text books, reference books and other study material.

b) Day- to — day schedule to be followed — detailing the pace, coverage, prior reading assignments, case studies, home assignments to be perused by the students etc.

c) Various components of evaluation, such as quizzes (announced or unannounced), assignment, open book test, field work, group discussion, seminar, assignments, tests/examinations, class participation, mid-term and end term grading with relative weightage etc.

d) Other matters found desirable and relevant.

6. Apprenticeship/Internship embedded degree programs (AEDP) Not Applicable

The apprenticeship or internship is optional for M. Pharm students during their research work in Semester III & IV. The primary aim of the internship is to provide hands-on experience in a real-world setting. The internship is typically conducted in approved pharmacy institutions, hospitals, or pharmaceutical industries, where students can apply their academic knowledge to practical scenarios. The duration of the internship is usually specified by the university or institution in alignment with PCI guidelines.

7. Programme structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, practical classes, seminars, assignments, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week/per activity.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course and is obtained by using a multiplier of one (1) for lecture and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having four lectures per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2. The contact hours of seminars, assignments and research work shall be treated as that of practical courses for the purpose of calculating credits. i.e., the contact hours shall be multiplied

by 1/2. Similarly, the contact hours of journal club, research work presentations and discussions with the supervisor shall be considered as theory course and multiplied by 1.

7.2. Minimum credit requirements

The minimum credit points required for the award of M. Pharm. degree is 100. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 105 credit points. These credits are divided into Theory courses, Practical, Seminars, Assignments, Research work, Discussions with the supervisor, Journal club and Co-Curricular activities over the duration of four semesters. The credits are distributed semester-wise as shown in Table 7. Courses generally progress in sequence, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

7.3. Academic work

A regular record of attendance both in Theory, Practical, Seminar, Assignment, Journal club, Discussion with the supervisor, Research work presentation and Dissertation shall be maintained by the department / teaching staff of respective courses.

7.4. Course of study

M. Pharm Pharmacy Practice program code is MPP.

The course of study for M. Pharm Pharmacy Practice shall include Semester wise Theory & Practical as given in Table 2 and 3. The number of hours to be devoted to each theory and practical course in any semester shall not be less than that shown in Table 4 to 5.

Table – 2: Course of study for M. Pharm. (Pharmacy Practice)

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
Semester I					
MPP101T	Clinical Pharmacy Practice	4	4	4	100
MPP102T	Pharmacotherapeutics-I	4	4	4	100
MPP 103T	Hospital & Community Pharmacy	4	4	4	100
MPP 104T	Clinical Research	4	4	4	100
MPP 105P	Pharmacy Practice Practical I	12	6	12	150
MPP 106S	Seminar/Assignment	7	4	7	100
	Total	**35**	**26**	**35**	**650**
Semester II					
MPP 201T	Principles of Quality Use of Medicines Pharmacotherapeutics II	4	4	4	100
MPP 202T	Pharmacotherapeutics II	4	4	4	100
MPP 203T	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	4	4	4	100
MPP 204T	Pharmacoepidemiology & Pharmacoeconomics	4	4	4	100
MPP 205P	Pharmacy Practice Practical II	12	6	12	150
MPP 206S	Seminar/Assignment	7	4	7	100
DM 101	Disaster Management	3	3	3	50
	Total	**38**	**29**	**38**	**700**

Table – 3: Course of study for M. Pharm. III Semester (Common for All Specializations)

Course Code	Course	Credit Hours	Credit Points
MRM 301T	Research Methodology and Biostatistics*	4	4
MPR 302J	Journal club	1	1
MPR 302P	Discussion / Presentation (Proposal Presentation)	2	2
MPR302R	Research Work	28	14
HR 101	Human Values and Professional Ethics	2	2
	Total	**37**	**23**

* Non University Exam

Table – 4: Course of study for M. Pharm. IV Semester
(Common for All Specializations)

Course Code	Course	Credit Hours	Credit Points
MPR 401J	Journal Club	1	1
MPR 401R	Research Work and Colloquium	31	16
MPR 401D	Discussion/Final Presentation	3	3
MPR401C	Co-Curricular Activities	--	7*
Total		**35**	**20**

Table – 5: Semester wise credits distribution

Semester	Credit Points
I	26
II	29
III	23
IV	20
Co-curricular Activities (Attending Conference, Scientific Presentations and Other Scholarly Activities)	Minimum=02 Maximum=07*
Total Credit Points	Minimum=100 Maximum=105*

*Credit Points for Co-curricular Activities

Table – 6: Guidelines for Awarding Credit Points for Co-curricular Activities

Name of the Activity	Maximum Credit Points Eligible / Activity
Participation in National Level Seminar/Conference/Workshop/Symposium/Training Programs (related to the specialization of the student)	01
Participation in international Level Seminar/Conference/Workshop/Symposium/Training Programs (related to the specialization of the student)	02
Academic Award/Research Award from State Level/National Agencies	01

Academic Award/Research Award from International Agencies	02
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	01
Research / Review Publication in International Journals (Indexed in Scopus / Web of Science)	02

Note: International Conference: Held Outside India
International Journal: The Editorial Board Outside India

* The credit points assigned for extracurricular and or co-curricular activities shall be given by the principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

7.5 Program Committee

The M. Pharm. programme shall have a Programme Committee constituted by the Head of the institution in consultation with all the Heads of the departments.
The composition of the Programme Committee shall be as follows:
A teacher at the cadre of Professor shall be the Chairperson; One Teacher from each M. Pharm specialization and four student representatives (two from each academic year), nominated by the Head of the institution.

7.5.1 Duties of the Program Committee:

Periodically reviewing the progress of the classes.
Discussing the problems concerning curriculum, syllabus and the conduct of classes.
Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.
Communicating its recommendation to the Head of the institution on academic matters.
The Programme Committee shall meet at least twice in a semester preferably at the end of each sessional exam and before the end semester exam.

8. Assessment and evaluation:

Assessment & Evaluation
The schemes for internal assessment and end semester examinations are given in Table 6 and 7.

8.1. End semester examinations:

The End Semester Examinations for each theory and practical course through semesters 1 & 2 shall be conducted by the respective university except for the subject with asterix symbol (*) in table 1 and 2 for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.

Table – 7: Scheme for internal assessment and End term examination (sem I & II)

Course Code	Course	Internal Assessment				End Semester Exams		Total
		Continuous	Sessional Exams		Total	Marks	Duration	Marks
		Mode	Marks	Duration				
SEMESTER I								
MPP 101T	Clinical Pharmacy Practice	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP102T	Pharmacotherapeutics-I	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 103T	Hospital & Community Pharmacy	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 104T	Clinical Research	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 105P	Pharmacy Practice Practical I	20	30	6 Hrs	50	100	6 Hrs	150
MPP 106S	Seminar /Assignment	-	-	-	-	-	-	100
							Total	**650**
SEMESTER II								
MPP 201T	Principles of Quality Use of Medicines	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 202T	Pharmacotherapeutics II	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 203T	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 204T	Pharmacoepidemiology & Pharmacoeconomics	10	15	1.5 Hrs	25	75	3 Hrs	100
MPP 205P	Pharmacy Practice Practical II	20	30	6 Hrs	50	100	6 Hrs	150
MPP 206S	Seminar /Assignment	-	-	-	-	-	-	100
DM 101	Disaster Management	05	10	1 Hr	15	35	1.5 Hrs	50
							Total	**700**

Table – 8: Scheme for internal assessment and End term examination (sem III & IV)

Course Code	Course	Internal Assessment				End Semester Exams		Total
		Continuous Mode	Sessional Exams		Total	Marks	Duration	Marks
			Marks	Duration				
SEMESTER III								
MRM301T	Research Methodology and Biostatistics*	10	15	1.5 Hrs	25	75	3 Hrs	100
MPR 302J	Journal club	-	-	-	25	-	-	25
MPR 302 P	Discussion / Presentation (Proposal Presentation)	-	-	-	50	-	-	50
MPR 302R	Research work*	-	-	-	-	350	1 Hr	350
HR 101	Human Values and Professional Ethics	05	10	1 Hrs	15	35	1.5 Hr	50
							Total	**575**
SEMESTER IV								
MPR 401J	Journal club	-	-	-	25	-	-	25
MPR 401D	Discussion / Final Presentation	-	-	-	75	-	-	75
MPR 401R	Research work and Colloquium	-	-	-	-	400	1 Hr	400
							Total	**500**

Table – 9: Scheme (Sem III & IV)

Theory	
Criteria	**Maximum Marks**
Attendance (Refer Table 8)	8
Student – Teacher interaction	2
Total	**10**
Practical	
Attendance (Refer Table 8)	10
Based on Practical Records, Regular viva voce, etc.	10
Total	**20**

8.2. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table – 9: Scheme continuous mode

Theory	
Criteria	**Maximum Marks**
Attendance (Refer Table 9)	8
Student – Teacher interaction	2
Total	10
Practical	
Attendance (Refer Table 9)	10
Based on Practical Records, Regular viva voce, etc.	10
Total	**20**

Table – 10: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	8	10
90 – 94	6	7.5
85 – 89	4	5
80 – 84	2	2.5
Less than 80	0	0

8.2.1 Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables 9 and 10.

9. Rules for Attendance

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

10. Promotion & Award of grades

The Pharmacy Council of India (PCI) has established guidelines to ensure uniformity in the promotion and grading of M. Pharm students across PCI-approved institutions. These guidelines emphasize the importance of internal assessments, which are mandatory and contribute significantly to the final grades. Assessments include both formative (continuous evaluation) and summative (end-semester exams) components, aligned with the PCI syllabus. To be promoted to

the next semester, students must secure a minimum of 50% marks in both internal assessments and end-semester examinations. Those failing to meet this criterion must reappear for supplementary exams conducted by their institution, with all subjects required to be cleared within the stipulated time frame outlined by PCI regulations. The grading system follows a credit-based semester system (CBSS), awarding grades from "O" (Outstanding) for scores 90% and above to "F" (Fail) for scores below 50%, with students needing at least a "B" grade (50%-59%) to pass. Additionally, students must maintain a minimum of 75% attendance in theory and practical sessions, with exceptions granted only under exceptional circumstances like medical emergencies, subject to academic council approval. M. Pharm programs also require students to undertake research projects or dissertations in their final year, evaluated through internal assessments by supervisors and external viva voce examinations conducted by PCI-appointed examiners, with significant weightage given to project work in determining final grades. Students who fail any subject are allowed supplementary examinations, with a maximum number of attempts specified by PCI guidelines, typically within twice the duration of the program. Migration between PCI-approved institutions is permitted only under exceptional circumstances and requires fulfilment of academic requirements at the current institution along with approvals from both institutions involved. These guidelines ensure standardization in academic progression while maintaining rigorous evaluation standards for postgraduate pharmacy education.

11. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However, his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

12. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the sessional exam component of the internal assessment. The re-conduct of the sessional exam shall be completed before the commencement of next end semester theory examinations.

13. Re-examination of end semester examinations

Re-examination of end semester examination shall be conducted as per the schedule given in table 10. The exact dates of examinations shall be notified from time to time.

Table – 11: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I and III	November / December	May / June
II and IV	May / June	November / December

Question paper pattern for end semester theory examinations
For 75 marks paper

I. Short Answer Questions (3 out of 4)	=	5x3 = 15
II. Long Answers (Answer 6 out of 7)	=	6x10 = 60
Total	=	75 marks

Question paper pattern for end semester practical examinations

I. Synopsis	=	10
II. Experiments	=	35
III. Case Presentation	=	25
IV. Viva voce + File	=	30
Total	=	100 marks

14. Allowed to keep terms

The Pharmacy Council of India (PCI) has reiterated its guidelines regarding the "allowed to keep terms" policy for pharmacy students. This policy is crucial for ensuring that students maintain the necessary academic standards to progress through their respective programs. According to the latest updates, institutions must adhere strictly to the Education Regulations set forth by the PCI, which include maintaining adequate faculty qualifications, infrastructure, and equipment.

Students are generally allowed to keep terms if they meet specific criteria, such as maintaining a minimum attendance percentage and achieving passing marks in internal assessments. Institutions are responsible for monitoring these criteria closely and must report any non-compliance to the PCI.

Additionally, the PCI has emphasized that institutions must apply through the DIGI-PHARMed portal for any approvals related to course continuations or admissions, ensuring that all processes are transparent and standardized. Institutions failing to comply with these guidelines risk not being included in the approved list for future admissions, which could lead to a "No Admission Year" scenario for them.

To summarize, adherence to PCI regulations is essential for pharmacy institutions and students alike, ensuring that educational standards are upheld and that students are given fair opportunities to progress in their studies.

15. Grading System

A student shall be declared PASS and eligible for getting grade in a course of M. Pharm programme if he/she secures at least 50% marks in that particular course including internal assessment.

15. 1. Grading of Performances

15.1.1. Letter grades and grade points allocations

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table 11.

Table – 12: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

16. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C1, C2, C3 and C4 and the student's grade points in these courses are G1, G2, G3 and G4, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4}{C_1 + C_2 + C_3 + C_4}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example, if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO}{C_1 + C_2 + C_3 + C_4}$$

17. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the IV semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all IV semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are

passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4}{C_1 + C_2 + C_3 + C_4}$$

where C_1, C_2, C_3,.... is the total number of credits for semester I,II,III,…. and S_1,S_2, S_3,....is the SGPA of semester I,II,III,…. .

18. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction = CGPA of. 7.50 and above

First Class = CGPA of 6.00 to 7.49

Second Class = CGPA of 5.00 to 5.99

19. Project work

All the students shall undertake a project under the supervision of a teacher in Semester III to IV and submit a report. 4 copies of the project report shall be submitted.
The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:		
Objective(s) of the work done	50	Marks
Methodology adopted	150	Marks
Results and Discussions	250	Marks
Conclusions and Outcomes	50	Marks
Total	**500**	**Marks**

Evaluation of Presentation:		
Presentation of work	100	Marks
Communication skills	50	Marks
Question and answer skills	100	Marks
Total	**250**	**Marks**

20. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the M.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the M. Pharm program in minimum prescribed number of years, (two years) for the award of Ranks.

21. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

22. Duration for completion of the program of study

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

23. Revaluation / Retotaling of answer papers

There is no provision for revaluation of the answer papers in any examination. However, the candidates can apply for retotaling by paying prescribed fee.

24. Re-admission after break of study

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

25. Promotion and Registration

No student shall be admitted to any examination unless he/she fulfils the norms given in progression rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I and II semesters till the III semester examinations. However, he/she shall not be eligible to attend the courses of IV semester until all the courses of I, II and III semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to IV semesters within the stipulated time period as per the norms.

26. Provision of Grace-Marks

The following rule for the award of grace marks to the students was approved by the Academic Council:
The University shall award grace-marks as per following:
"One percent of the total marks of theory examination of all the semesters may be given for improving the division of a candidate. Grace marks given to a candidate in semester examination may be deducted from total grace marks to be given for improvement of the division."
A maximum of One percent of the total marks of theory examination as grace marks at the end of each semester/year, provided that a student secures a minimum of 15% marks in the respective subject/s of the End Semester/yearly Examination.

OR

The remainder or part there of the 1% grace marks of first semester/year plus 1 percent grace-marks of second year, provided that a student secures a minimum of 15% marks in the respective subject/s of the End Semester Examination, similarly for next semesters/years.

For internal Examination:
Carry forward of marks in case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However, his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

Note: Grade AB should be considered as failed and treated as one head for deciding ATKT. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

27. Placement opportunities:
The Pharmacy Council of India (PCI) has recently updated its guidelines regarding placement opportunities for pharmacy students, aiming to enhance employability and industry readiness. The new directives emphasize the importance of establishing strong ties between educational institutions and the pharmaceutical industry. Institutions are encouraged to create dedicated placement cells that facilitate internships, industrial visits, and direct recruitment drives.
Key components of the updated guidelines include:

- **Industry Collaboration**: Institutions must actively collaborate with pharmaceutical companies and healthcare organizations to provide students with practical exposure and job opportunities.
- **Skill Development Programs**: Schools are required to implement skill enhancement programs that align with industry needs, focusing on both technical skills and soft skills essential for professional success.
- **Placement Tracking**: Institutions should maintain a robust tracking system for student placements, which will be reviewed during PCI inspections. This data will help assess the effectiveness of placement initiatives.
- **Mandatory Reporting**: Institutions are mandated to report placement statistics annually to the PCI, ensuring transparency and accountability in their placement processes.

28. Programme Overview: M. Pharmacy (Pharmacy Practice)

The Program consists of subjects under the following categories:

Table 7: Program Scheme: **M. Pharmacy (Pharmacy Practice)**

Year 1 Sem 1												
S. No.	**Course Name**	**Course Code**	**Level**	**Category (Type of Course)**	**Credits (Course wise)**	**Hours per Week**			**Marks Distribution**			**Total Credits (Semester wise)**
						L	**T**	**P**	**I**	**E**	**TL**	
1.	Clinical Pharmacy Practice	MPP 101T	500-599	DC	4	4			25	75	100	**26**
2.	Pharmacotherapeutics-I	MPP 102T	500-599	DC	4	4			25	75	100	
3.	Hospital & Community Pharmacy	MPP 103T	500-599	DC	4	4			25	75	100	
4.	Clinical Research	MPP 104T	500-599	DC	4	4			25	75	100	
5.	Pharmacy Practice Practical I	MPP 105P	500-599	DC	6			12	50	100	150	
6.	Seminar/Assignment	MPP 106S	500-599	DC	4	7			100		100	
Year 1 Sem 2												
1.	Principles of Quality Use of Medicines	MPP 201T	500-599	DC	4	4			25	75	100	**29**
2.	Pharmacotherapeutics II	MPP 202T	500-599	DC	4	4			25	75	100	
3.	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	MPP 203T	500-599	DC	4	4			25	75	100	
4.	Pharmacoepidemiology & Pharmacoeconomics	MPP 204T	500-599	DC	4	4			25	75	100	
5.	Pharmacy Practice Practical II	MPP 205P	500-599	DC	6			12	50	100	150	

6.	Seminar/Assignment	MPP 206S	500-599	DC	4	7			100		100	
7.	Disaster Management	DM 101	500-599	UNI	3	3			15	35	50	
Year 2 Sem 3												
1.	Research Methodology and Biostatistics*	MRM 301T	500-599	DC	4	4			25	75	100	**23**
2.	Journal club	MPR 302J	500-599	DC	1	1			25		25	
3.	Discussion / Presentation (Proposal Presentation)	MPR 302P	500-599	DC	2	2			50		50	
4.	Research Work	MPR302R	500-599	DC	14	28				350	350	
5.	Human Values and Professional Ethics	HR 101	500-599	UNI	2	2			15	35	50	
Year 2 Sem 4												
1	Journal Club	MPR 401J	500-599	DC	1	1			25		25	**20**
2	Research Work and Colloquium	MPR 401R	500-599	DC	16	31				400	400	
3	Discussion/Final Presentation	MPR 401D	500-599	DC	3	3			75		75	

1st SEMESTER

CLINICAL PHARMACY PRACTICE (MPP 101T)

Scope

This course is designed to impart the basic knowledge and skills that are required to practice pharmacy including the provision of pharmaceutical care services to both healthcare professionals and patients in clinical settings.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Understand the elements of pharmaceutical care and provide comprehensive patient care services.
- Interpret the laboratory results to aid the clinical diagnosis of various disorders.
- Provide integrated, critically analyzed medicine and poison information to enable health care professionals in the efficient patient management.

Course outcomes

CO01: Comprehend the components of pharmaceutical care and deliver extensive patient care services that promote the overall health and well-being of all patients.

CO02: Analyze laboratory findings to assist in diagnosing a range of disorders clinically by utilizing innovative diagnostic tools and technologies to support high-quality patient care.

CO03: Deliver thoroughly evaluated medicine and poison information in an integrated manner to facilitate efficient patient management for healthcare professionals, promoting safe and effective medication use while ensuring responsible consumption and production practices.

CO04: Demonstrate effective communication skills to interact with patients, caregivers, and other healthcare professionals in a collaborative and empathetic manner, fostering partnerships and enhancing patient-centered care.

CO05: Conduct comprehensive patient assessments, including medication histories, physical exams, and laboratory data interpretation, to provide high-quality patient care and educate patients about their health and medication management.

THEORY 60 Hrs

1. **Introduction to Clinical Pharmacy:** Definition, evolution and scope of clinical pharmacy, International and national scenario of clinical pharmacy practice Pharmaceutical care Clinical Pharmacy Services: Ward round participation, Drug therapy review (Drug therapy monitoring including medication order review, chart endorsement, clinical review and pharmacist interventions) 12 Hrs

2 **Clinical Pharmacy Services:** Patient medication history interview, Basic concept of medicine and poison information services, Basic concept of pharmacovigilance, Hemovigilance, Materiovigilance and AEFI, Patient medication counselling, Drug utilisation evaluation, Documentation of clinical pharmacy services, Quality assurance of clinical pharmacy services. 12 Hrs

3 **Patient Data Analysis:** Patient Data & Practice Skills: Patient's case history - its structure and significances in drug therapy management, Common medical abbreviations and terminologies used in clinical practice, Communication skills: verbal and non-verbal communications, its applications in patient care services.

Lab Data Interpretation: Hematological tests, Renal function tests, Liver function tests. 12 Hrs

4 **Lab Data Interpretation:** Tests associated with cardiac disorders, Pulmonary function tests, Thyroid function tests, Fluid and electrolyte balance, Microbiological culture sensitivity tests 12 Hrs

5 **Medicines & Poison Information Services Medicine Information Service:** Definition and need for medicine information service, Medicine information resources, Systematic approach in answering medicine information queries, Preparation of verbal and written response, Establishing a drug information centre.

Poison Information Service: Definition, need, organization and functions of poison information centre. 12 Hrs

REFERENCE

1. A Textbook of Clinical Pharmacy Practice– Essential concepts and skills– Parthasarathi G, Karin Nyfort-Hansen and Milap Nahata
2. Practice Standards and Definitions – The Society of Hospital Pharmacists of Australia
3. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc
4. Relevant review articles from recent medical and pharmaceutical literature.

PHARMACOTHERAPEUTICS-I (MPP 102T)

Scope

This course aims to enable the students to understand the different treatment approaches in managing various disease conditions. Also, it imparts knowledge and skills in optimizing drug therapy of a patient by individualizing the treatment plan through evidence-based medicines.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Describe and explain the rationale for drug therapy.
- Summarize the therapeutic approach for management of various disease conditions including reference to the latest available evidence.
- Discuss the clinical controversies in drug therapy and evidence-based medicine
- Prepare individualized therapeutic plans based on diagnosis.
- Identify the patient specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time- course of clinical and laboratory indices of therapeutic response and adverse effect/s).

Course outcomes

CO01: Understand the etiopathogenesis, clinical presentation, and management of various disorders to enhance health outcomes and promote well-being across diverse populations.
CO02: Apprehend the importance of rational drug therapy and prescribe guidelines for different age groups, ensuring equitable access to safe and effective medications.
CO03: Comprehend desired pharmacotherapeutic outcomes for each drug and disease-related problem, focusing on optimizing treatment effectiveness and minimizing adverse effects.
CO04: Determine rational pharmacotherapeutic alternatives that prioritize sustainability and cost-effectiveness, contributing to responsible healthcare practices.
CO05: Understand the importance of individualizing therapeutic regimens to cater to the unique needs of patients, enhancing the quality of care and health education.

THEORY 60 Hrs

Etiopathogenesis and pharmacotherapy of diseases associated with following systems:

1. **Cardiovascular system:** Hypertension, Congestive cardiac failure, Acute coronary syndrome, Arrhythmias, Hyperlipidemias. 12 Hrs
2. **Respiratory system:** Asthma, Chronic obstructive airways Disease, Drug induced pulmonary diseases
3. **Endocrine system:** Diabetes mellitus, Thyroid diseases. 06 Hrs

12 Hrs

4. **Gastrointestinal system**: Peptic ulcer diseases, Reflux esophagitis, Inflammatory bowel diseases, Jaundice & hepatitis, Cirrhosis, Diarrhea and Constipation, Drug-induced liver disease.

12 Hrs

5. **Hematological diseases**: Anaemia, Deep vein thrombosis, Drug induced haematological disorders

12 Hrs

6. **Bone and joint disorders:** Rheumatoid arthritis, Osteoarthritis, Gout, Osteoporosis.
7. **Dermatological Diseases**: Psoriasis, Eczema and scabies, impetigo, drug induced skin disorders
8. **Ophthalmology:** Conjunctivitis, Glaucoma 06 Hrs

REFERENCES

1. Roger and Walker. Clinical Pharmacy and Therapeutics - Churchill Living stone publication.
2. Joseph T. Dipiro et al. Pharmacotherapy: A Pathophysiologic Approach Appleton & Lange
3. Robins SL. Pathologic basis of disease-W.B. Saunders publication
4. Eric T. Herfindal. Clinical Pharmacy and Therapeutics- Williams and Wilkins Publication
5. Lloyd Young and Koda-Kimble MA Applied Therapeutics: The clinical Use of Drugs-Lippincott Williams and Wilkins
6. Chisholm- Burns Wells Schwing hammer Malone and Joseph P Dipiro. Pharmacotherapy Principles and practice-–McGraw Hill Publication
7. Carol Mattson Porth. Principles of Pathophysiology- Lippincott Williams and Wilkins
8. Harrison's. Principles of Internal Medicine-McGraw Hill
9. Relevantreviewarticlesfromrecentmedicalandpharmaceuticalliterature

HOSPITAL & COMMUNITY PHARMACY (MPP 103T)

Scope

This course is designed to impart basic knowledge and skills that are required to practice pharmacy in both hospital and community settings.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Understand the organizational structure of hospital pharmacy.
- Understand drug policy and drug committees.
- Know about procurement &drug distribution practices.
- Know the admixtures of radiopharmaceuticals.
- Understand the community pharmacy management.
- Know about value added services in community pharmacies.

Course outcomes

CO1: Understand the roles and responsibilities of pharmacists in hospital and community settings, ensuring equitable access to healthcare and promoting health for all individuals.
CO02: Demonstrate proficiency in accurately dispensing medications and ensuring patient safety, contributing to the overall well-being of the community and minimizing health risks.
CO03: Collaborate effectively with healthcare teams to optimize patient outcomes, enhancing the quality of care and fostering partnerships that support comprehensive health initiatives.
CO04: Manage inventory and handle medications while ensuring compliance with regulations, promoting responsible practices that safeguard public health and the environment.
CO05: Possess knowledge of drug interactions, adverse effects, and contraindications to provide informed medication counseling, empowering patients to make safe and effective health decisions.

THEORY 60 Hrs

1. Introduction to Hospitals – Definition, classification, organizational structure Hospital Pharmacy: Definition, Relationship of hospital pharmacy department with other departments, Organizational structure, legal requirements, workload statistics, Infrastructural requirements, Hospital Pharmacy Budget and Hospital Pharmacy management Hospital Drug Policy: Pharmacy & Therapeutics Committee, Infection Control committee, Research & Ethics Committee, Management of Medicines as per NABH

12 Hrs

2. Hospital Formulary Guidelines and its development, Developing Therapeutic guidelines, Drug procurement process, and methods of Inventory control, Methods of Drug distribution, Intravenous admixtures, Hospital Waste Management

12 Hrs

3. Education and training: Training of technical staff, training and continuing education for pharmacists, Pharmacy students, medical staff and students, Nursing staff and students, Formal and informal meetings and lectures, Drug and therapeutics newsletter.

Community Pharmacy Practice: Definition, roles & responsibilities of community pharmacists, and their relationship with other health care providers.

Community Pharmacy management: Legal requirements to start community pharmacy, site selection, lay out & design, drug display, super drug store model, accounts and audits, good dispensing practices, Different softwares & databases used in community pharmacies. Entrepreneurship in community

pharmacy.

12 Hrs

4. Prescription – Legal requirements & interpretation, prescription related problems Responding to symptoms of minor ailments: Head ache, pyrexia ,menstrual pains, food and drug allergy, OTC medication: Rational use of over the counter medications Medication counselling and use of patient information leaflets Medication adherence – Definition, factors influencing adherence behaviour , strategies to improve medication adherence Patient referrals to the doctors ADR monitoring in community pharmacies

12 Hrs

5. Health Promotion – Definition and health promotion activities, family planning, Health screening services, first aid, prevention of communicable and non-communicable diseases, smoking cessation, Child & mother care National Health Programs- Role of Community Pharmacist in Malaria and TB control programs Home Medicines review program – Definition, objectives, Guidelines , method and outcomes Research in community pharmacy Practice

12 Hrs

REFERENCES

1. Hospital Pharmacy-Hassan WE. Lea and Febiger publication.
2. Textbook of hospital pharmacy –Allwood MC and Blackwell.
3. Avery's Drug Treatment, Adis International Limited.
4. Community Pharmacy Practice – Ramesh Adepu, BSP Publishers, Hyderabad
5. Remington Pharmaceutical Sciences.
6. Relevant review articles from recent medical and pharmaceutical literature

CLINICAL RESEARCH (MPP 104T)

Scope

This course aims to provide the students an opportunity to learn drug development process especially the phases of clinical trials and also the ethical issues involved in the conduct of clinical research. Also, it aims to imparts knowledge and develop skills on conceptualizing, designing, conducting and managing clinical trials.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Know the new drug development process.
- Understand the regulatory and ethical requirements.
- Appreciate and conduct the clinical trials activities.
- Know safety monitoring and reporting in clinical trials.
- Manage the trial coordination process.

Course outcomes

CO01: Understand the comprehensive process of new drug development from discovery to market, ensuring that innovations in healthcare are accessible and beneficial to all populations.
CO02: Identify, navigate, and comply with regulatory and ethical requirements in drug development, promoting responsible practices that protect public health and ensure the safety of new therapies.
CO03: Design, conduct, and analyze clinical trial activities effectively, contributing to robust scientific research that advances medical knowledge and improves health outcomes.
CO04: Implement safety monitoring and reporting protocols during clinical trials, ensuring participant safety and fostering trust in the research process.
CO05: Coordinate and manage all aspects of clinical trial operations efficiently, enhancing the effectiveness of research initiatives and facilitating timely access to new treatments for diverse communities.

THEORY 60 Hrs

1. **Drug development process:** Introduction, various approaches to drug discovery, Investigational new drug application submission Ethics in Biomedical Research: Ethical Issues in Biomedical Research – Principles of ethics in biomedical research, Ethical committee [institutional review board] - its constitution and functions, Challenges in implementation of ethical guidelines, ICH GCP guidelines and ICMR guidelines in conduct of Clinical trials, Drug Safety Reporting.

12 Hrs

2. **Types and Designs used in Clinical Research:** Planning and execution of clinical trials, Various Phases of clinical trials, Bioavailability and Bioequivalence studies, Randomization techniques (Simple randomization, restricted randomization, blocking method and stratification), Types of research designs based on Controlling Method (Experimental, Quasi experimental, and Observational methods) Time Sequences (Prospective and Retrospective), Sampling methods (Cohort study, case Control study and cross sectional study), Health outcome measures (Clinical & Physiological ,Humanistic and economic) Clinical Trial Study team: Roles and responsibilities of: Investigator, Study Coordinator, Sponsor, Monitor, Contract Research Organization

12 Hrs

3. **Clinical trial Documents:** Guidelines to the preparation of following documents: Protocols, Investigator's Brochure, Informed Consent Form, Case report forms, Contracts and agreements, Dairy Cards Clinical Trial Start up activities: Site Feasibility Studies, Site/Investigator selection, Pre-study

visit, Investigator meeting, Clinical trial agreement execution, Ethics committee document preparation and submission

12 Hrs

4. **Investigational Product:** Procurement and Storage of investigation product Filing procedures: Essential documents for clinical trial, Trial Master File preparation and maintenance, Investigator Site File, Pharmacy File, Site initiation visit, Conduct, Report and Follow up Clinical Trial Monitoring and Close out: Preparation and conduct of monitoring visit: Review of source documents, CRF, ICF, IP storage, accountability and reconciliation, Study Procedure, EC communications, Safety reporting ,Monitoring visit reporting and follow-up Close-Out visit: Study related documents collection, Archival requirement, Investigational Product reconciliation and destruction ,Close-Out visit report.

12 Hrs

5. **Quality Assurance and Quality Control in Clinical Trials:** Types of audits, Audit criteria, Audit process, Responsibilities of stakeholders in audit process, Audit follow-up and documentation, Audit resolution and Preparing for FDA inspections, Fraud and misconduct management Data Management Infrastructure and System Requirement for Data Management: Electronic data capture systems, Selection and implementation of new systems, System validation and test procedures, Coding dictionaries, Data migration and archival Clinical Trial Data Management: Standard Operating Procedures, Data management plan, CRF & Data base design considerations, Study set-up, Data entry, CRF tracking and corrections, Data cleaning, Managing laboratory and ADR data, Data transfer and database lock, Quality Control and Quality Assurance in CDM, Data mining and warehousing.

12 Hrs

REFERENCES

1. Principles and practice of pharmaceutical medicine, Second edition. Authors: Lionel. D. Edward, Aadrew. J. Flether Anthony W Fos, Peter D Sloaier Publisher: Wiley.
2. Handbook of clinical research. Julia Lloyd and Ann Raven Ed. Churchill Livingstone.
3. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes.
4. Central Drugs Standard Control Organization. Good Clinical Practices Guidelines for Clinical Trials on Pharmaceutical Products in India. New Delhi: Ministry of Health.
5. International Conference on Harmonisation of Technical requirements for registration of Pharmaceuticals for human use.ICH Harmonised Tripartite Guideline. Guideline for Good Clinical Practice.E6; May1996.
6. Ethical Guidelines for Biomedical Research on Human Subjects. Indian Council of Medical Research, New Delhi.
7. Textbook of Clinical Trials edited by David Machin, Simon Dayand Sylvan Green, John Wiley and Sons.
8. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. SecondEdition, Jan2000, WileyPublications.
9. Goodman & Gilman: JG Hardman, LE Limbard, McGraw Hill Publications.
10. Relevant review articles from recent medical and pharmaceutical literature.

PHARMACY PRACTICE PRACTICAL – I (MPP 105P)

Pharmacy Practice practical component includes experiments covering important topics of the courses Clinical Pharmacy Practice, Pharmacotherapeutics -I, Hospital & Community Pharmacy and Clinical Research.

Course outcomes

CO01: Select medications tailored to diverse patient needs, ensuring equitable access to effective treatments for all demographics.

CO02: Demonstrate competence in assessing drug interactions and adverse effects, promoting safe prescribing practices that prioritize patient safety and well-being.

CO03: Master therapeutic planning to optimize treatment outcomes, focusing on innovative strategies that enhance the effectiveness of care delivery.

CO04: Apply pharmacotherapeutic principles to real-world clinical scenarios, ensuring that patient care is informed by evidence-based practices and tailored to individual circumstances.

CO05: Critically evaluate drug efficacy and adjust treatment plans accordingly, fostering a responsive approach to patient care that enhances health outcomes and supports sustainable healthcare practices.

List of Experiments (24)

1. Treatment Chart Review (one)
2. Medication History Interview (one)
3. Patient Medication Counselling (two)
4. Drug Information Query (two)
5. Poison Information Query (one)
6. Lab Data Interpretation (two)
7. Presentation of clinical cases of various disease conditions adopting Pharmaceutical Care Plan Model (eight)
8. ABC Analysis of a given list of medications (one)
9. Preparation of content of a medicine, with proper justification, for the inclusion in the hospital formulary (one)
10. Formulation and dispensing of a given IV admixtures (one)
11. Preparation of a patient information leaflet (two)
12. Preparation of Study Protocol (one)
13. Preparation of Informed Consent Form (one)

2nd SEMESTER.

PRINCIPLES OF QUALITY USE OF MEDICINES (MPP 201T)

Scope:

This course is designed to impart basic knowledge and skills that are required to practice quality use of medicines (QUM) in different healthcare settings and also to promote quality use of medicines, in clinical practice, through evidence-based medicine approach.

Objectives:

Upon completion of this course, it is expected that students shall be able to:

- Understand the principles of quality use of medicines.
- Know the benefits and risks associated with use of medicines.
- Understand regulatory aspects of quality use of medicines.
- Identify and resolve medication related problems.
- Promote equality use of medicines.
- Practice evidence-based medicines

Course outcomes

CO01: Demonstrate a comprehensive understanding of the principles of quality use of medicines in various healthcare settings, ensuring that medications are used judiciously and appropriately to enhance patient outcomes.

CO02: Evaluate and articulate the benefits and risks associated with different medicines, enabling informed decision-making that prioritizes patient safety and well-being.

CO03: Analyze and apply knowledge of regulatory frameworks governing the quality use of medicines, ensuring compliance with national and international standards that promote safe and effective medication practices.

CO04: Identify and resolve medication-related problems through critical thinking and evidence-based strategies, enhancing patient safety and therapeutic outcomes while minimizing potential harm.

CO05: Promote the quality use of medicines within the healthcare system, utilizing evidence-based medicine to inform practice and policy, ultimately contributing to improved health outcomes and sustainable healthcare practices.

THEORY 60 Hrs

1. **Introduction to Quality use of medicines (QUM):** Definition and Principles of QUM, Key partners and responsibilities of the partners, building blocks in QMC, Evaluation process in QMC, Communication in QUM, Cost effective prescribing.

12 Hrs

2. **Concepts in QUM Evidence based medicine:** Definition, concept of evidence-based medicine, Approach and practice of evidence based medicine in clinical settings Essential drugs: Definition, need, concept of essential drug, National essential drug policy and list Rational drug use: Definition, concept and need for rational drug use, Rational drug prescribing, Role of pharmacist in rational drug use.

12 Hrs

3. **QUM in various settings:** Hospital settings, Ambulatory care/Residential care, Role of health care professionals in promoting the QUM, Strategies to promote the QUM, Impact of QUM on E-health, integrative medicine and multidisciplinary care. QUM in special population: Pediatric prescribing,

Geriatric prescribing, prescribing in pregnancy and lactation, prescribing in immune compromised and organ failure patients.

12 Hrs

4. **Regulatory aspects of QUM in India:** Regulation including scheduling, Regulation of complementary medicines, Regulation of OTC medicines, Professional responsibility of pharmacist, Role of industry in QUM in medicine development.

12 Hrs

5. **Medication errors:** Definition, categorization and causes of medication errors, Detection and prevention of medication errors, Role of pharmacist in monitoring and management of medication errors Pharmacovigilance: Definition, aims and need for Pharmacovigilance, Types, predisposing factors and mechanism of adverse drug reactions (ADRs), Detection, reporting and monitoring of ADRs, Causality assessment of ADRs, Management of ADRs, Role of pharmacist in pharmacovigilance.

12 Hrs

REFERENCES:

1. A Textbook of Clinical Pharmacy Practice– Essential concepts and skills– Parthasarathi G, Karin Nyfort –Hansen and Milap Nahata
2. Andrews EB, Moore N. Mann's Pharmacovigilance
3. Dipiro JT, Talbert RL, Yee GC. Pharmacotherapy: A Pathophysiologic Approach
4. Straus SE, Richardson WS, Glasziou P, Haynes RB. Evidence-Based Medicine: How to practice and teach it
5. Cohen MR. Medication Errors
6. Online: http://medicinesaustralia.com.au/files/2012/05/MA_QUM_External_Red uced.pdf http://curriculum.racgp.org.au/statements/quality-use-of-medicines/ http://www.rug.nl/research/portal/files/14051541/Chapter_2.pdf
7. Relevant review articles from recent medical and pharmaceutical literature.

PHARMACOTHERAPEUTICS II (MPP 202T)

Scope

This course aims to enable the students to understand the different treatment approaches in managing various disease conditions. Also, it imparts knowledge and skills in optimizing drug therapy of a patient by individualizing the treatment plan through evidence-based medicines.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Describe and explain the rationale for drug therapy
- Summarize the therapeutic approach for management of various disease conditions including reference to the latest available evidence
- Discuss the clinical controversies in drug therapy and evidence-based medicine
- Prepare individualized therapeutic plans based on diagnosis
- Identify the patient specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time- course of clinical and laboratory indices of therapeutic response and adverse effect/s)

Course outcomes

CO01: Understand the etiopathogenesis, clinical presentation, and management of various disorders to enhance health outcomes and promote well-being across diverse populations.
CO02: Apprehend the importance of rational drug therapy and prescribing guidelines for different age groups, ensuring equitable access to safe and effective medications.
CO03: Comprehend desired pharmacotherapeutic outcomes for each drug and disease-related problem, focusing on optimizing treatment effectiveness and minimizing adverse effects.
CO04: Determine rational pharmacotherapeutic alternatives that prioritize sustainability and cost-effectiveness, contributing to responsible healthcare practices.
CO05: Understand the importance of individualizing therapeutic regimens to cater to the unique needs of patients, enhancing the quality of care and health education.

THEORY 60 Hrs

1. **Nervous system:** Epilepsy, Parkinson's disease, Stroke, Headache ,Alzheimer's disease, Neuralgias and Pain pathways and Pain management. 12 Hrs
2. **Psychiatric disorders:** Schizophrenia, Depression, Anxiety disorders, Sleep disorders, Drug induced psychiatric disorders 12 Hrs
3. **Renal system:** Acute renal failure, Chronic renal failure, Renal dialysis, Drug induced renal disease 06 Hrs
4. **Infectious diseases**: General guidelines for the rational use of antibiotics and surgical prophylaxis, Urinary tract infections, Respiratory tract infections, Gastroenteritis, Tuberculosis, Malaria, Bacterial endocarditis, Septicemia, Meningitis, HIV and opportunistic infections, Rheumatic fever, Dengue fever, H1N1, Helmenthiasis, Fungal infections 12 Hrs
5. **Gynecological disorders**: Dysmenorrhea, Hormone replacement therapy. 06 Hrs

6. **Oncology:** General principles of cancer chemotherapy, pharmacotherapy of breast cancer, lung cancer, head & neck cancer, haematological malignancies, Management of nausea and vomiting, Palliative care

12 Hrs

REFERENCES

1. Roger and Walker. Clinical Pharmacy and Therapeutics - Churchill Living stone publication.
2. Joseph T. Dipiro et al. Pharmacotherapy: A Pathophysiologic Approach Appleton &Lange
3. Robins SL. Pathologic basis of disease-W.B. Saunders publication
4. Eric T. Herfindal. Clinical Pharmacy and Therapeutics- Williams and Wilkins Publication
5. Lloyd Young and Koda-Kimble MA Applied Therapeutics: The clinical Use of Drugs-Lippincott Williams and Wilkins
6. Chisholm- Burns Wells Schwinghammer Malone and Joseph P Dipiro. Pharmacotherapy Principles and practice-–McGraw Hill Publication
7. Carol Mattson Porth. Principles of Pathophysiology- Lippincott Williams and Wilkins
8. Harrison's. Principles of Internal Medicine-McGraw Hill
9. Relevant review articles from recent medical and pharmaceutical literature.

CLINICAL PHARMACOKINETICS AND THERAPEUTIC DRUG MONITORING (MPP 203T)

Scope

This course is designed to enable students to understand the basics principles and applications of pharmacokinetics in designing the individualized dosage regimen, to interpret the plasma drug concentration profile in altered pharmacokinetics, drug interactions and in therapeutic drug monitoring processes to optimize the drug dosage regimen. Also, it enables students to understand the basic concepts of pharmacogenetics, pharmacometrics for modelling and simulation of pharmacokinetic data.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Design the drug dosage regimen for individual patients.
- Interpret and correlate the plasma drug concentrations with patients' therapeutic outcomes.
- Recommend dosage adjustment for patients with renal/ hepatic impairment.
- Recommend dosage adjustment for paediatrics and geriatrics.
- Manage pharmacokinetic drug interactions.
- Apply pharmacokinetic parameters in clinical settings.
- Interpret the impact of genetic polymorphisms of individuals on pharmacokinetics and or pharmacodynamics of drugs.
- Do pharmacokinetic modelling for the given data using the principles of pharmacometrics.

Course outcomes

CO01: Utilize pharmacokinetic principles to tailor drug dosage regimens for individualized patient care, promoting equitable access to effective and safe medications.

CO02: Formulate drug dosage schedules considering administration methods, ensuring responsible medication practices and minimizing waste.

CO03: Develop and execute pharmacokinetic services, including converting dosage regimens from intravenous to oral administration, to enhance patient comfort and adherence.

CO04: Comprehend the importance of modified pharmacokinetics, pharmacogenetics, and pharmacometrics, leveraging innovation to optimize therapeutic outcomes.

CO05: Modify dosage regimens for patients with renal or hepatic impairments, demonstrating a commitment to inclusive healthcare practices that address diverse patient needs.

THEORY 60 Hrs

1. **Introduction to Clinical pharmacokinetics**: Compartmental and Non compartmental models, Renal and non-renal clearance, Organ extraction and models of hepatic clearance, Estimation and determinants of bioavailability, Multiple dosing, Calculation of loading and maintenance doses Designing of dosage regimens: Determination of dose and dosing intervals, Conversion from intravenous to oral dosing, Nomograms and Tabulations in designing dosage regimen.

12 Hrs

2. **Pharmacokinetics of Drug Interaction:** Pharmacokinetic drug interactions, Inhibition and Induction of Drug metabolism, Inhibition of Biliary Excretion

Pharmacogenetics: Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes, Genetic Polymorphism in Drug Transport and Drug Targets, Pharmacogenetics and Pharmacokinetic / Pharmacodynamic considerations Introduction to Pharmacometrics: Introduction to Bayesian Theory,

Adaptive method or Dosing with feedback, Analysis of Population pharmacokinetic Data.
12 Hrs

3. **Non Linier Mixed Effects Modelling:** The Structural or Base Model, Modeling Random Effects, Modeling Covariate Relationships, Mixture Model, Estimation Methods, Model Building Techniques, Covariate Screening Methods, Testing the model assumptions, Precision of the parameter estimates and confidence intervals, Model misspecification and violation of the model assumptions, Model Validation, Simulation of dosing regimens and dosing recommendations, Pharmacometrics software.
12 Hrs

4. **Altered Pharmacokinetics:** Drug dosing in the elderly, Drug dosing in the paediatrics, Drug dosing in the obese patients, Drug dosing in the pregnancy and lactation, Drug dosing in the renal failure and extracorporeal removal of drugs, Drug dosing in the in hepatic failure.
12 Hrs

5. **Therapeutic Drug monitoring:** Introduction, Individualization of drug dosage regimen (Variability – Genetic, age ,weight, disease and Interacting drugs), Indications for TDM, Protocol for TDM, Pharmacokinetic/ Pharmacodynamic Correlation in drug therapy, TDM of drugs used in the following conditions: Cardiovascular disease: Digoxin , Lidocaine, Amiodarone; Seizure disorders: Phenytoin, Carbamazepine, Sodium Valproate; Psychiatric conditions: Lithium, Fluoxetine , Amitriptyline ; Organ transplantations: Cyclosporine; Cytotoxic Agents: Methotrexate, 5-FU, Cisplatin; Antibiotics: Vancomycin, Gentamicin, Meropenem
12 Hrs

REFERENCES

1. Leon Shargel, Susanna Wu-Pong, Andrew Yu. Applied Biopharmaceutics & Pharmacokinetics. New York: McGraw Hill.
2. Peter L. Bonate. Pharmacokinetic - Pharmacodynamic Modelling and Simulation. Springer Publications.
3. Michael E. Burton, Leslie M. Shaw, Jerome J. Schentag, William E. Evans. Applied Pharmacokinetics & Pharmacodynamics: Principles of Therapeutic Drug Monitoring Lippincott Williams &Wilkins.
4. Steven How-Yan Wong, Irving Sunshine. Handbook of Analytical Therapeutic Drug Monitoring and Toxicology. CRC Press, USA.
5. Soraya Dhillon, Andrzej Kostrzewski. Clinical pharmacokinetics. 1st edition. London: Pharmaceutical Press.
6. Joseph T. Dipiro, William J. Spruill, William E. Wade, Robert A . Blouin and Jane M. Pruemer. Concepts in Clinical Pharmacokinetics. American Society of Health-System Pharmacists, USA.
7. Malcolm Rowland, Thomas N. Tozer. Clinical Pharmacokinetics and pharmacodynamics: concepts and applications. Iippincott Williams & Wilkins,USA.
8. Evans, Schentag, Jusko. Applied pharmacokinetics. American Society of Health system Pharmacists, USA.
9. Michael E. Winter. Basic Clinical Pharmacokinetics. Iippincott Williams & Wilkins, USA.
10. Milo Gibaldi. Biopharmaceutics and Clinical Pharmacokinetics. Pharma Book Syndicate, USA.
11. Dhillon and Kostrzewski. Clinical pharmacokinetics. Pharmaceutical Press, London.
12. John E. Murphy. Clinical Pharmacokinetics. 5th edition. US: American Society of Health-System Pharmacist, USA.
13. Relevant review articles from recent medical and pharmaceutical literature

PHARMACOEPIDEMIOLOGY & PHARMACOECONOMICS (MPP 204T)

Scope

This course enables students to understand various pharmacoepidemiological methods and their clinical applications. Also, it aims to impart knowledge on basic concepts, assumptions, terminology, and methods associated with Pharmacoeconomics and health related outcomes, and when should be appropriate Pharmacoeconomic model should be applied for a health care regimen.

Objectives

Upon completion of this course, it is expected that students shall be able to:

- Understand the various epidemiological methods and their applications
- Understand the fundamental principles of Pharmacoeconomics.
- Identify and determine relevant cost and consequences associated with pharmacy products and services.
- Perform the key Pharmacoeconomics analysis methods
- Understand the Pharmacoeconomic decision analysis methods and its applications.
- Describe current Pharmacoeconomic methods and issues.
- Understand the applications of Pharmacoeconomics to various pharmacy settings.

Course outcomes

CO1: Understand the fundamental concepts and principles of Pharmacoepidemiology and its significance in enhancing public health and clinical practice, ensuring the safe and effective use of medications for diverse populations.

CO02: Apply Pharmacoepidemiology principles to optimize medication use, focusing on improving patient outcomes and promoting equitable access to healthcare resources.

CO03: Demonstrate competency in the design, ethical considerations, conduct, and evaluation of Pharmacoepidemiology studies, ensuring that research adheres to high ethical standards and contributes to informed decision-making in healthcare.

CO04: Understand basic pharmacoeconomic principles and methods to evaluate healthcare costs and outcomes, promoting efficient resource allocation and sustainability in healthcare systems.

CO05: Demonstrate competency in the design, conduct, and evaluation of pharmacoeconomic studies, ensuring that economic evaluations inform policy decisions and enhance the value of healthcare interventions.

THEORY 60 Hrs

1. **Introduction to Pharmacoepidemiology:** Definition, Scope, Need, Aims & Applications; Outcome measurement: Outcome measures, Drug use measures: Monetary units, Number of prescriptions, units of drug dispensed, defined daily doses, prescribed daily doses, Diagnosis and Therapy surveys, Prevalence, Incidence rate, Monetary units, number of prescriptions, unit of drugs dispensed, defined daily doses and prescribed daily doses, medications adherence measurements. Concept of risk: Measurement of risk, Attributable risk and relative risk, Time-risk relationship and odds ratio

12 Hrs

2. **Pharmacoepidemiological Methods:** Qualitative models: Drug Utilization Review; Quantitative models: case reports, case series, Cross sectional studies, Cohort and case control studies, Calculation of Odds' ratio, Meta analysis models, Drug effects study in populations: Spontaneous reporting, Prescription event monitoring, Post marketing surveillance, Record linkage systems

Applications of Pharmacoepidemiology

12 Hrs

3. **Introduction to Pharmacoeconomics:** Definition, history of Pharmacoeconomics, Need of Pharmacoeconomic studies in Indian health care system. Cost categorization and resources for cost estimation: Direct costs, Indirect costs. Intangible costs. Outcomes and Measurements of Pharmacoeconomics: Types of outcomes: Clinical outcome, Economic outcomes, Humanistic outcomes; Quality Adjusted Life Years, Disability Adjusted Life Years Incremental Cost Effective Ratio, Average Cost Effective Ratio. Person Time, Willingness To Pay, Time Trade Off and Discounting.

12 Hrs

4. **Pharmacoeconomic evaluations:** Definition, Steps involved, Applications, Advantages and disadvantages of the following Pharmacoeconomic models: Cost Minimization Analysis (CMA), Cost Benefit Analysis (CBA), Cost Effective Analysis (CEA), Cost Utility Analysis (CUA), Cost of Illness (COI), Cost Consequences Analysis.

12 Hrs

5. **Definition, Steps involved, Applications, Advantages and disadvantages of the following:** Health related quality of life (HRQOL): Definition, Need for measurement of HRQOL, Common HRQOL measures. Definition, Steps involved, Applications of the following: Decision Analysis and Decision tree, Sensitivity analysis, Markov Modeling, Software used in pharmacoeconomic analysis, Applications of Pharmacoeconomics.

12 Hrs

REFERENCES

1. Rascati K L. Essentials of Pharmacoeconomics, Woulters Kluwer Lippincott Williams &Wilkins, Philadelphia.
2. Thomas E Getzen. Health economics. Fundamentals and Flow of Funds. John Wiley & Sons, USA.
3. Andrew Briggs, Karl Claxton, Mark Sculpher. Decision Modelling for Health Economic Evaluation, Oxford University Press, London.
4. Michael Drummond, Mark Sculpher, George Torrance, Bernie O'Brien and Greg Stoddart. Methods for the Economic Evaluation of Health Care Programmes Oxford University Press, London. 206
5. George E Mackinnon III. Understanding health outcomes and pharmacoeconomics.
6. Graker, Dennis. Pharmacoeconomics and outcomes.
7. Walley, Pharmacoeconomics.
8. Pharmacoeconomic – ed. by Nowakowska–University of Medical Sciences, Poznan.
9. Relevant review articles from recent medical and pharmaceutical literature.

PHARMACY PRACTICE PRACTICAL – II (MPP 205P)

Pharmacy Practice practical component includes experiments covering important topics of the courses Principles of Quality Use of Medicines, Pharmacotherapeutics -II, Clinical Pharmacokinetics & Therapeutic Drug Monitoring and Pharmacoepidemiology and Pharmacoeconomics.

Course outcomes

CO01: Develop effective patient counseling and education skills on medication usage, potential side effects, and lifestyle modifications to enhance patient understanding and adherence.

CO02: Conduct comprehensive medication reviews and implement appropriate therapeutic interventions to optimize patient outcomes and ensure safe medication practices.

CO03: Apply principles of pharmacy management, including inventory control and compliance with legal and ethical standards, to promote efficient and responsible pharmacy operations.

CO04: Utilize health informatics tools and technologies, such as electronic health records and pharmacy information systems, to enhance the quality and accessibility of pharmacy services.

CO05: Assess, document, and manage adverse drug reactions, implementing appropriate intervention strategies to improve patient safety and therapeutic effectiveness.

List of Experiments (24)

1. Causality assessment of adverse drug reactions (three)
2. Detection and management of medication errors (three)
3. Rational use of medicines in special population (three)
4. Presentation of clinical cases of various disease conditions adopting Pharmaceutical Care Plan Model (eight)
5. Calculation of Bioavailability and Bioequivalence from the given data (two)
6. Interpretation of Therapeutic Drug Monitoring reports of a given patient (three)
7. Calculation of various Pharmacoeconomic outcome analysis for the given data (two)

DM 101 Disaster Management (Theory)

3Hours/week

Scope and Objectives of the Course

1. To provide students an exposure to disasters, their significance and types
2. To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
3. To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
4. To enhance awareness of institutional processes in the country
5. To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

Course outcomes

CO01: Understand the relationship between vulnerability, disasters, prevention and disaster
CO02: Enhance knowledge on disasters impact on social,economic,political, psychosocial, health etc
CO03: Comprehend the significance of disasters and its types.
CO04: Analyse the global trends of disasters and adaptation.
CO05: Impart the learning opportunities to understand the vulnerabilities, urban disasters and waste management

THEORY

Disasters: Classification, Causes, Impacts

- Introduction to Disasters: Concepts, and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks)
- Impacts (including social, economic, political, environmental, health, psychosocial, etc. Differential impacts- in terms of caste, class, gender, age, location, disability) Classification of hazards/disasters and causes

Principles of disaster management

- Approaches to Disaster Risk reduction: Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness,
- Community based DRR, Components of Disaster Relief: Water, Food, Sanitation, Shelter, and Health, Structural and non-structural measures.

Hazard Profile (India), Disaster Risk Management in India

- Hazard and Vulnerability profile of India
  Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation) ,Role of Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders.

Disaster and Development

- Inter-relationship between Disasters and Development: Factors affecting Vulnerabilities, impact of Development projects such as dams, embankments, changes in Land-use etc. urban disasters, Waste Management
  Global trends in disasters & Adaptation: Global Trends, Complex emergencies, Pandemics Climate change and Adaptation, Relevance of indigenous knowledge, appropriate technology and local resources

Research Methodology and Biostatistics (MRM301T)

Scope:

This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non-Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

Objectives:

Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, MINITAB, R, DOE (Design Experiment)
- Know the various statistical techniques to solve statistical problems.
- Appreciate statistical techniques in solving the problems.

Course outcomes:

CO01: Develop the ability to apply the statistical techniques and methods while working on a research project work by using softwares.

CO02: Understand the appropriate statistical methods required for a particular research design.

CO03: Choose the appropriate research design and develop an appropriate research hypothesis for a research project.

CO04: Develop a appropriate framework for research studies, study designs and their strengths and limitations.

CO05: Analyze of statistical results and communicate findings effectively.

Theory Course content: 60 Hrs

UNIT I:

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples

Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples. 10 Hrs

UNIT II:

Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique.

Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

Designing the methodology:Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases. 10 Hrs

UNIT III:

Preview of statistical parameters. Different distributions, fiducial limits, linear regression and correlation analysis, and their significance, parametric tests, type of errors, hypothesis testing, experimental designs, statistics in bioequivalence testing, statistical quality control, in-vitro in-vivo correlation. Probability determination, student T-test and chi square test and wilcoxan's rank sum tests. 10 Hrs

UNIT IV:

Application and Methodology of One way, two way, three way and repeated measures ANOVA. With post hoc tests like Fischer LSD test Tukey's multiple range tests, Bonferroni's test, Sheffe's test and Dennett's test. 10 Hrs

Unit-VI

Design and Analysis of experiments:

Factorial Design: Definition, 2^2, 2^3 designs. Advantage of factorial design

Response Surface methodology: Central composite design, Historical design, Optimization Techniques

10 Hrs

Recommended Books:

- Clinical Pharmacokinetics Concepts and Applications 3rd edition by Malcolm Rowland and Thomas N. Tozer, Lea and Febiger, Philadelphia, 1987.
- Gupta, S. (2003) Research Methodologies and Statistical Techniques, Deep and Deep Publications Pvt. Ltd., New Delhi.
- Kothari, C.R. (2003) Research Methodologies: Methods and Techniques, Wishwa Prakashan, New Delhi.
- Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. New York.
- Fundamental of Statistics – Himalaya Publishing House- S. C. Gupta
- Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
- Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

HR 101 Human Values and Professional Ethics **2 Hours/ Week**

1. **Scope & Objective of the Course:**
The course provides a wide scope of learning & understanding of the subject and after completion of the subject the student will have the ability to develop human values and its importance in their professional life. The student will also have good knowledge of human rights.

The main objectives of the course are:

- It will highlight specific issues and important of human rights.
- To understand the importance of personal development and create positive personality.
- To identify the national, social and professional values, religious values.
- To understand about national integration and international cooperation.
- To understand the basic fundamental rights of constitution.
- Introduction to human rights.

Course outcomes

CO01: Develop critical thinking about character formation, Personal development and value education.
CO02: Enhance the knowledge in understanding National and Professional Values.
CO03: Deepen the awareness about Fundamental Rights.
CO04: Promote compliance with International and National concepts of Human Rights.
CO05: Nurture respect to women and children by clearing he concept of their human rights.

THEORY

General Concepts Introduction about human rights and value education, aim of education, concept of human values and its type
Personal development: Self -analysis, gender equality, respect to age, experience, maturity, family member, coworker. Personality development and its importance in professional world
Character formation through human values: Truthfulness, sacrifice, sincerity, self-control, tolerance, positive attitude, dignity, ethics
National values: Democracy, socialism, secularism, equality, justice, liberty, freedom
Social values: sympathy, universal brother-hood, duty towards our society
Professional Values: Knowledge thirst, sincerity towards responsibility, ethics, regularity, punctuality, and faith
Religious values: Accept and respect others believes, tolerance, understanding, faith
Fundamental rights: Introduction and importance of fundamental rights of Indian constitution
Right to Equality: Introduction and its importance, types of rights of equality, equality before law, abolition of untouchability, abolition of titles
Rights to freedom: Introduction and its importance, types of rights, freedom of speech, freedom to reside and settle, freedom to practice any profession
Rights against exploitation and right to freedom of religion: Introduction and its importance and its effect on human life
Cultural and educational rights and rights to constitutional remedies
Right to property and right to education: Introduction and its importance, importance of education on our life

Human rights-general: Concepts of human rights and its Indian and international perspective, evolution of human rights, Universal Declaration of Human Rights, significance of the UDHR, analysis of the declaration

Therapeutic Measures: Control of mind through physical exercise, meditation

Meditation and Yoga: Introduction and its effects on human mind, types of yoga, how to control our thought through yoga and meditation.

Human rights of women and children: Social practice and constitutional safeguards, gender discrimination in workplace

Female feticide, physical assault and harassment, domestic violence, condition of working of women, child labour, violation by individuals, nuclear weapons and terrorism safeguard.

1. **Recommended Books (Reference Books/Textbooks):**

a. **RB01:** Value Education and Human Rights, R.P. Shukla
b. **TB01:** Introduction to Human Rights and Duties, Dr. T. S. N. Sastry
c. **TB02:** Value Education and Education For Human Rights, V.C. Pandey

29. Examples of few questions statements pertaining to different levels of Bloom's Taxonomy

Remember

A lot of emphasis is laid on, so as to make sure that all assessment components are conducted while following different levels of Bloom's Taxonomy as mentioned in figure.

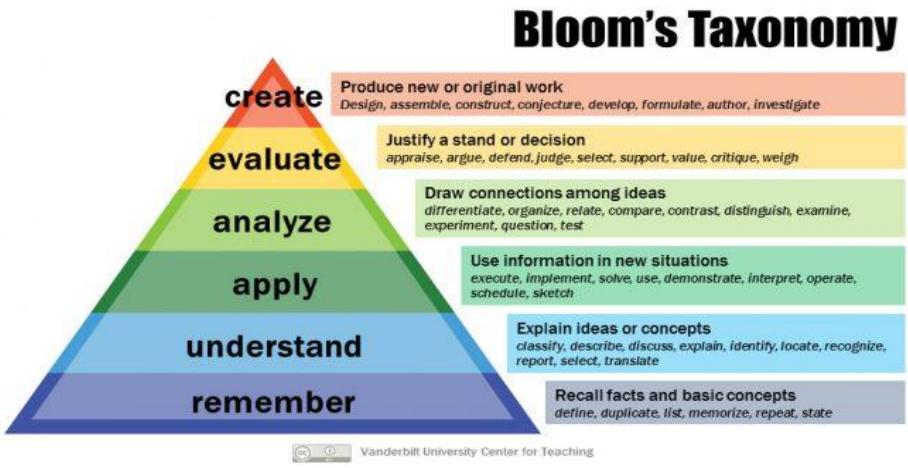

Figure 1. Bloom's Taxonomy [7]

Further a focused effort if also made to align every single Further a focused effort if also made to align every single test item in assessment components with one or the other course learning outcome.

Retrieving, recognizing, and recalling relevant knowledge from long-term memory.

Sample Questions

1. Classify antitubercular drugs into first line and second line drugs.
2. Enlist the major classes of antithyroid drugs.

Understand

Constructing meaning from oral, written and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining.

Sample Questions

1. Explain the different types of oral contraceptives.

2. How can an understanding of chronotherapy, which involves timing medication administration based on circadian rhythms, help in the management of these conditions?

Applying

Carrying out or using a procedure through executing or implementing.

Sample Questions

1. Enumerate the different types of oral contraceptives. Mention composition of each. What are the primary mechanisms of action of these oral contraceptives, and what are some common side effects associated with their use, aiding in a foundational understanding of how these medications prevent pregnancy and their potential risks?

2. What are the main classes of oral hypoglycemic medications, and how do they work to lower blood sugar levels in patients with diabetes, fostering a foundational understanding of their pharmacological mechanisms? Mention the side effect of each drug.

Analysing

Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing and attributing

Sample Questions

1. Compile the main mechanisms of action of antitubercular drugs aiding in the treatment of tuberculosis? Mention briefly the management of tuberculosis emphasizing the main goals of antitubercular chemotherapy.

2. Enumerate the primary mechanisms of action of antithyroid drugs in individuals with hyperthyroidism, facilitating a basic comprehension of their pharmacological effects?

Creating & Evaluating

Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning or producing. Making judgments based on criteria and standards through checking and critiquing

Sample Questions

1. Review how corticosteroids exert their pharmacological effects in the body, fostering a basic understanding of their uses. What are the pharmacological actions of these drugs on various organs and site the side effects of these drugs?

2. Define circadian rhythm, and how does it influence various bodily functions and disease processes such as cardiovascular disease, diabetes, asthma, and peptic ulcer?

30. Course Handout

An elaborate document named 'Course Handout' providing details about every single course is shared with students at the beginning of every semester. This document typically has various components like –

Course Handout

Institute/School Name			
Department Name			
Programme Name			
Course Name		Session	
Course Code		Semester/Batch	
L-T-P(Per Week)		Course Credits	
Pre-requisite		NHEQF Level[1]	
Course Coordinator			

1. Objectives of the Course

<< Provide a brief overview and objectives of this course in not more than 100 words. >>

2. Course Learning Outcomes (CLOs)

Student should be able to:

	CLOs	Program Outcomes (PO)	NHEQF Level Descriptor[2]	No. of Lectures
CLO01				
CLO02				
CLO03				
CLO04				
CLO05				
CLO06 (Only for lab components)				
Total Contact Hours				

CLO-PO Mapping

CLO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO01												
CLO02												
CLO03												
CLO04												
CLO05												
CLO06												

H=High, M=Medium, L=Low

3. Recommended Books:

B01:
B02:
B03:
B04:
B05

[1] National Higher Education Qualification Framework Level, Refer to annexure

[2] NHEQF Level Descriptor, Refer to Annexure & Learning outcomes descriptors for qualification for all levels on the NHEQF

4. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	
2.	
3.	
4.	
5.	

5. Recommended Tools and Platforms

<<Mention Tools and Platforms required for the course if required>>

6. Course Plan: Theory+ Lab

Plan Theory Plan

Lect. No.	Topic(s)
ST1	
ST2	
End Term Exam	

Lab Plan

Lab No.	Topic(s)
Continuous Evaluation1 (15marks)	
Continuous Evaluation2 (15Marks)	

7. Delivery/Instructional Resources

Theory Plan:

Lect. No.	Topics	Book No, CH No, Page No	TLM[3]	ALM[4]	Web References	Audio-Video
		B01, CH 1.1-1.5, Page no 3-13				

Lab Plan:

Lab No.	Experiment	TLM	ALM	Web References	Audio-Video

8. Remedial Classes[5]

<<Supplement course handout, which may perhaps include special lectures and discussions that would be planned, and schedule notified accordingly.>>

9. Self-Learning[6]

Assignments to promote self-learning, survey of contents from multiple sources.

S.No	Topics	CO	ALM	References/MOOCS

[3] Teaching Learning Methods, Refer to Annexure
[4] Active Learning Methods
[5] Refer to Annexure
[6] Refer to Annexure

10. Delivery Details of Content Beyond Syllabus[7]

Content beyond syllabus covered (if any) should be delivered to all students that would be planned, and schedule notified accordingly.

S.No	Advanced Topics, Additional Reading, Research papers and any	CO	POs	ALM	References/MOOCS

11. Evaluation Scheme & Components:

Assessment Type[8]	Evaluation Component[9]	Type of Component[10]	No. of Assessments[11]	% Weightage of Component	Max. Marks	Mode of Assessment
Formative	Component1	Continuous Lab Evaluations	02*	30%		Offline
Summative	Component2	Sessional Tests(STs)	02**	20%		Offline
Summative	Component3	End Term Examination	01***	50%		Offline
	Total		**100%**			

Note: Details in above table are sample for the reference, The department decides the assessment policy for each course.

12. Syllabus of the Course:

Subject:			
S.No.	**Topic(s)**	**No. ofLectures**	**Weightage %**

13. Academic Integrityy Policy:

Education at Chitkara University builds on the principle that excellence requires freedom where Honesty and integrity are its prerequisites. Academic honesty in the advancement of knowledge requires that all students and Faculty respect the integrity of one another's work and recognize the importance of acknowledging and safeguarding intellectual property. Any breach of the same will be tantamount to severe academic penalties.

This Document is approved by:

Designation	Name	Signature
Course Coordinator		
Head-Academic Delivery		

[7] Refer to Annexure
[8] Refer to Annexure 2 of NCrF
[9] Refer to Annexure
[10] Refer to Annexure
[11] Refer to Annexure

Dean		
Date(DD/MM/YYYY)		

Faculty members are expected to religiously follow the contents of the course handout in complete letter and spirit.

31. Mapping of Programme Outcomes (POs) with Course Outcomes (COs)

Sl. No.	Course Name	Course Code	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
1.	Clinical Pharmacy Practice	MPP-101T	CO01: Comprehend the components of pharmaceutical care and deliver extensive patient care services that promote the overall health and well-being of all patients.	M	M			H	H	H		L	L	
			CO02: Analyze laboratory findings to assist in diagnosing a range of disorders clinically by utilizing innovative diagnostic tools and technologies to support high-quality patient care.	H	H			M	L				H	
			CO03: Deliver thoroughly evaluated medicine and poison information in an integrated manner to facilitate efficient patient management for healthcare professionals, promoting safe and effective medication use while ensuring responsible consumption and production practices.	M	M	H		L	M	H	H	H	M	
			CO04: Demonstrate effective communication skills to interact with patients, caregivers, and other healthcare professionals in a collaborative and empathetic manner, fostering partnerships and enhancing patient-centered care.	H				M	M			H	L	

			CO05: Conduct comprehensive patient assessments, including medication histories, physical exams, and laboratory data interpretation, to provide high-quality patient care and educate patients about their health and medication management.	H				H	H	H	L	M,	L	
2.	Pharmacotherapeutics-I	MPP-102T	CO01: Understand the etiopathogenesis, clinical presentation, and management of various disorders to enhance health outcomes and promote well-being across diverse populations.	M	M			L	M	H	H	H	M	
			CO02: Apprehend the importance of rational drug therapy and prescribing guidelines for different age groups, ensuring equitable access to safe and effective medications.	H			M			L	L	L		
			CO03: Comprehend desired pharmacotherapeutic outcomes for each drug and disease-related problem, focusing on optimizing treatment effectiveness and minimizing adverse effects.	M	H	H		L	M					
			CO04: Determine rational pharmacotherapeutic alternatives that prioritize sustainability and cost-effectiveness, contributing to responsible healthcare practices.	H	M	M	H	L			L			

			CO05: Understand the importance of individualizing therapeutic regimens to cater to the unique needs of patients, enhancing the quality of care and health education.	M	H	M	H	M		L	L			
3.	Hospital & Community Pharmacy	MPP-103T	CO01: Understand the roles and responsibilities of pharmacists in hospital and community settings, ensuring equitable access to healthcare and promoting health for all individuals.	H		H		L	M	M	L	H		L
			CO02: Demonstrate proficiency in accurately dispensing medications and ensuring patient safety, contributing to the overall well-being of the community and minimizing health risks.	M		H		H	H	M		H	M	
			CO03: Collaborate effectively with healthcare teams to optimize patient outcomes, enhancing the quality of care and fostering partnerships that support comprehensive health initiatives.	M			H	M	H		H			L
			CO04: Manage inventory and handle medications while ensuring compliance with regulations, promoting responsible practices that safeguard public health and the environment.	H		M	L	L		M				
			CO05: Possess knowledge of drug interactions, adverse effects, and contraindications to provide informed	H				M	H	H	L	L	H	

			medication counseling, empowering patients to make safe and effective health decisions.											
4.	Clinical Research	MPP-104T	CO01: Understand the comprehensive process of new drug development from discovery to market, ensuring that innovations in healthcare are accessible and beneficial to all populations.		H	H	H	H			M		M	L
			CO02: Identify, navigate, and comply with regulatory and ethical requirements in drug development, promoting responsible practices that protect public health and ensure the safety of new therapies.			H		M				H		L
			CO03: Design, conduct, and analyze clinical trial activities effectively, contributing to robust scientific research that advances medical knowledge and improves health outcomes.		H	M	H	M			M	L	H	
			CO04: Implement safety monitoring and reporting protocols during clinical trials, ensuring participant safety and fostering trust in the research process.	H	M	M	L	H	L			H	M	
			CO05: Coordinate and manage all aspects of clinical trial operations efficiently, enhancing the effectiveness of research initiatives and facilitating timely access to new treatments for diverse communities.			M	H		H			L		M

5.	Pharmacy Practice Practical I	MPP-105P	CO01: Select medications tailored to diverse patient needs, ensuring equitable access to effective treatments for all demographics.	H	M		H	M		L				H
			CO02: Demonstrate competence in assessing drug interactions and adverse effects, promoting safe prescribing practices that prioritize patient safety and well-being.	H		L		L	M	H				L
			CO03: Master therapeutic planning to optimize treatment outcomes, focusing on innovative strategies that enhance the effectiveness of care delivery.	H		H		H	H	M			M	L
			CO04: Apply pharmacotherapeutic principles to real-world clinical scenarios, ensuring that patient care is informed by evidence-based practices and tailored to individual circumstances.	M		L	M		L	H			M	
			CO05: Critically evaluate drug efficacy and adjust treatment plans accordingly, fostering a responsive approach to patient care that enhances health outcomes and supports sustainable healthcare practices.	H		M	H	H	H	M	L			L
6.	Principles of Quality Use of medicines	MPP-201T	CO01: Demonstrate a comprehensive understanding of the principles of quality use of medicines in various healthcare settings, ensuring	H		L		M	M	M	L			H

			that medications are used judiciously and appropriately to enhance patient outcomes.											
			CO02: Evaluate and articulate the benefits and risks associated with different medicines, enabling informed decision-making that prioritizes patient safety and well-being.	H		M		H	M	H			H	L
			CO03: Analyze and apply knowledge of regulatory frameworks governing the quality use of medicines, ensuring compliance with national and international standards that promote safe and effective medication practices.	H			H	H			M	M	H	L
			CO04: Identify and resolve medication-related problems through critical thinking and evidence-based strategies, enhancing patient safety and therapeutic outcomes while minimizing potential harm.	H				L	H	L	H		H	M
			CO05: Promote the quality use of medicines within the healthcare system, utilizing evidence-based medicine to inform practice and policy, ultimately contributing to improved health outcomes and sustainable healthcare practices.	H		M		H	M	H	L		M	L
7.	Pharmacotherapeutics II	MPP 202T	CO01: Understand the etiopathogenesis, clinical presentation, and management of various disorders to enhance	H	M	L		H	H	H	M	L	M	H

			health outcomes and promote well-being across diverse populations.											
			CO02: Apprehend the importance of rational drug therapy and prescribing guidelines for different age groups, ensuring equitable access to safe and effective medications.	H						L	L	L	H	M
			CO03: Comprehend desired pharmacotherapeutic outcomes for each drug and disease-related problem, focusing on optimizing treatment effectiveness and minimizing adverse effects.	H	L	M		H	H	H			M	L
			CO04: Determine rational pharmacotherapeutic alternatives that prioritize sustainability and cost-effectiveness, contributing to responsible healthcare practices.	H	M	M		H	H	H	L		M	
			CO05: Understand the importance of individualizing therapeutic regimens to cater to the unique needs of patients, enhancing the quality of care and health education.	H	H	M		M	H	M	L		M	L
8.	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	MPP203T	CO01: Utilize pharmacokinetic principles to tailor drug dosage regimens for individualized patient care, promoting equitable access to effective and safe medications.	H		M		H	H	H	M		M	L
			CO02: Formulate drug dosage schedules considering	H		M		L	L	M	L		H	

			administration methods, ensuring responsible medication practices and minimizing waste.											
			CO03: Develop and execute pharmacokinetic services, including converting dosage regimens from intravenous to oral administration, to enhance patient comfort and adherence.	H	H	M		M	H	M			M	L
			CO04: Comprehend the importance of modified pharmacokinetics, pharmacogenetics, and pharmacometrics, leveraging innovation to optimize therapeutic outcomes.	H	M	H		H	H	H			M	L
			CO05: Modify dosage regimens for patients with renal or hepatic impairments, demonstrating a commitment to inclusive healthcare practices that address diverse patient needs.	H		M		H	H	H		L	M	L
9.	Pharmacoepidemiology & Pharmacoeconomics	MPP 204T	CO01: Understand the fundamental concepts and principles of Pharmacoepidemiology and its significance in enhancing public health and clinical practice, ensuring the safe and effective use of medications for diverse populations.	H	L	H		H	H	H		H	M	L
			CO02: Apply Pharmacoepidemiology principles to optimize medication use, focusing on improving patient outcomes	M	L	M		H	H	H		H	H	L

			and promoting equitable access to healthcare resources.											
			CO03: Demonstrate competency in the design, ethical considerations, conduct, and evaluation of Pharmacoepidemiology studies, ensuring that research adheres to high ethical standards and contributes to informed decision-making in healthcare.	H	M	H	H	H	M	L	L	H	H	L
			CO04: Understand basic pharmacoeconomic principles and methods to evaluate healthcare costs and outcomes, promoting efficient resource allocation and sustainability in healthcare systems.	M		L	M	L	M		L	H	M	L
			CO05: Demonstrate competency in the design, conduct, and evaluation of pharmacoeconomic studies, ensuring that economic evaluations inform policy decisions and enhance the value of healthcare interventions.	M		L	M	L		L		L	H	L
10.	Pharmacy Practice Practical I	MPP205P	CO01: Develop effective patient counselling and education skills on medication usage, potential side effects, and lifestyle modifications to enhance patient understanding and adherence.	M	L	H		M	M	M	H	H	M	H
			CO02: Conduct comprehensive medication reviews and implement	H	L	H		M	M	M	H		M	H

			appropriate therapeutic interventions to optimize patient outcomes and ensure safe medication practices.											
			CO 03: Apply principles of pharmacy management, including inventory control and compliance with legal and ethical standards, to promote efficient and responsible pharmacy operations.	L	M	H					L		M	H
			CO 04: Utilize health informatics tools and technologies, such as electronic health records and pharmacy information systems, to enhance the quality and accessibility of pharmacy services.	L	L	H		M	L	L	L		H	H
			CO 05: Assess, document, and manage adverse drug reactions, implementing appropriate intervention strategies to improve patient safety and therapeutic effectiveness.	H	L	H		H	M	H	M	H	M	H
11.	Disaster Management	DM 101	C01: Understand the relationship between vulnerability, disasters, prevention and disaster	H				M				L		
			CO2: Enhance knowledge on disasters, impact on social, economic, political, psychosocial, health etc.		H			M			L			

			CO3: Comprehend the significance of disasters and their types.	H						M			L	
			CO 4: Analyze the global trends of disasters and adaptation.	H		M				L				
			CO5: Impart the learning opportunities to understand the vulnerabilities, urban disasters and waste management		H			M				L		
12.	Research Methodology and Biostatistics	MRM 301T	CO01: Develop the ability to apply the statistical techniques and methods while working on a research project work by using software.	H	M									
			CO02: Understand the appropriate statistical methods required for a particular research design.	H	M									
			CO03: Choose the appropriate research design and develop an appropriate research hypothesis for a research project.	H	M									
			CO04: Develop a appropriate framework for research studies, study designs and their strengths and limitations.	H	M									
			CO05: Analyze of statistical results and communicate findings effectively.	H	M									
13.	Human Values & Professional Ethics	HR 101	CO1: Develop critical thinking about character formation, Personal development and value education.	H			M				L			

			CO2: Enhance the knowledge in understanding National and Professional Values.	H			M					H		
			CO3: Deepen awareness about Fundamental Rights.		H				L				M	
			CO4: Promote compliance with International and National concepts of Human Rights.	H			M						M	H
			CO5: Nurture respect to women and children by clearing the concept of their human rights.	H			M			L				