RAMAIAH UNIVERSITY OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Structure and Course Details of M. Pharm. Pharmacy Practice

2026-2027

Programme Code: 062

Faculty of Pharmacy

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Professor and Head
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Dean – Academic Affairs
Ramaiah University of Applied Sciences
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University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment

Mission

Our purpose is creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelong learning. We serve the technical, scientific and economic needs of our Society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars, workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunities in the society by incubating and nurturing technology product ideas and supporting technology backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrich the experiences of faculties and students through research and developmental programmes

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Faculty's Vision and Mission

Vision

Aspires to create skilled and competent pharmacy professionals by imparting quality education in pharmaceutical sciences to meet the global health challenges for the betterment of mankind

Mission

M1 - To impart quality education to develop pharmacy professionals to lead the progress in global healthcare

M2 - To evolve into center of excellence in pharmaceutical research

M3 - To create entrepreneurs and problem solvers in multi-disciplinary arena

M4 – To inculcate professional ethics and passion for lifelong learning

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Faculty	Pharmacy
Department	Pharmacy Practice
Programme Code	062
Programme Name	M. Pharm. Pharmacy Practice
Dean of the Faculty	Dr. S. Bharath
HOD	Dr. G.R Saraswathy

1. **Title of the Award:** M. Pharm. in Pharmacy Practice
2. **Mode of Study:** Full-Time
3. **Awarding Institution /Body:** M. S. Ramaiah University of Applied Sciences, Bengaluru
4. **Joint Award:** Not Applicable
5. **Teaching Institution:** Faculty of Pharmacy, M. S. Ramaiah University of Applied Sciences, Bengaluru
6. **Date of Programme Specifications:** July 2024
7. **Date of Programme Approval by the Academic Council of MSRUAS:** 06 April 2017
8. **Next Review Date:** June 2028
9. **Programme Approving Regulating Body and Date of Approval:** Pharmacy Council of India
10. **Programme Accredited Body and Date of Accreditation:** Not Applicable
11. **Grade Awarded by the Accreditation Body:** Not Applicable
12. **Programme Accreditation Validity:** Not Applicable
13. **Programme Benchmark:** Not Applicable
14. **Rationale for the Programme**

Pharmacy Practice is the discipline which develops the professional role of the clinical pharmacist in areas like pharmacovigilance, therapeutic drug monitoring, pharmacoeconomics, drug therapy review and patient counseling. Department of Pharmacy Practice is associated with 1500 bedded Ramaiah Medical Teaching Hospital and Ramaiah Memorial Hospital. The clinical pharmacist provides direct patient care services that optimizes the use of medication and promotes good health, wellness and disease prevention. A great deal of research work is required to be done to understand newer diseases and many other systemic disorders. With the advent of good clinical practices and ICH guidelines in clinical studies, clinical research has emerged as the most expanding and exponentially growing sector. To meet the demand in this field, there is an absolute need for more clinical pharmacists who can help in coordinating and conducting the clinical trials. Keeping these trends in view we intend to introduce the programme of Pharmacy practice.

The M.S. Ramaiah College of Pharmacy, now a constituent of MSRUAS as Faculty of Pharmacy has been in existence for over 2 decades. Over the years, Faculty of Pharmacy of MSRUAS has grown and evolved as one of the premier institutions in the state of Karnataka. It has very good infrastructure, noteworthy laboratory facilities, experienced and competent staff. During the last two decades, it has produced over 1000 graduates and 110 post graduates. The presence of other

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Faculties of applied sciences of the University will facilitate the students to experience more than the conventional curriculum.
Faculty of Pharmacy of MSRUAS offers M. Pharm in Pharmacy Practice degree which is featured with critical thinking, analytical and problem-solving skills, outcome-based curriculum, open electives across various Faculties.

15. Programme Mission

The aim of the programme is to produce postgraduates with advanced knowledge and understanding of pharmacy practice; higher order critical, analytical, problem solving and transferable skills; ability to think rigorously and independently to meet higher level expectations of pharmaceutical industry, academics, research or take up entrepreneurial route.

16. Graduate Attributes (GAs)

GA-1. Pharmaceutical Knowledge Proficiency: Strong grounding in core and applied pharmaceutical sciences and practice

GA-2. Scientific and Analytical Thinking: Ability to critically analyze data, processes, and clinical information

GA-3. Ethical and professional Integrity: Commitment to ethical conduct, patient safety and regulatory compliance

GA-4. Patient-Centered Orientation: Sensitivity to patient needs, cultural diversity and healthcare outcomes.

GA-5. Industry and Practice Readiness: Preparedness for roles in industry, hospitals, community pharmacy, research and regulation

GA-6. Digital and Technological Awareness: Familiarity with AI, data analytics, automation, and modern pharmaceutical technologies

GA-7. Effective Communication Skills: Clear, empathetic, and professional interaction across healthcare settings

GA-8. Teamwork and Leadership Skills: Ability to collaborate, lead, and contribute constructively in teams

GA-9. Innovation and Problem-Solving Mindset: Capability to identify problems and develop practical, evidence-based solutions

GA-10. Lifelong Learning Orientation: Motivation for continuous professional development and higher education

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17. Programme Outcomes (POs)

M. Pharm. graduates will be able to:

PO-1. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO-2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO-3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO-4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO-5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

PO-6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO-7. **Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO-8. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

PO-9. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO-10. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO-11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

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technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

18. Programme Goal

The Programme goal is to produce proficient postgraduates with advanced knowledge and skills to work as efficient pharmacist in health care institutions and community, drug safety analyst, clinical trial coordinator, epidemiologist, pharmacoeconomist, and researcher.

19. Program Educational Objectives (PEOs)

The objectives of the M. Pharm program in Pharmacy Practice are to:

PEO-1. Educate the students to focus their attention in the fields of hospital and community pharmacy and guiding them to take up the jobs in the hospitals after their graduation

PEO-2. Create research interest in the minds of students so that willingly they may take up research as a career with passion in the field of clinical research as well as in the research organizations

PEO-3. Provide quality pharmacy education to the students, which help them get tuned to work in different research areas such as pharmacoeconomics, pharmaco-epidemiology and pharmacovigilance

PEO-4. Inculcate strong human values and social, interpersonal and leadership skills required for professional success in evolving global professional environments

20. Programme Specific Outcomes (PSOs)

At the end of the M. Pharm program in Pharmacy Practice, the graduate will be able to:

PSO-1. Apply the knowledge to ensure rationalisation of drug therapy, identify and report adverse drug reactions, suggest alternative drug therapy in case of prescription errors, outline the evidence-based guidelines used for specific diseases and select pharmacoeconomics and pharmacoepidemiological methods.

PSO-2. Demonstrate leadership, ethical responsibility, and effective professional skills in pharmaceutical sciences by addressing societal healthcare needs, promoting environmentally sustainable practices, and engaging in lifelong learning for continuous professional growth and innovation

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21. Programme Structure:

Table 1 Programme Structure

Course Code	Course	Credits	Hours/Week
SEMESTER – I			
PROGRAMME SPECIALIZATION COURSES			
PPC501	1. Clinical Pharmacy Practice	4	4
PPC502	2. Pharmacotherapeutics - I	4	4
PPC503	3. Hospital & Community Pharmacy	4	4
PPC504	4. Clinical Research	4	4
PPL505	5. Pharmacy Practice Practical - I	6	12
PPS506	6. Seminar / Assignment	4	7
SEMESTER - II			
PROGRAMME SPECIALIZATION COURSES			
PPC507	1. Principles of Quality Use of Medicines	4	4
PPC508	2. Pharmacotherapeutics-II	4	4
PPC509	3. Clinical Pharmacokinetics and Therapeutic Drug Monitoring	4	4
PPC510	4. Pharmacoepidemiology & Pharmacoeconomics	6	4
PPL511	5. Pharmacy Practice Practical - II	6	12
PPS512	6. Seminar / Assignment	4	7
SEMESTER - III			
FACULTY COMMON SPECIALIZATION COURSES			
PPF613	1.Research Methodology and Biostatistics	4	4
PPF614	2.Journal Club	1	1
PPF615	3.Group Project	4	-
PPF616	4.Discussion / Presentation (Proposal Presentation)	2	2
PPF617	5.Research Work	14	28
SEMESTER – IV			
PROGRAMME SPECIALIZATION COURSES			
PPF618	1.Journal Club	1	1
PPF619	2. Discussion / Final Presentation	3	3
PPF620	3. Research Work	16	31
MANDATORY COURSE/S			
PPF621	1.Participation/Presentation in research forum: National / International Seminar, Conferences, Workshops	3	-
PPF622	2.Publication: National / International Journals		-
PPF623	3.Academic/Research award: State/National/International Agencies /MOOC		-

22. Course Delivery: As per the Timetable

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23. Teaching and Learning Methods

1. Face to Face Lectures using Audio-Visuals
2. Workshops, Group Discussions, Debates, Presentations
3. Demonstrations
4. Guest Lectures
5. Laboratory Work/Field Work/Workshop
6. Hospital Visit/Health Care Activities
7. Seminars/Webinars/Conferences
8. Group Exercises/ Case Studies
9. Group Project
10. Project Work
11. Community Orientation Program/Health Camps
12. Exhibitions/Technical Festivals

24. Assessment and Grading

Table 2 Assessment and Grading

Semester I

Course code	Name of Course	Internal Assessment				Semester End Examination		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
PPC501	1. Clinical Pharmacy Practice	10	15	1 h	25	75	3 h	100
PPC502	1.Pharmacotherapeutics-I	10	15	1 h	25	75	3 h	100
PPC503	2. Hospital & Community Pharmacy	10	15	1 h	25	75	3 h	100
PPC504	3. Clinical Research	10	15	1 h	25	75	3 h	100
PPL505	4. Pharmacy Practice Practical - I	20	30	6 h	50	100	6 h	150
PPS506	5. Seminar / Assignment	-	-	-	-	-	-	100

Semester II

Course code	Name of Course	Internal Assessment				Semester End Examination		Total marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
PPC507	1. Principles of Quality Use of Medicines	10	15	1 h	25	75	3 h	100
PPC508	2.Pharmacotherapeutics-II	10	15	1 h	25	75	3 h	100
PPC509	3. Clinical Pharmacokinetics and Therapeutic Drug Monitoring	10	15	1 h	25	75	3 h	100
PPC510	4. Pharmacoepidemiology & Pharmacoeconomics	10	15	1 h	25	75	3 h	100
PPL511	5. Pharmacy Practice Practical - II	20	30	6 h	50	100	6 h	150
PPS512	6. Seminar / Assignment	-	-	-	-	-	-	100

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Semester III

Course code	Name of Course	Internal Assessment				Semester End Examination		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
PPF613	1.Research Methodology and Biostatistics	10	15	1 h	25	75	3h	100
PPF614	2.Journal Club	-	-	-	25	-	-	25
PPF615	3.Group Project	-	-	-	-	-	-	-
PPF616	4.Discussion / Presentation (Proposal Presentation)	-	-	-	50	-	-	50
PPF617	5.Research Work	-	-	-	-	350	1 h	350

Semester IV

Course code	Name of Course	Internal Assessment				Semester End Examination		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
PPF618	1.Journal Club	-	-	-	25	-	-	25
PPF619	2. Discussion / Presentation	-	-	-	75	-	-	75
PPF620	3. Research Work	-	-	-	-	400	1 h	400

24.1 Components of Grading

There shall be **two components** of grading in the assessment of each course:

Component 1, Continuous Evaluation (CE): This component involves multiple subcomponents (SC1, SC2, etc.) of learning assessment. The assessment of the subcomponents of CE is conducted during the semester at regular intervals. This subcomponent represents the formative assessment of students' learning.

Component 2, Semester-end Examination (SEE): This component represents the summative assessment carried out in the form an examination conducted at the end of semester.

Marks obtained CE and SEE components have a weightage of 25:75 (CE:25% and SEE: 75%) in determining the final marks obtained by a student in a Course.

The complete details of Grading are given in the Academic Regulations.

24.2 Continuous Evaluation Policies

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Continuous evaluation depends on the type of the course as discussed below:

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24.2.1 Theory Courses

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent ▶	SC1	SC2	SC3	
Subcomponent Type ▶	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks ▶	8	2	15	
CO-1				
CO-2				
CO-3				
CO-4				
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

24.2.2 Laboratory Courses

Focus of Cos on each Component or Subcomponent of Evaluation				
	Component1: CE(25%Weightage)			Component2: SEE (75%Weightage)
Subcomponent ▶	SC1	SC2	SC3	
Subcomponent Type ▶	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 100 Marks
Maximum Marks ▶	10	10	30	
CO-1				
CO-2				
CO-3				
The details of SC1,SC2,SC3 are presented in the Programme Specifications Document.				

Theory
(Component -1: 25 Marks + Component-2: 75Marks)
Component - 1: - 25 Marks
It has two sub-components (Part A & B)

Part – A: Continuous Evaluation: 10 Marks
The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Part – B: Sessional Examination: 15 Marks

Two sessional examinations (each for 15 Marks with one hour duration) will be conducted. Average marks of the two sessionals will be computed for sessional examination marks.

Component -2 Semester End Theory Examination: 75 Marks
Theory Examination: A theory exam shall be conducted for maximum marks 75 Marks with three hours of duration

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Practical – 150 Marks
(Component -1: 50 Marks + Component-2: 100 Marks)
Component - 1: - 50 Marks
It has two sub-components (Part A & B)
Part – A: Continuous Evaluation: 20 Marks
The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Table 3:- Scheme for awarding Continuous Evaluation-Theory

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction**	2
Total	10

** student will be continuously assessed during theory and practical sessions

Table 4:- Guidelines for the allotment of marks for attendance*

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

Part – B: Sessional Examination: 15 Marks
Two sessional examinations (each for 15 Marks with one hour duration) will be conducted. Average marks of the two sessionals will be computed for sessional examination marks.

Component -2 Semester End Theory Examination: 75 Marks
Theory Examination: A theory exam shall be conducted for maximum marks 75 Marks with three hours of duration

Practical – 150 Marks
(Component -1: 50 Marks + Component-2: 100 Marks)
Component - 1: - 50 Marks
It has two sub-components (Part A & B)
Part – A: Continuous Evaluation: 20 Marks
The marks allocated for continuous mode of internal assessment shall be awarded as per the scheme given below:

Scheme for awarding Continuous Evaluation -Practical

Criteria	Maximum Marks
Attendance*	10
Practical Records, Regular viva-voce**	10
Total	20

Guidelines for allotment of marks for attendance*

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

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Part – B: Sessional Examination: 30 Marks

Two sessional examinations (each for 30 Marks with six-hour duration) will be conducted. Average marks of the two sessional examinations will be computed for sessional examination marks.

Component -2 Semester End Practical Examination: 100 Marks

Practical Examination: 100 Marks with six hours of duration. Practical examination shall also consist of a viva –voce (Oral) examination.

The assessment questions are set to test the learning outcomes. In each component, a certain learning outcome is assessed.

Note: For more details on the break-ups, please refer to the Course Specifications

A student is required to score an overall 50% for successful completion of a course and earn the credits.

Note: Final marks awarded in each of the courses will be confirmed only after SAB/PAB as explained in Academic Regulations of M. Pharm. Programme.

Assignment & Seminar

The detailed procedure and evaluation procedure is available in the Operation Manual / Student Handbook/Academic Regulations.

Journal Club

The detailed procedure and evaluation procedure is available in the Operation Manual / Student Handbook/Academic Regulations.

Group Project

The detailed procedure and evaluation procedure is available in the Operation Manual / Student Handbook/Academic Regulations

Mandatory Courses

The credit points assigned for extracurricular and or co-curricular activities shall be given by the Dean of the Faculty and the same shall be submitted to the University.

Name of the Activity	Maximum credit points Eligible /Activity
Participation in National level Seminar/ Conference / Workshop/Symposium/Training Programs	01
Participation in International level outside India 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

Dissertation/Research Work

1. Every candidate shall carry out work on an assigned research project under the guidance of a recognized Postgraduate Teacher, the result of which shall be written up and submitted in the form of a dissertation.

2. Work for writing the Dissertation is aimed at contributing to the development of spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in pharmaceutical/medical sciences and the manner of identifying and consulting available literature. Dissertation shall be submitted as per the notified time schedule mentioned in the Academic calendar / student hand book.

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3. The Dissertation and viva-voce shall be evaluated by two examiners, one Internal and one External examiner appointed by the University.
Scheme of Evaluation of Dissertation book:

Scheme of 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**

Scheme of Evaluation of Presentation:

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

A student is required to score a minimum of 50% overall for successful completion of Dissertation and earn the corresponding credits.

Supplementary/re-registration examination and improvement of sessional marks

The eligibility criteria and procedures for supplementary examination and improvement of sessional marks are as per the Pharmacy Council of India (PCI) norms and as indicated in the Academic Regulations governing this programme.

25. Student Support for Learning

1. Course Notes
2. Reference Books in the Library
3. Magazines and Journals
4. Internet Facility
5. Computing Facility
6. Laboratory Facility
7. Workshop Facility
8. Staff Support
9. Lounges for Discussions
10. Any other support that enhances their learning

26. Quality Control Measures

1. Review of Course Notes
2. Review of Question Papers and Assignment Questions
3. Student Feedback
4. Moderation of Assessed Work
5. Opportunities for students to see their assessed work
6. Review by external examiners and external examiners reports
7. Staff Student Consultative Committee Meetings
8. Student exit feedback
9. Subject Assessment Board (SAB)
10. Programme Assessment Board (PAB)

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27. Programme Map (Course-PO-PSO Map)

Sem.	Course Title	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
1	Clinical Pharmacy Practice	3		3			3	2	3	2			2	3
1	Pharmacotherapeutics-I	3		3	2			2	1	3		1	3	3
1	Hospital & Community Pharmacy	3	3	3	2				3	2	3	3	3	3
1	Clinical Research	3	3				3	3	2			2	3	2
1	Pharmacy Practice Practical - I	3	3	3	3	3	3	3	3	3		2	3	3
1	Seminar / Assignment			3					3			3	2	2
2	Principles of Quality Use of Medicines	3			2		3	3	2	3	2	1	2	3
2	Pharmacotherapeutics-II	3		3	2			2	1	3		1	1	3
2	Clinical Pharmacokinetics and Therapeutic Drug Monitoring	3		3	3		3			3		2	3	2
2	Pharmacoepidemiology & Pharmacoeconomics	3		3	2		2			2	3	2	2	3
2	Pharmacy Practice Practical - II	2		3	2		2	3	2	2		2	3	3
2	Seminar / Assignment			3					3			3	2	2
3	Research Methodology and Biostatistics	3	3	2				3		2	1	3	2	2
3	Journal Club	1	1		3				3			1	2	2
3	Group Project	1	2	3	3	1		3				1	2	2
3	Discussion / Presentation (Proposal Presentation)	2	2	2	2				3			2	2	2
3	Research Work	1	3	3	2		2	2	3	1	1	1	2	2
4	Journal Club	1	1		3				3			1	2	2
4	Research Work	1	3	3	2		2	2	3	1	1	1	2	2
4	Discussion / Final Presentation	1	3	3	2		2	2	3	1	1	1	2	2
4	Participation/Presentation in research forum: National / International Seminar, Conferences, Workshops			3		3	3		3			3	2	2
4	Publication: National / International Journals			3	3		3	3	3			3	2	2
4	Academic/Research award: State/National/International Agencies/MOOC	1				2	2		3			3	1	2

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28. Co-curricular Activities

Students are encouraged to take part in co-curricular activities like seminars, conferences, symposia, paper writing, attending industry exhibitions, project competitions and related activities for enhancing their knowledge and networking.

29. Cultural and Literary Activities

Annual cultural festivals are held to showcase the creative talents in students. They are involved in planning and organizing the activities.

30. Sports and Athletics

Students are encouraged to take part in sports and athletic events regularly. Annual sports meet will be held to demonstrate sportsmanship and competitive spirit.

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RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Course Specifications

M. Pharm. in Pharmacy Practice

Programme Code: 062

Faculty of Pharmacy
Batch 2026-2027

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SEMESTER 1

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Programme Structure and Course Details of M. Pharm in Pharmacy Practice 2024-2026

Course Specifications: Clinical Pharmacy Practice (Theory)

Course Title	Clinical Pharmacy Practice
Course Code	PPC501
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with clinical pharmacy and its services. This course is designed to impart knowledge on patient data analysis, laboratory data interpretation, pharmacovigilance, answering drug and poison information queries, conducting medication history interview and patient counseling.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. **Course Outcomes (COs)**

After the successful completion of this course, the student will be able to:

CO-1 Discuss the evolution of clinical pharmacy in national and international scenario
CO-2 Explain the pharmaceutical care and clinical pharmacy services
CO-3 Elaborate on various laboratory tests and interpret the patient data
CO-4 Analyze the requirements of drug and poison information service and answer a query

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4. **Course Contents**

Unit 1 **12 hours**

Introduction to Clinical Pharmacy: Definition, evolution and scope of clinical pharmacy, International andnational 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)

Unit 2 **12 hours**

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

Unit 3 **12 hours**

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

Unit 4 **12 hours**

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

Unit 5 **12 hours**

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

5. **Course Map (CO-PO-PSO Map)**

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	3		1			1						2	1
CO-2	2		3			3	2	3	2			2	3
CO-3	3		3			2	2					2	3
CO-4	2		3			3	2	3	2			2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	2	
2. Demonstration using Physical Models/Systems	3	
3. Demonstration on a Computer		
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop/Course/ Workshop/Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	03	
2. Guest Lecture		
3. Field Visit/ Hospital Visit	00	
4. Brain Storming Sessions		
5. Group Discussions	02	
6. Discussing Possible Innovations		
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

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Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent ▶	SC1	SC2	SC3	
Subcomponent Type ▶	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks ▶	8	2	15	
CO-1		×	×	×
CO-2		×	×	×
CO-3		×	×	×
CO-4		×	×	×
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3 hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by the concerned course leader/s.

Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.

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3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. **Achieving COs**

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. **Course Resources**
   a. **Class Notes**
   b. **Essential Reading**
      1. Parthasarathi, G., Hansen, N.K. and Nahata, M.C. (2012) A text book of Clinical Pharmacy Practice; Essential Concepts and Skills. 2nd Edition. Chennai: Orient Langram Pvt. Ltd.
      2. Scott, L.T. (1992) Basic Skills in Interpreting Laboratory Data, USA: American Society of Health. System Pharmacists Inc.
   c. **Recommended Reading**

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1. Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia (2006).
2. A text book of Hospital Pharmacy by S.H. Merchant & Dr. J.S. Qadry. Revised by R.K. Goyal & R.K. Parikh

d. Journals and Magazines

1. Indian Journal of Pharmacy practice
2. International Journal of Pharmacy practice

e. Websites

1. www.medscape.com
2. www.ovid.com
3. www.micromedex.com

f. Other Electronic Resources

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Course Specifications: Pharmacotherapeutics-I (Theory)

Course Title	Pharmacotherapeutics I
Course Code	PPC502
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with the pharmacotherapy of selected diseases. The course enables the students to understand the etiopathogenesis and different treatment approaches in managing selected diseases. Also, it imparts knowledge and skills in optimizing drug therapy of a patient by individualizing the treatment plan.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. **Course Outcomes (COs)**

After the successful completion of this course, the student will be able to:

CO-1 Explain the risk factors and pathophysiology of cardiovascular, respiratory, endocrine, gastrointestinal, hematological, bone and joint, dermatological, and ophthalmic disorders

CO-2 Describe the clinical manifestations and diagnostic approaches of cardiovascular, respiratory, endocrine, gastrointestinal, hematological, bone and joint, dermatological, and ophthalmic disorders

CO-3 Discuss the pharmacological management of cardiovascular, respiratory, endocrine, gastrointestinal, hematological, bone and joint, dermatological, and ophthalmic disorders

CO-4 Evaluate non-pharmacological measures and personalized therapeutic plans for cardiovascular, respiratory, endocrine, gastrointestinal, hematological, bone and joint, dermatological, and ophthalmic disorders

4. **Course Contents**

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Etiopathogenesis and pharmacotherapy of diseases associated with following systems

Unit 1 **12 hours**

Cardiovascular system: Hypertension, Congestive cardiac failure, Acute coronary syndrome, Arrhythmias, Hyperlipidemias.

Unit 2 **12 hours**

Respiratory system: Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases

Endocrine system: Diabetes, Thyroid diseases

Unit 3 **12 hours**

Gastrointestinal system: Peptic ulcer diseases, Reflux esophagitis, Inflammatory bowel diseases, Jaundice & hepatitis

Unit 4 **12 hours**

Gastrointestinal system: Cirrhosis, Diarrhea and Constipation, Drug-induced liver disease

Hematological diseases: Anemia, Deep vein thrombosis, Drug induced hematological disorders

Unit 5 **12 hours**

Bone and joint disorders: Rheumatoid arthritis, Osteoarthritis, Gout, Osteoporosis,

Dermatological Diseases: Psoriasis, Eczema and scabies, impetigo, drug induced skin disorders

Ophthalmology: Conjunctivitis, Glaucoma

5. **Course Map (CO-PO-PSO Map)**

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2		2	1					1			3	3
CO-2	2		2	2			1	1	2			3	3
CO-3	3		3	2			2	1	3		1	3	3
CO-4	2		2	2			2	1	3		1	3	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	5	
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer		
Tutorials		00
Practical Work		
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	03	
2. Guest Lecture	00	
3. Field Visit/ Hospital Visit	00	
4. Brain Storming Sessions	00	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent ▶	SC1	SC2	SC3	
Subcomponent Type ▶	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks ▶	8	2	15	
CO-1		×	×	×
CO-2		×	×	×
CO-3		×	×	×
CO-4		×	×	×
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3 hours duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

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Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. **Achieving COs**

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher Interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

10. **Course Resources**
    a. **Class Notes**
    b. **Essential Reading**

1. Walker, R. and Whittlesea, C. (2007) Clinical Pharmacy and Therapeutics. New York: Churchill Livingstone publication.
2. Dipiro, T.J., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M. (2011) Pharmacotherapy: A Pathophysiologic Approach. 8th edn. New York: McGraw-Hill

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c. Recommended Reading

1. Cotran, R.S., Kumar, V. and Robbins S.L. (2005) Pathologic Basis of Disease. 7thedn. USA: W.B. Saunders Company.
2. Helms, R.A., Quan, D.J., Herfindal, E.T. and Gourley, D.R. (2006) Textbook of Therapeutics: Drug and Disease Management. 8th edn. Philadelphia: Lippincott Williams and Wilkins Publication.
3. Koda-Kimble, M.A., Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A. and Williams, B.R. (2013) Applied Therapeutics: The Clinical Use of Drugs. 10thedn. Philadelphia: Lippincott Williams and Wilkins Publication.
4. Speight, T.M. and Holford, N.H.G. (2011) Avery's Drug Treatment. 4thedn. New Delhi: Adis International Limited.

d. Magazines and Journals

1. Australian Prescriber, NPS Medicine Wise, Australia.
2. British Medical Journal, The BMJ Publishing Group, London
3. Annals of Pharmacotherapy, SAGE Publishing, USA
4. Indian Journal of Medical Research, Medknow Publications, Europe
5. Indian Journal of Pharmacology, Medknow Publications, Europe
6. Saudi Pharmaceutical Journal, King Saud University, Saudi Arabia

e. Websites

1. www.micromedex.com
2. www.medscape.com
3. www.pubmed.com
4. www.sciencedirect.com

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Programme Structure and Course Details of M. Pharm in Pharmacy Practice 2024-2026

Course Specifications: Hospital & Community Pharmacy (Theory)

Course Title	Hospital & Community Pharmacy
Course Code	PPC503
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The course imparts knowledge and skills that are required to practice pharmaceutical services in both hospital and community settings. This course deals with legal requirements and problems associated with prescription. It also helps in understanding safe disposal of hospital waste management, development of hospital formulary guidelines and health screening for improved patient care.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Describe the organizational structure, management, and drug policies of hospital pharmacy services
- **CO-2** Explain hospital formulary development, therapeutic guidelines, drug distribution systems, and waste management practices
- **CO-3** Discuss education, training, management, and entrepreneurship aspects of community pharmacy practice
- **CO-4** Apply principles of prescription handling, patient counselling, medication adherence, health promotion, and community pharmacy services

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4. Course Contents

Unit 1 **12 hours**

Introduction to Hospitals:

Definition, classification, organizational structure

Hospital Pharmacy: Definition, Relationship of hospital pharmacy department with other departments, Organizational structure, legal requirements, work load 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.

Unit 2 **12 hours**

Guidelines:

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.

Unit 3 **12 hours**

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 software & databases used in community pharmacies. Entrepreneurship in community pharmacy.

Unit 4 **12 hours**

Prescription – Legal requirements & interpretation, prescription related problems

Responding to symptoms of minor ailments: Headache, pyrexia, menstrual pains, food and drug allergy

OTC medication: Rational use of over-the-counter medications

Medication counseling and use of patient information leaflets

Medication adherence – Definition, factors influencing adherence behavior, strategies to improve medication adherence

Patient referrals to the doctors

ADR monitoring in community pharmacies

Unit 5 **12 hours**

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

Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course "Pharmacy Practice Practical – I MPP105P".

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	3	2	2	1				1	1			3	3
CO-2	3	2	3	2				1	2	3	1	3	3
CO-3	2	3	1	2				3	2	1	3	3	3
CO-4	3	2	3	1				3	3	2	2	3	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	2	
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer	3	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	02	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	01	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent	SC1	SC2	SC3	
Subcomponent Type	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks	8	2	15	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
CO-4		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3 hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

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Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.
Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Notes

b. Essential Reading

1. Hassan, W.E., 1986. *Hospital pharmacy*. Lea & Febiger.
2. Stephens, M. ed., 2011. *Hospital pharmacy*. Pharmaceutical Press.
3. Bhise, S.B. (2007) Health Education and Community Pharmacy, Pune: Pragati Books Pvt.Ltd.
4. Merchant, S. H., Qadry J.S. (2000) A textbook of Hospital Pharmacy. Ahmedabad: Shah Educational Publishers.

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c. Recommended Reading

1. Avery's Drug Treatment, Adis International Limited.
2. Community Pharmacy Practice – Ramesh Adepu, BSP Publishers, Hyderabad
3. Taylor, K.M. and Harding, G. eds., 2001. *Pharmacy practice*. CRC Press.
4. Parthasarathi, G., Nyfort-Hansen, K. and Nahata, M.C. eds., 2004. *A text book of clinical pharmacy practice: essential concepts and skills*. Orient Blackswan.
5. Remington, J.P., 2006. Remington: The science and practice of pharmacy (Vol. 1). Lippincott Williams & Wilkins.
6. Troy, D.B. and Beringer, P. eds., 2006. Remington: The science and practice of pharmacy (Vol. 1). Lippincott Williams & Wilkins Waning,
7. Gennaro, A.R., 1990. Remington's pharmaceutical sciences.

d. Magazines and Journals

1. International Journal of Epidemiology, Oxford Academic, USA
2. The New England Journal of Medicine, Massachusetts medical society, UK.

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Programme Structure and Course Details of M. Pharm in Pharmacy Practice 2024-2026

Course Specifications: Clinical Research (Theory)

Course Title	Clinical Research
Course Code	PPC504
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with basic concepts, assumptions, terminology and methods associated with Clinical Research. The course imparts knowledge on which appropriate principles of clinical research should be applied for improving patient safety and conducting sound clinical trials on investigational medicinal products through stringent quality control mechanisms.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Explain the drug development process, including preclinical studies, clinical trial phases and regulatory requirements
- **CO-2** Discuss biomedical research ethics, essential clinical trial documents and procedures involved in study start-up, monitoring and close-out
- **CO-3** Elaborate on the phases of clinical trials, quality assurance and quality control methods used in clinical research
- **CO-4** Summarize various clinical research models and their applications in ensuring safe and effective drug development

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4. Course Contents

Unit 1 **12 hours**

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.

Unit 2 **12 hours**

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.

Unit 3 **12 hours**

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

Unit 4 **12 hours**

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.

Unit 5 **12 hours**

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.

Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course Pharmacy Practice Practical – I MPP105P"

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1	1					2					2	1
CO-2		1				3	3	2				1	2
CO-3	3	3					2				2	3	2
CO-4	2						2					1	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	03	
2. Demonstration using Physical Models / Systems	02	
3. Demonstration on a Computer		
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	02	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	00	
5. Group Discussions	03	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent	SC1	SC2	SC3	
Subcomponent Type	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks	8	2	15	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
CO-4		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3-hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

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Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Note

b. Essential Reading

1. Edwards, L.D., (2007) Principles and practice of pharmaceutical medicine. 2nd edn. Chichester, West Sussex: John Wiley.
2. Association, T., Research, C. and Industry, the P. (1994) Association for clinical research in the pharmaceutical industry handbook of clinical research. Edited by Julia Lloyd and Ann Raven. Edinburgh: Churchill Livingstone.

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c. Recommended Reading

1. Di Giovanna, I. and Hayes, G. (eds.) (2001) Principles of clinical research. Exeter, United Kingdom: Wrightson Biomedical Publishing.
2. Mentions, I.L. (2017) ICH official web site: ICH. Available at: http://www.ich.org/home.html (Accessed: 26 February 2017)
3. Machin, D., Day, S. and Green, S. (eds.) (2006) Textbook of clinical trials. 2nd edn. New York, NY, United States: Wiley, John & Sons
4. Rondel (1999) Clinical data Management. 2nd edn. United Kingdom: John Wiley & Sons.

d. Magazines and Journals

1. Clinical Trials, Sage Journals, USA.
2. International Journal of Clinical Trials, Medip Academy, USA.

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Pharmacy Practice Practical- I (Practical)

Course Title	Pharmacy Practice Practical- I
Course Code	PPL505
Course Type	Core Practical
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of the course is to enable the students to review treatment chart, perform medication history interview, patient counselling, answer drug and poison information queries and interpret lab data. Also, it imparts knowledge and skills in presentation of clinical cases of various disease conditions adopting pharmaceutical care plan model and preparation of a patient information leaflet.

2. Course Size and Credits:

Number of Credits	06
Credit Structure (Lecture: Tutorial: Practical)	0:0:12
Total Hours of Interaction	180
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	150 **Component 1: 50 Marks** A. Continuous Evaluation: 20 Marks A1. Attendance – 10 marks A2. Practical Record & Viva-voce – 10 marks B. Sessional Examination: 30 Marks (average of two) **Component 2 (SEE): 100 Marks** Practical Examination: 100 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Apply biomedical knowledge for lab data interpretation, answering drug/poison queries, preparation of IV admixtures, formulary decisions, and designing patient information leaflet
- **CO-2** Evaluate treatment chart, interview patient's medication history, perform patient counselling and involve in pharmaceutical care plans and clinical pharmacy activities
- **CO-3** Elaborate on informed consent form, patient confidentiality, and ethical decision-making in clinical practice

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4. Course Contents

1. Treatment Chart Review (one)
2. Medication History Interview (one)
3. Patient Medication Counseling (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)

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2	3	3	3				2			2	3	2
CO-2	3	2	1	2			2	2				3	2
CO-3	1	1	2		2	2	3	2	2			3	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		20
Demonstrations		07
1. Demonstration using Videos	07	
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer		
Tutorials		00
Practical Work		150
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	150	
6. Model Studio	00	
Others		05

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1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	00	
5. Group Discussions	05	
6. Discussing Possible Innovations	00	
Written Examination		18
Total Duration in Hours		**200**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (33.33% Weightage)			**Component 2: SEE (66.66% Weightage)**
Subcomponent▶	**SC1**	**SC2**	**SC3**	
Subcomponent Type ▶	**Attendance**	**Practical Records, Regular viva voce**	**Sessional Exam**	**Semester End Examination 100 Marks**
Maximum Marks▶	**10**	**10**	**30**	
CO-1		×	×	×
CO-2		×	×	×
CO-3		×	×	×
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 50 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	10
Practical Records, Regular viva voce	10
Total	20

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	10
90 – 94	7.5
85 – 89	5
80 – 84	2.5
Less than 80	0

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1B. Practical Records, Regular viva voce

1C. Sessional exam: Two sessional examinations (each for 30 Marks with six-hour duration) will be conducted. Average marks of the two sessional will be computed for sessional examination marks.

Component - 2: 100 marks
Practical Examination: A practical exam shall be conducted for maximum marks 100 Marks with six hours of duration. Component 2 will be evaluated by course leader and external examiner.

Re-assessment
1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Laboratory interactions and self-study
2.	Understanding	Experiments conducted in laboratory
3.	Critical Skills	Experiments conducted in laboratory
4.	Analytical Skills	Inference of laboratory results
5.	Problem Solving Skills	Lab work and Examination
6.	Practical Skills	Face to face interactions and lab work
7.	Group Work	Laboratory Tasks
8.	Self-Learning	Practical Record writing and Examination
9.	Written Communication Skills	Viva voce and presentation of results
10.	Verbal Communication Skills	Presentation of results
11.	Presentation Skills	Laboratory Tasks
12.	Behavioral Skills	Practical Record writing and presentation of results
13.	Information Management	Group discussions and planning of Laboratory Tasks
14.	Personal Management	Course work
15.	Leadership Skills	Presentation, Handling Questions during presentation, Interaction with peers

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9. Course Resources

a. Class Notes

b. Essential Reading

1. Lab manual
2. Walker, R. and Whittlesea, C. (2007) Clinical Pharmacy and Therapeutics. NewYork: Churchill Livingstone publication.
3. Dipiro, T.J., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M. (2011) Pharmacotherapy: A Pathophysiologic Approach. 8thedn. New York: McGraw-Hill.

c. Recommended Reading

1. Cotran, R.S., kumar, V. and Robbins S.L. (2005) Pathologic Basis of Disease. 7thedn. USA: W.B.Saunders Company.
2. Helms, R.A., Quan, D.J., Herfindal, E.T. and Gourley, D.R. (2006) Textbook of Therapeutics: Drug and Disease Management. 8thedn. Philadelphia: Lippincott Williams and Wilkins Publication.
3. Koda-Kimble, M.A., Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A. and Williams, B.R. (2013) Applied Therapeutics: The Clinical Use of Drugs. 10thedn. Philadelphia: Lippincott Williams and Wilkins Publication.
4. Speight, T.M. and Holford, N.H.G. (2011) Avery's Drug Treatment. 4thedn. New Delhi: Adis International Limited.

d. Magazines and Journals

1. Australian Prescriber, NPS MedicineWise, Australia.
2. British Medical Journal, London
3. Annals of Pharmacotherapy, SAGE Publishing, USA
4. Indian Journal of Medical Research, Medknow Publications, Europe
5. Indian Journal of Pharmacology, Medknow Publications, Europe
6. Saudi Pharmaceutical Journal, King Saud University, Saudi Arabia

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Seminar/Assignment

Course Title	Seminar/Assignment
Course Code	PPS506
Course Type	Seminar
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The course aims to instill critical thinking, analytical thinking and problem-solving skills amongst students. Students are trained to refer to literature and present their thought process, justification either in the form of an essay or debate as a concise report. Students are trained for collaborative learning while analyzing and also solving problems. They are exposed to citation, referencing and paraphrasing. Students are also exposed in communicating the collected information/literature to present and defend their accomplishment.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	105
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component -1: Assignment = 60 Marks** Report evaluated individually for 15 marks for 4 theory Courses in the semester. **Component -2: Seminar = 40 Marks** Assignment presentation evaluated individually for 10 marks for 4 theory Courses in the semester
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. **Course Outcomes (COs)**

After the successful completion of this course, the student will be able to:

- **CO-1** Apply subject-specific concepts to solve assignment-based problems using logical reasoning and critical evaluation
- **CO-2** Critically review information from scientific literature and other credible sources to support assignment solutions and seminar topics
- **CO-3** Prepare and deliver scientifically well-structured seminar presentations and written assignments
- **CO-4** Demonstrate independent learning skills and incorporation of feedback received during assignments and seminar presentations

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4. **Course Contents**

Critical review of the literature on the given assignment
Writing and Communication skills
Citation and referencing styles-Harvard referencing style
Plagiarism review Analytical and problem-solving skills
Practical/Laboratory content: NA

5. **Course Map (CO-PO-PSO Map)**

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1			3								1	2	
CO-2			3					1			2	2	2
CO-3			1					3			1	2	2
CO-4			1					2			3	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. **Course Teaching and Learning Methods**

Teaching and Learning Methods		Duration in hours	Total Duration in Hours
Face to Face Lectures			10
Demonstrations			10
1. Demonstration using Videos		5	
2. Demonstration using Physical Models/Systems			
3. Demonstration on a Computer		5	
Numeracy			00
1. Solving Numerical Problems		00	
Practical Work			00
1. Course Laboratory		00	
2. Computer Laboratory		00	
3. Engineering Workshop/Course Workshop/Kitchen		00	
4. Clinical Laboratory		00	
5. Hospital		00	
6. Model Studio		00	
Others			65
1. Case Study Presentation		30	
2. Guest Lecture		00	
3. Industry/Field Visit		00	
4. Brain Storming Sessions		10	
5. Group Discussions		15	
6. Discussing Possible Innovations		10	
Report and Presentations			20
Total Duration in Hours			105

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7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

	Component 1: Assignment (60% Weightage)	Component 2: Seminar (40% Weightage)
Subcomponent ▶	SC1	SC2
Subcomponent Type ▶	Assignment	Seminar
Maximum Marks ▶	60	40
CO-1	X	X
CO-2	X	X
CO-3	X	X
CO-4	X	X

Component - 1: Assignment = 60Marks [4 courses of 15 marks each]
One word processed assignment submitted for 4 theory courses in a semester will be evaluated by Course Leaders for a maximum of 15 marks each.

Component - 2: Seminar = 40Marks [4 courses of 10 marks each]
Presentation on submitted assignments will be evaluated by Course Leaders for a maximum of 10 marks each.
Marks awarded for four individual Courses (Assignment -15 marks & Seminar – 10 marks) will be summed and calculated for the total marks obtained for a maximum marks of 100.
The assessment questions are set to test the learning outcomes. In each component a certain learning outcomes are assessed. The following table illustrates the focus of learning outcome in each component assessed:
Both components will be moderated by concerned course leader/s.

Reassessment
1. If a student fails in the course, it is considered fail and he or she has to earn the credits in the make up opportunity and re-registration to the Course is required.
2. The maximum number of such opportunities is limited as per the academic regulations governing this programme.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading and findings
2.	Understanding	Reading and findings
3.	Critical Skills	Literature Review
4.	Analytical Skills	Data collection
5.	Problem Solving Skills	Data analysis
6.	Practical Skills	Writing & Presentation
7.	Group Work	Data analysis
8.	Self-Learning	Reading and findings
9.	Written Communication Skills	Assignment processing
10.	Verbal Communication Skills	Presentations
11.	Presentation Skills	Presentations
12.	Behavioral Skills	Interaction
13.	Information Management	Paper writing
14.	Leadership Skills	Effective management of learning, time management, achieving the learning

9. **Course Resources**

a. Essential Reading

1. Research articles
2. Relevant text books
3. Visits to websites relevant to assignment problem

b. Recommended Reading

NA

c. Magazines and Journals

1. Relevant magazines and journals pertaining to assignment

d. Websites

1. Specific web information pertaining to assignment

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SEMESTER 2

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Programme Structure and Course Details of M. Pharm in Pharmacy Practice 2024-2026

Course Specifications: Principles of Quality Use of Medicines (Theory)

Course Title	Principles of Quality Use of Medicines
Course Code	PPC507
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to introduce the essentials of principles of Quality use of Medicine (QUM) for promoting safe use of medicines. This course deals with basic concepts, assumptions, terminology and methods associated with quality use of medicine, medication errors and pharmacovigilance in various settings. The course also imparts knowledge on appropriate regulatory aspects of QUM in India.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Appraise the principles, concepts, and approaches involved in the quality use of medicines and rational drug use

CO-2 Explain the regulatory aspects and strategies for promoting quality use of medicines in various healthcare settings and special populations

CO-3 Discuss the regulatory requirements, professional responsibilities, and the role of pharmaceutical industry in quality use of medicines

CO-4 Apply principles of pharmacovigilance in ensuring safe and rational use of medicines

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4. Course Contents

Unit 1 **12 hours**

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

Unit 2 **12 hours**

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.

Unit 3 **12 hours**

Regulatory aspects of QUM in India: 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 QUMon 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.

Unit 4 **12 hours**

Regulatory aspects 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

Unit 5 **12 hours**

Medication errors and Pharmacovigilance: 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 ofADRs, Causality assessment of ADRs, Management of ADRs, Role of pharmacist in pharmacovigilance

(Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course "Pharmacy Practice Practical – I MPP205P")

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2			1		2	2	1	1			2	3
CO-2	3			2		2	2	1	3	2		2	3
CO-3	2			1		3	3	2	2	2		2	3
CO-4	3			2		3	3	2	3	2	1	2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	02	
2. Demonstration using Physical Models/Systems	03	
3. Demonstration on a Computer		
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop/Course/ Workshop/Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	02	
2. Guest Lecture	00	
3. Field Visit/ Hospital visit	01	
4. Brain Storming Sessions	00	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

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Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent	SC1	SC2	SC3	
Subcomponent Type	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks u	8	2	15	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
CO-4		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	**8**
90 – 94	**6**
85 – 89	**4**
80 – 84	**2**
Less than 80	**0**

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3-hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by the concerned course leader/s.

Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

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The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.
Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Notes

b. Essential Reading

1. Course notes
2. Walker, R. and Whittlesea, C. (2007) *Clinical Pharmacy and Therapeutics*. NewYork:Churchill Livingstone publication.
3. Dipiro, T.J., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M. (2011)
4. *Pharmacotherapy: A Pathophysiologic Approach*. 8th edn. New York: McGraw-Hill.

c.Recommended Reading

1. Cotran, R.S., kumar, V. and Robbins S.L. (2005) *Pathologic Basis of Disease*. 7th edn. USA: W.B.Saunders Company.
2. Helms, R.A., Quan, D.J., Herfindal, E.T. and Gourley, D.R. (2006) *Textbook of Therapeutics: Drug and Disease Management*. 8th edn. Philadelphia: Lippincott Williams and Wilkins Publication.
3. Koda-Kimble, M.A., Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A. and Williams, B.R. (2013) *Applied Therapeutics: The Clinical Use of Drugs*. 10th edn. Philadelphia: Lippincott Williams and Wilkins Publication.
4. Speight, T.M. and Holford, N.H.G. (2011) *Avery's Drug Treatment*. 4th edn. New Delhi: Adis International Limited.

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d. Magazines and Journals

1. Australian Prescriber, NPS MedicineWise, Australia.
2. British Medical Journal, London
3. Annals of Pharmacotherapy, SAGE Publishing, USA
4. Indian Journal of Medical Research, Medknow Publications, Europe
5. Indian Journal of Pharmacology, Medknow Publications, Europe
6. Saudi Pharmaceutical Journal, King Saud University, Saudi Arabia

e. Websites

1. www.sciencedirect.com
2. www.pubmed.com

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Course Specifications: Pharmacotherapeutics-II (Theory)

Course Title	Pharmacotherapeutics-II
Course Code	PPC508
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with the pharmacotherapy of selected diseases. The course enables the students to understand the etiopathogenesis and different treatment approaches in managing selected diseases. Also, it imparts knowledge and skills in optimizing drug therapy of a patient by individualizing the treatment plan.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Explain the risk factors and pathophysiology of neurological, psychiatric, renal, infectious, gynecological, and oncological disorders

CO-2 Elaborate on the clinical manifestations and diagnostic approaches of neurological, psychiatric, renal, infectious, gynecological, and oncological disorders

CO-3 Discuss the pharmacological management of neurological, psychiatric, renal, infectious, gynecological, and oncological disorders

CO-4 Evaluate the non-pharmacological measures and personalized therapeutic plans for neurological, psychiatric, renal, infectious, gynecological, and oncological disorders

4. Course Contents

Etiopathogenesis and pharmacotherapy of diseases associated with following systems

Unit 1 **12 hours**

Nervous system: Epilepsy, Parkinson's disease, Stroke, Headache, Alzheimer's disease, Neuralgias and Pain pathways and Pain management

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Unit 2 **12 hours**

Psychiatric disorders: Schizophrenia, Depression, Anxiety disorders, Sleep disorders, Drug induced psychiatric disorders

Renal system: Acute renal failure, Chronic renal failure, Renal dialysis, Drug induced renal disease

Unit 3 **12 hours**

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.

Unit 4 **12 hours**

Infectious diseases: Meningitis, HIV and opportunistic infections, Rheumatic fever, Dengue fever, H1N1, Helminthiasis, Fungal infections

Gynecological disorders: Dysmenorrhea, Hormone replacement therapy.

Unit 5 **12 hours**

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

Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course Pharmacy Practice Practical – II MPP205P"

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2		2	1					1			3	1
CO-2	2		2	2			1	1	2			3	3
CO-3	3		3	2			2	1	3		1	3	3
CO-4	2		2	2			2	1	3		1	3	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		00
Practical Work		05
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	

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5. Hospital	05	
6. Model Studio	00	
Others		
1. Case Study Presentation	02	05
2. Guest Lecture	00	
3. Field Visit/ Hospital Visit	01	
4. Brain Storming Sessions	00	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		5
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			**Component 2: SEE (75% Weightage)**
Subcomponent	**SC1**	**SC2**	**SC3**	
Subcomponent Type	**Attendance**	**Student – Teacher Interaction**	**Sessional Exam**	**Semester End Examination 75 Marks**
Maximum Marks	**8**	**2**	**15**	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
CO-4		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

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1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks
A 3 hours duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

Re-assessment
1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher i Interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

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9. **Course Resources**

a. Class Notes

b. Essential Reading

1. Walker, R. and Whittlesea, C. (2007) Clinical Pharmacy and Therapeutics. New York: Churchill Livingstone publication.
2. Dipiro, T.J., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M. (2011) Pharmacotherapy: A Pathophysiologic Approach.8thedn. New York: McGraw-Hill.

c. Recommended Reading

1. Cotran, R.S., Kumar, V. and Robbins S.L. (2005) Pathologic Basis of Disease. 7thedn. USA: W.B. Saunders Company.
2. Helms, R.A., Quan, D.J., Herfindal, E.T. and Gourley, D.R. (2006) Textbook of Therapeutics: Drug and Disease Management. 8th edn. Philadelphia: Lippincott Williams and Wilkins Publication.
3. Koda-Kimble, M.A., Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A. and Williams, B.R. (2013) Applied Therapeutics: The Clinical Use of Drugs. 10thedn. Philadelphia: Lippincott Williams and Wilkins Publication.
4. Speight, T.M. and Holford, N.H.G. (2011) Avery's Drug Treatment. 4thedn. New Delhi: Adis International Limited.

d. Magazines and Journals

1. British Medical Journal
2. Annals of Pharmacotherapy
3. Indian Journal of Medical Research
4. Indian Journal of Pharmacology

e. Websites

a. www.micromedexsolutions.com
b. www.medscape.com
c. www.pubmed.com
d. www.sciencedirect.com

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Course Specifications: Clinical Pharmacokinetics and Therapeutic Drug Monitoring (Theory)

Course Title	Clinical Pharmacokinetics and Therapeutic Drug Monitoring
Course Code	PPC509
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The course imparts knowledge on principles and applications of pharmacokinetics in patient care to individualize drug therapy. It also helps in understanding the basic concepts of drug interaction, pharmacogenetics and pharmacometrics for modeling and simulation of pharmacokinetic data.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Explain the principles of clinical pharmacokinetics and dosage regimen design
- **CO-2** Discuss the pharmacokinetic drug interactions, pharmacogenetics, and basics of pharmacometrics
- **CO-3** Summarize population pharmacokinetic modeling and simulation methods used in pharmacometrics
- **CO-4** Interpret altered pharmacokinetics and therapeutic drug monitoring data in special populations, and in patients with hepatic and renal impairment

4. Course Contents

Unit 1 **12 hours**

Introduction to Clinical pharmacokinetics:

Compartmental and Non-compartmental models, Renal and nonrenal 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.

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Unit 2 **12 hours**

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

Unit 3 **12 hours**

Non-Linear 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

Unit 4 **12 hours**

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

Unit 5 **12 hours**

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

Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course "Pharmacy Practice Practical – II MPP205P"

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2		3	2		2			2			3	2
CO-2	3		2	3		2			2		2	3	2
CO-3	2		3	3		1			2		2	3	2
CO-4	3		3	2		3			3			3	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	01	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	04	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	02	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	01	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			**Component 2: SEE (75% Weightage)**
Subcomponent	**SC1**	**SC2**	**SC3**	
Subcomponent Type	**Attendance**	**Student – Teacher Interaction**	**Sessional Exam**	**Semester End Examination 75 Marks**
Maximum Marks	**8**	**2**	**15**	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
CO-4		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

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Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	**8**
90 – 94	**6**
85 – 89	**4**
80 – 84	**2**
Less than 80	**0**

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3-hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Notes

b. Essential Reading

1. Shargel, L., Wu-Pong, S. and Yu, A.B., 2007. Applied Biopharmaceutics & Pharmacokinetics
2. McGraw-Hill Brian, Bonate, P.L. and Steimer, J.L., 2006. Pharmacokinetic-pharmacodynamic modeling and simulation (pp. 205-265). New York: Springer

c. Recommended Reading

1. Burton, M.E. ed., 2006. Applied pharmacokinetics & pharmacodynamics: principles of therapeutic drug monitoring. Lippincott Williams & Wilkins.
2. Wong, S.H. and Sunshine, I., 1996. Handbook of analytical therapeutic drug monitoring and toxicology. CRC Press.5. Soraya Dhillon, Andrzej Kostrzewski. Clinical pharmacokinetics. 1st edition. London: Pharmaceutical Press.
3. Kayne, S.B., Ritschel, W.A., Kearns, G.L., Houghton, P., Mukherjee, P.K., Azzopardi, L.M., Maguire, T., Haslam, D., Arnold, R.J., Elenbaas, R.M. and Worther, D.B., 2010. Elaine D. Mackowiak Essentials of Nonprescription Medications and Devices Pharmaceutical Press, 2010. 240pp, $45.00 (softcover) ISBN 978-0-85369-861-6. American Journal of Pharmaceutical Education, 74(5)
4. Rowland, M. and Tozer, T.N., 2005. Clinical pharmacokinetics/ pharmacodynamics. Philadelphia: Lippincott Williams and Wilkins.
5. Winter, M.E., 2010. Basic clinical pharmacokinetics. Wolters Kluwer/Lippincott Williams & Wilkins Health,.
6. Gibaldi, M., 1977. Biopharmaceutics and clinical pharmacokinetics. Lea & Febiger.
7. Dhillon, S., 2006. Clinical pharmacokinetics. Pharmaceutical Press.

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8. Troy, D.B. and Beringer, P. eds., 2006. Remington: The science and practice of pharmacy (Vol. 1). Lippincott Williams & Wilkins Waning, R and Montagne, M. (2000) Pharmacoepidemiology: Principles and Practice. 1st Edition,New York: McGraw- Hill Medical publishing division.

d. Magazines and Journals

1. International Journal of Epidemiology, Oxford Academic, USA
2. The New England Journal of Medicine, Massachusetts medical society, UK.

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Pharmacoepidemiology and Pharmacoeconomics (Theory)

Course Title	Pharmacoepidemiology & Pharmacoeconomics
Course Code	PPC510
Course Type	Core Theory
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with basic concepts, assumptions, terminology and methods associated with pharmacoepidemiology, pharmacoeconomics and health related outcomes. The course imparts knowledge on which appropriate pharmacoeconomic model should be applied for a health care regimen.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Explain the concepts of risk ratio, odds ratio, and outcome measurements in pharmacoepidemiology
- **CO-2** Apply pharmacoepidemiological methods for the evaluation of drug use and therapeutic outcomes
- **CO-3** Discuss health-related quality of life measures and their importance in healthcare evaluation
- **CO-4** Summarize pharmacoeconomic principles, models, and their applications in the Indian healthcare system

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4. Course Contents

Unit 1 **12 hours**

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

Unit 2 **12 hours**

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

Unit 3 **12 hours**

Introduction to Pharmacoeconomics:

Definition, history of Pharmacoeconomics, Need of Pharmacoeconomic studies in Indian healthcare 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.

Unit 4 **12 hours**

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 (COA).

Unit 5 **12 hours**

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.

Practical/Laboratory content: Selected experiments pertaining to this course were dealt in the course "Pharmacy Practice Practical – I MPP205P"

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	3		2									2	
CO-2			3	2								2	
CO-3						2			2			1	1
CO-4	2								2	3	2	1	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		50
Demonstrations		05
1. Demonstration using Videos	02	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	03	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	02	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	01	
5. Group Discussions	02	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent	SC1	SC2	SC3	
Subcomponent Type	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks	8	2	15	
CO-1		x	x	x
CO-2		x	x	x
CO-3		x	x	x
CO-4		x	x	x
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	**8**
90 – 94	**6**
85 – 89	**4**
80 – 84	**2**
Less than 80	**0**

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3-hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

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Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.
Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Notes

b. Essential Reading

1. Brian, L.S. and Kimmel, L.S. (2007) Textbook of Pharmacoepidemiology. 5th Edition, London: John wiley and sons Ltd.
2. Rascati, K. (2013) Essentials of Pharmacoeconomics. 2nd Edition, Philadelphia: Lippincott Williams & Wilkins
3. David D. Celentano (2019) Gordis Epidemiology, 6th Edition, ELSEVIER.

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c. Recommended Reading

1. Waning, R and Montagne, M. (2000) Pharmacoepidemiology: Principles and Practice. 1st Edition,New York: McGraw- Hill Medical publishing division.
2. Thomas E Getzen. (1997)Health economics. Fundamentals and Flow of Funds. 1st Edition, John Wiley & Sons, USA.
3. Andrew Briggs, Karl Claxton, Mark Sculpher. (2006) Decision Modelling for Health Economic Evaluation. 1st Edition, London: Oxford University Press.
4. Michael Drummond, Mark Sculpher, George Torrence, Bernie O'Brien and Greg Stoddart. (2005) Methods for the Economic Evaluation of Health Care Programmes. 3rd Edition, London: Oxford University Press.

d. Magazines and Journals

1. International Journal of Epidemiology
2. The New England Journal of Medicine

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Pharmacy Practice Practical- II (Practical)

Course Title	Pharmacy Practice Practical- II
Course Code	PPL511
Course Type	Core Practical
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of the course is to enable the students to assess the causal relationship between a drug and adverse drug reaction, detect and manage drug interactions, appreciate rational use of drugs in special populations, and calculate bio availability, bioequivalence and pharmacoeconomic outcomes. Also, it imparts knowledge and skills in presentation of clinical cases of various disease conditions adopting pharmaceutical care plan model.

2. Course Size and Credits:

Number of Credits	06
Credit Structure (Lecture: Tutorial: Practical)	0:0:6
Total Hours of Interaction	180
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	150 **Component 1: 50 Marks** C. Continuous Evaluation: 20 Marks A1. Attendance – 10 marks A2. Practical Record & Viva-voce – 10 marks D. Sessional Examination: 30 Marks (average of two) **Component 2 (SEE): 100 Marks** Practical Examination: 100 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Apply pharmaceutical knowledge for the causality assessment of adverse drug reactions and management of medication errors
- **CO-2** Analyze the rational use of medicines in special population and interpret therapeutic drug monitoring reports of a given patient
- **CO-3** Assess the bioavailability, bioequivalence and pharmacoeconomic outcomes

4. Course Contents

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)

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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)

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2		2									2	
CO-2			2	2		2	3	2	2			2	3
CO-3	2		3	2			2				2	3	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		20
Demonstrations		10
1. Demonstration using Videos		
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer	10	
Tutorials		00
Practical Work		140
1. Course Laboratory	100	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	40	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		10
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	05	
5. Group Discussions	00	
6. Discussing Possible Innovations	05	
Written Examination		20
Total Duration in Hours		**200**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of Cos on each Component or Subcomponent of Evaluation				
	Component 1: CE (33.33% Weightage)			Component 2: SEE (66.66% Weightage)
Subcomponent	SC1	SC2	SC3	
Subcomponent Type	Attendance	Practical Records, Regular viva voce	Sessional Exam	Semester End Examination 100 Marks
Maximum Marks	10	10	30	
CO-1		X	X	X
CO-2		X	X	X
CO-3		X	X	X
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

Component - 1: 50 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	10
Practical Records, Regular viva voce	10
Total	20

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	10
90 – 94	7.5
85 – 89	5
80 – 84	2.5
Less than 80	0

1B. Practical Records, Regular viva voce

1C. Sessional exam: Two sessional examinations (each for 30 Marks with six-hour duration) will be conducted. Average marks of the two sessionals will be computed for sessional examination marks.

Component - 2: 100 marks

Practical Examination: A practical exam shall be conducted for maximum marks 100 Marks with six hours of duration. Component 2 will be evaluated by course leader and external examiner.

Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

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The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Laboratory interactions and self-study
2.	Understanding	Experiments conducted in laboratory
3.	Critical Skills	Experiments conducted in laboratory
4.	Analytical Skills	Inference of laboratory results
5.	Problem Solving Skills	Lab work and Examination
6.	Practical Skills	Face to face interactions and lab work
7.	Group Work	Laboratory Tasks
8.	Self-Learning	Practical Record writing and Examination
9.	Written Communication Skills	Viva voce and presentation of results
10.	Verbal Communication Skills	Presentation of results
11.	Presentation Skills	Laboratory Tasks
12.	Behavioral Skills	Practical Record writing and presentation of results
13.	Information Management	Group discussions and planning of Laboratory Tasks
14.	Personal Management	Course work
15.	Leadership Skills	Presentation, Handling Questions during presentation, Interaction with peers

9. Course Resources

a. Class Notes

b. Essential Reading

1. Lab manual
2. Walker, R. and Whittlesea, C. (2007) Clinical Pharmacy and Therapeutics. NewYork: Churchill Livingstone publication.
3. Dipiro, T.J., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M. (2011) Pharmacotherapy: A Pathophysiologic Approach. 8thedn. New York: McGraw-Hill.

c. Recommended Reading

1. Cotran, R.S., kumar, V. and Robbins S.L. (2005) Pathologic Basis of Disease. 7thedn. USA: W.B.Saunders Company.
2. Helms, R.A., Quan, D.J., Herfindal, E.T. and Gourley, D.R. (2006) Textbook of Therapeutics: Drug and Disease Management. 8thedn. Philadelphia: Lippincott Williams and Wilkins Publication.

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3. Koda-Kimble, M.A., Alldredge, B.K., Corelli, R.L., Ernst, M.E., Guglielmo, B.J., Jacobson, P.A., Kradjan, W.A. and Williams, B.R. (2013) Applied Therapeutics: The Clinical Use of Drugs. 10thedn. Philadelphia: Lippincott Williams and Wilkins Publication.
4. Speight, T.M. and Holford, N.H.G. (2011) Avery's Drug Treatment. 4thedn. New Delhi: Adis International Limited.

d. Magazines and Journals

1. Australian Prescriber, NPS MedicineWise, Australia.
2. British Medical Journal, London
3. Annals of Pharmacotherapy, SAGE Publishing, USA
4. Indian Journal of Medical Research, Medknow Publications, Europe
5. Indian Journal of Pharmacology, Medknow Publications, Europe
6. Saudi Pharmaceutical Journal, King Saud University, Saudi Arabia

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Seminar/Assignment (Theory)

Course Title	Seminar/Assignment
Course Code	PPS512
Course Type	Seminar
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The course aims to instill critical thinking, analytical thinking and problem-solving skills amongst students. Students are trained to refer to literature and present their thought process, justification either in the form of an essay or debate as a concise report. Students are trained for collaborative learning while analyzing and also solving problems. They are exposed to citation, referencing and paraphrasing. Students are also exposed in communicating the collected information/literature to present and defend their accomplishment.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	105
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	100 **Component -1: Assignment = 60 Marks** Report evaluated individually for 15 marks for 4 theory Courses in the semester. **Component -2: Seminar = 40 Marks** Assignment presentation evaluated individually for 10 marks for 4 theory Courses in the semester
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Apply subject-specific concepts to solve assignment-based problems using logical reasoning and critical evaluation

CO-2 Critically review information from scientific literature and other credible sources to support assignment solutions and seminar topics

CO-3 Prepare and deliver scientifically well-structured seminar presentations and written assignments

CO-4 Demonstrate independent learning skills and incorporation of feedback received during assignments and seminar presentations

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4. **Course Contents**

Critical review of the literature on the given assignment
Writing and Communication skills
Citation and referencing styles-Harvard referencing style
Plagiarism review Analytical and problem-solving skills

Practical/Laboratory content: NA

5. **Course Map (CO-PO-PSO Map)**

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1			3								1	2	
CO-2			3					1			2	2	2
CO-3			1					3			1	2	2
CO-4			1					2			3	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. **Course Teaching and Learning Methods**

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		10
Demonstrations		10
1. Demonstration using Videos	5	
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer	5	
Tutorials		00
Practical Work		15
1. Course Laboratory	05	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	10	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		50
1. Case Study Presentation	10	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	10	
5. Group Discussions	00	
6. Discussing Possible Innovations	30	
Written Examination/ Presentation		20
Total Duration in Hours		**105**

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7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment is presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.
The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

	Component 1: Assignment (60% Weightage)	Component 2: Seminar (40% Weightage)
Subcomponent	**SC1**	**SC2**
Subcomponent Type	**Assignment**	**Seminar**
Maximum Marks	**60**	**40**
CO-1	X	X
CO-2	X	X
CO-3	X	X
CO-4	X	X

Component - 1: Assignment = 60 Marks [4 courses of 15 marks each]
One word processed assignment submitted for 4 theory courses in a semester will be evaluated by Course Leaders for a maximum of 15 marks each.

Component - 2: Seminar = 40 Marks [4 courses of 10 marks each]
Presentation on submitted assignments will be evaluated by Course Leaders for a maximum of 10 marks each.
Marks awarded for four individual Courses (Assignment -15 marks & Seminar – 10 marks) will be summed and calculated for the total marks obtained for a maximum marks of 100.
The assessment questions are set to test the learning outcomes. In each component a certain learning outcomes are assessed. The following table illustrates the focus of learning outcome in each component assessed:
Both components will be moderated by concerned course leader/s.

Reassessment

1. If a student fails in the course, it is considered fail and he or she has to earn the credits in the make up opportunity and re-registration to the Course is required.
2. The maximum number of such opportunities is limited as per the academic regulations governing this programme.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading and findings
2.	Understanding	Reading and findings
3.	Critical Skills	Literature Review
4.	Analytical Skills	Data collection
5.	Problem Solving Skills	Data analysis
6.	Practical Skills	Writing & Presentation
7.	Group Work	Data analysis
8.	Self-Learning	Reading and findings
9.	Written Communication Skills	Assignment processing
10.	Verbal Communication Skills	Presentations
11.	Presentation Skills	Presentations
12.	Behavioral Skills	Interaction
13.	Information Management	Paper writing
14.	Leadership Skills	Effective management of learning, time management, achieving the learning

9. **Course Resources**

a. **Essential Reading**

1. Research articles
2. Relevant textbooks
3. Visits to websites relevant to assignment problem

b. **Magazines and Journals**

1. Relevant magazines and journals pertaining to assignment

c. **Websites**

1. Specific web information pertaining to assignment

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SEMESTER 3

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Course Specifications: Research Methodology and Biostatistics (Theory)

Course Title	Research Methodology and Biostatistics
Course Code	PPF613
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

This course deals with the basic principles of research methodology and medical research. The students are trained on statistical tools and methodologies to solve problem arising in medical research. The course will also impart students the guidelines for quality maintenance of laboratory animals for conducting biomedical research.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacognosy & Pharmacy Practice
Total Course Marks	100 **Component 1: 25 Marks** 1A: Attendance: 8 Marks 1B: Student-Teacher interaction: 2 Marks 1C: Sessional Exam: 15 Marks **Component 2 (SEE):** Semester End Examination: 75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Elaborate on the value, scope, objective and requirements of research
- **CO-2** Discuss the basic concept and importance of statistical analysis
- **CO-3** Explain principles of medical research and pharmaceutical ethics
- **CO-4** Summarize the guidelines for the maintenance of laboratory animals

4. Course Contents

Unit 1

General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques. **12 hours**

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Unit 2

Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests (students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxan rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values. **12 hours**

Unit 3

Medical Research: History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality. **12 hours**

Unit 4

CPCSEA guidelines for laboratory animal facility: Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs personnel and training, transport of lab animals.

12 hours

Unit 5

Declaration of Helsinki: History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care. **12 hours**

(Practical/Laboratory content (please mention if Lab content doesn't exist for this course): Doesn't exist

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1		3										2	
CO-2	3		2										2
CO-3							3		2		3		2
CO-4							3			1	3		2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		55
Demonstrations		00
1.Demonstration using Videos		
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer		
Tutorials		00
Practical Work		
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		05
1. Case Study Presentation	00	
2. Guest Lecture	02	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	00	
5. Group Discussions	03	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**65**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document. The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (25% Weightage)			Component 2: SEE (75% Weightage)
Subcomponent ▶	SC1	SC2	SC3	
Subcomponent Type ▶	Attendance	Student – Teacher Interaction	Sessional Exam	Semester End Examination 75 Marks
Maximum Marks ▶	8	2	15	
CO-1		×	×	×
CO-2		×	×	×
CO-3		×	×	×
CO-4		×	×	×
The details of SC1, SC2, SC3 are presented in the Programme Specifications Document.				

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Component - 1: 25 marks

The marks allocated for Continuous mode of internal assessment shall be awarded as per the scheme given below:

Criteria	Maximum Marks
Attendance*	8
Student-Teacher Interaction	2
Total	10

1A. Guidelines for the allotment of marks for attendance*

Percentage of Attendance Theory	Marks
95 – 100	8
90 – 94	6
85 – 89	4
80 – 84	2
Less than 80	0

1B. Student-Teacher interaction

1C. Sessional exam: Two sessional exams (each for 30 marks) of 1 hour duration will be conducted, one at the end of 6th week and the other at the end of the 12th week. The average of the 2 sessional marks reduced to 15 will be the marks scored in the Sessional Examination

Component - 2: 75 marks

A 3 hour duration Semester End Examination will be conducted for maximum marks of 75. Both components will be evaluated by concerned course leader/s.

Re-assessment

1. A student who fails to secure a minimum 50% in component-1 and 2 put together will be asked to register for Supplementary examination.
2. A student who has not satisfied the attendance requirement (not eligible for SEE) shall have to appear for Supplementary examination.
3. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

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8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Student-Teacher interaction, Assignments
4.	Analytical Skills	Student-Teacher Interaction
5.	Problem Solving Skills	Class room lectures, Examination and Assignments
6.	Practical Skills	--
7.	Group Work	Assignments
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination, Student-Teacher Interaction
10.	Verbal Communication Skills	Presentations, Student-Teacher Interaction
11.	Presentation Skills	Class room activity, Assignment, Examination
12.	Behavioral Skills	Course work
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Course work
15.	Leadership Skills	Handling questions during presentations, class room behavior with peers, Student-Teacher interaction

9. Course Resources

a. Class Notes

b. Essential Reading

1. Booth W. C, Colomb and Williams, G.G (2005) The Craft of Research, Chicago University Press.
2. Willium M.K and Trochim. (2003) Research Methods, 2nd ed, Biztantra Publications.
3. Jonathan Grix. (2004) The Foundation of Research, Palgrave Study Guides
4. Bolton S and Bon C (2009) Pharmaceutical Statistics - Practical & Clinical Applications. 5th ed. New York: Marcel Dekker.
5. Jagadeesh, G., Sreekant Murthy, Gupta Y.K., Amitabh Prakash (2010) Biomedical Research, Lippincott Williams and Wilkins, 1ST ed, New Delhi.
6. Gupta S.K. (2007) Basic principles of clinical Research and methodology, Institute of Clinical Research, India.
7. Karthikeyan. S (2016) Comprehensive Textbook of Biostatistics & Research Methodology, 1st Ed. Bhalani Publishing House, Mumbai.
8. Arun Bhadra Khanal (2016) Mahajan's Methods in Biostatistics for Medical Students and Research Workers, 8th Ed. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
9. Ghosh M.N,(2008) Fundamentals of experimental Pharmacology, 4th ed, Hilton and company, Kolkata.

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c. Recommended Reading

1. Muth, J.E.D. (2006) Basic Statistics and Pharmaceutical Statistical Applications, 2nd ed. New Delhi:CRC Press.
2. Jones, D.S. (2002) Pharmaceutical Statistics. UK: Pharmaceutical Press.
3. Himanshi Joshi, (2015) An alternative approach to experimental Pharmacology. India: Himdeep publication.

d. Magazines and Journals

1. Indian Journal of Medical Research- ICMR, India.
2. The International Journal of Biostatistics-Berkeley Electronic Press, United States.
3. Indian Journal of Pharmacology- Medknow Publication, India.

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Journal Club

Course Title	Journal club
Course Code	PPF614
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to equip a student to critically appraise the research article published in reputed journals. Students are trained for inquiry based learning and critical thinking skills. Students will also be trained to access journals adopting search engines and made to choose a topic of interest, collect relevant data, analyze and assess the quality of scientific paper and comment on the internal and external validity of the findings. Student will be able to base their opinion on evidence based literature.

2. Course Size and Credits:

Number of Credits	01
Credit Structure (Lecture: Tutorial: Practical)	1:0:0
Total Hours of Interaction	15
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	**Total Marks: 25** **Component 1: 15 Marks** Report Evaluation: 15 marks **Component 2: 10 Marks** Presentation: 10 marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Utilize scientific databases and digital research tools to identify relevant pharmaceutical and biomedical publications

CO-2 Validate the scientific literature for quality and relevance

CO-3 Create a presentation on the critically appraised article

CO-4 Demonstrate effective communication skills by presenting findings in appropriate forum

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4. Course Contents

Selection of suitable topic of their specialization
Identify suitable journal for the research data
Collect and appraise the relevant data from the scientific article
Develop a report on the critical observations and present/ debate in Journal club
Practical/Laboratory content: NA

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1			3							1	2	1
CO-2				2								2	
CO-3		1		2				3			1	2	2
CO-4		1						3			1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		10
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	10	
5. Group Discussions	00	
6. Discussing Possible Innovations	00	
Report preparation/ Report Evaluation & Presentations		05
Total Duration in Hours		**15**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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Focus of COs on each Component or Subcomponent of Evaluation		
	Component 1: Report evaluation (15% Weightage)	Component 2: Presentation (10% Weightage)
Subcomponent Type ▶	Report Evaluation	Presentation
Maximum Marks ▶	15	10
CO-1	×	×
CO-2	×	×
CO-3	×	×
CO-4	×	×

Component - 1: 15 marks

Report submitted will be evaluated by a committee of examiners consisting not less than 2 members with in the Department appointed by the Head of the Department in consultation with the Academic Registrar of the Faculty

Component - 2: 10 marks

Evaluation of presentation by a committee of examiners consisting not less than 2 members within the Department appointed by the Head of the Department in consultation with the Academic Registrar of the Faculty.

Both components will be moderated by concerned course leader/s.

Re-assessment

1. If a student fails in the course, it is considered fail and he /she has to re-register in the next opportunity. The marks awarded will be recapped to 50%.
2. The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading
2.	Understanding	Reading
3.	Critical Skills	Review on Seminar topic
4.	Analytical Skills	Comments on the reviewed topic
5.	Problem Solving Skills	--
6.	Practical Skills	--
7.	Group Work	--
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Paper writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Interactions
13.	Information Management	Group discussions and planning of Laboratory Tasks
14.	information Management	Paper writing
15.	Leadership Skills	Presentation, Handling Questions during presentation, Interaction with peers

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9. Course Resources

a. Class Notes

b. Essential Reading

1. Jennifer Raff, 2013, How to read and understand a scientific paper: A guide for non- scientists.

c. Recommended Reading

1. Relevant articles pertaining to the programme domain.

d. Magazines and Journals

1. Relevant magazines and journals pertaining to the programme domain

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Group Project

Course Title	Group Project
Course Code	PPF615
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Faculty of Pharmacy

1. Course Summary

This course will focus on the applications of appropriate methods and techniques involved in pharmaceutical Sciences using relevant University resources for definition and execution of the project. The group project will enable the students to apply the theoretical and practical aspects of pharmaceutical sciences as well as project management techniques taught during the programme. This course will enable the students to gain practical experience of working in a project mode, requiring interactions with the domain specialist to meet the technical challenges of the project undertaken.

2. Course Size and Credits:

Number of Credits	04
Credit Structure (Lecture: Tutorial: Practical)	4:0:0
Total Hours of Interaction	NA
Number of Weeks in a Semester	15
Department Responsible	Department of Pharmacognosy, Pharmaceutical Chemistry, Pharmacology, Pharmaceutics, Pharmacy Practice
Total Course Marks	NA
Pass Criterion	Report Submission , Presentation & Exhibition of the project
Attendance Requirement	NA

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Develop the ability to work in a team to execute research projects
- **CO-2** Apply appropriate research methodologies in project planning and execution
- **CO-3** Compile, document the findings and defend the project with a structured presentation

4. Course Contents

Need for undertaking a project, Project design, protocol / specifications design, methodology, analysis, product/design/model evaluation and presentation
Project Management, Time Management, Resource Management
Costing, Finance Management, Procurement, Project Development, Testing, Project Evaluation
Project Exhibition, Presentation Team building, Team work, Leadership skills
Practical/Laboratory content: Interdepartmental laboratory work

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1					2			2				2	1
CO-2	1	2	3	2	3	1						2	1
CO-3					2	1		3			1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer		
Tutorials		00
Practical Work		
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		00
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	00	
5. Group Discussions	00	
6. Discussing Possible Innovations	00	
Written Examination		00
Total Duration in Hours		**NA**

7. Course Assessment and Reassessment

There are two components for assessment in this course

		Type of Assessment	
No.	**Intended Learning Outcome**	**Component-I** (Project Report and Viva-Voce)	**Component-II** (Exhibition and Presentation)
1	CO-1	X	
2	CO-2	X	
3	CO-3	X	X

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Component - 1: 50% weight
Project Report and Viva-Voce

Component - 2: 50% weight
Exhibition and Presentation
Both components will be moderated by concerned course leader/s.

Reassessment
If a student fails in any one of the components, it is considered fail and the student should resubmit the project report or re-register to the course as applicable.
The maximum number of such opportunities is limited as per the academic regulations governing this course.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.
Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Group Project Work
2.	Understanding	Group Project Work
3.	Critical Skills	Group Project Work
4.	Analytical Skills	Group Project Work
5.	Problem Solving Skills	Group Project Work
6.	Practical Skills	Group Project Work
7.	Group Work	Group Project Work
8.	Self-Learning	Group Project Work
9.	Written Communication Skills	Report writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Course work
13.	Information Management	Group Project Work
14.	Personal Management	Group Project Work
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcomes

9. Course Resources

a. Essential Reading
1. Assigned reading relevant to the group project

b. Recommended Reading
1. Assigned reading relevant to the group project

c. Magazines and Journals
1. Specific Journals relevant to group project work

d. Websites
1. Specific Websites relevant to group project work

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Course Specifications: Discussion / Synopsis Presentation

Course Title	Discussion / Synopsis Presentation
Course Code	PPF616
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to imbibe a student to critically appraise the research problem/project proposal. Students will be trained to plan and execute the solution for the research problem through discussion and presentation with their mentor and peers using acquired knowledge, skills, evidence based literature and experience.

2. Course Size and Credits:

Number of Credits	02
Credit Structure (Lecture: Tutorial: Practical)	2:0:0
Total Hours of Interaction	60
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	50
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Analyze relevant scientific literature for the selection of research problem
- **CO-2** Compile the findings obtained from scientific articles to identify a research problem
- **CO-3** Design a research protocol based on the identified research problem with structured objectives
- **CO-4** Defend the research problem and proposed plan of work in appropriate forum

4. Course Contents

Conduct of research work in the laboratories and collection of data/findings

Record the findings/data for solving research problem with scientific based results

Develop a report on the critical observations and discuss with mentor /peer.

Presentation of the reports/findings in appropriate forum.

Practical/Laboratory content: NA.

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	2			2								2	
CO-2			1	1							1	2	2
CO-3		2	2	1				2				2	1
CO-4								3			2	2	2

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in Hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		30
1. Case Study Presentation	10	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	10	
5. Group Discussions	10	
6. Discussing Possible Innovations	00	
Synopsis Preparation / Presentation/ Discussion		5
Total Duration in Hours		**35**

7. Course Assessment and Reassessment

Synopsis to be evaluated along with the supporting documents by the Head of the Department/ Nominated Examiner by the HoD/Academic Registrar/Dean. Panel to evaluate and endorse. Dean of the Faculty to approve and submit to the University.

Re-assessment

The remarks/queries/suggestions made by the examiner during scrutiny of the synopsis should be attended by the candidate in consultation with the Research Supervisor and must be re-submitted for evaluation process

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading
2.	Understanding	Reading
3.	Critical Skills	Review on Seminar topic
4.	Analytical Skills	Comments on the reviewed topic
5.	Problem Solving Skills	Research work, discussion
6.	Practical Skills	Research work, Interactions
7.	Group Work	Discussion
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Report writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Course work
13.	Information Management	Interactions
14.	Personal Management	Document writing and Presentation
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcomes

9. **Course Resources**

a. **Essential Reading**

1. Jennifer Raff, 2013, How to read and understand a scientific paper: A guide for non-scientists

b. **Magazines and Journals**

1. International Journal of Pharmaceutics, Elsevier, Science Direct, Amsterdam
2. European Journal of Pharmaceutical Sciences, Elsevier, Science Direct, Amsterdam
3. Advanced Drug Delivery Reviews, Elsevier, Science Direct, Amsterdam
4. Journal of Controlled Release, Elsevier, Science Direct, Amsterdam
5. Drug Development and Industrial Pharmacy, Informa UK

c. **Websites**

1. www.pubmed.com
2. www.sciencedirect.com

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Course Specifications: Research Work

Course Title	Research Work
Course Code	PPF617
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to encourage students to develop skills in identification of a research problem in the chosen domain. This course also emphasizes the application of principles of research methodology, preparation of research project proposal, research project management, execution of research project with effective technical documentation and presentation.

2. Course Size and Credits:

Number of Credits	14
Credit Structure (Lecture: Tutorial: Practical)	0:0:14
Total Hours of Interaction	28
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	**Total Marks: 350** **Component -1: 250 Marks** Evaluation of Interim-Dissertation work Progress **Component -2: 100 Marks** Evaluation of Interim-Dissertation Presentation
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Apply appropriate research methodologies to conduct research and achieve the stated objectives

CO-2 Develop innovative ideas and methodologies to improve the identified research problem

CO-3 Compile and present research findings effectively in an appropriate forum

4. Course Contents

- Information search, retrieval and review
- Research problem identification
- Project definition and project planning with objectives
- Use of conceptual models/methodologies and frameworks
- Problem solving and evaluation
- Interpretations and drawing conclusions
- Proposing ideas or methods for further work
- Dissertation writing
- Oral presentation

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Practical/Laboratory content: Yes

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1	3	3	2			2		1	1	1	2	2
CO-2	1	2	2	1			1			1	1	2	2
CO-3				2		2		3				2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		
1.Demonstration using Videos		
2. Demonstration using Physical Models / Systems		
3. Demonstration on a Computer		
Tutorials		00
Practical Work		
1. Course Laboratory	25	
2. Computer Laboratory	03	
3. Engineering Workshop / Course/Workshop / Kitchen	00	28
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	00
4. Brain Storming Sessions	00	
5. Group Discussions	00	
6. Discussing Possible Innovations	00	
Presentation Evaluation		02
Total Duration in Hours		30

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M.Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

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The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of Cos on each Component or Subcomponent of Evaluation		
	Component 1: CE (250 Marks)	Component 2: SEE (100 Marks)
CO-1	×	×
CO-2	×	×
CO-3	×	×

Component - 1: Evaluation of Dissertation Book

Objectives	25 Marks
Review of literature	25 Marks
Methodology – Preliminary and on-going, evaluation parameters	100 Marks
Results and Discussion	100 Marks
Total	**250 Marks**

Component - 2: Evaluation of Dissertation Presentation

Presentation of work	50 Marks
Communication skills	25 Marks
Question and answer skills	25 Marks
Total	**100 Marks**

The components will be evaluated by two examiners, one would be the Guide/ Supervisor (Internal Examiner) and the other External examiner would be the senior faculty member (within Department/Faculty for Component-1 & outside external to the University for Component-2.

However the process of Dissertation evaluation in the IV semester should be carried out only after the student passes all the courses till III semester.

Re-assessment

1. If a student fails in the course, it is considered fail and re-registration to the course is required
2. The maximum number of such opportunities is limited as per the academic regulations governing this programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

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8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Dissertation
2.	Understanding	Dissertation
3.	Critical Skills	Dissertation
4.	Analytical Skills	Dissertation
5.	Problem Solving Skills	Dissertation
6.	Practical Skills	Dissertation
7.	Group Work	Dissertation
8.	Self-Learning	Dissertation
9.	Written Communication Skills	Report writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Presentation
13.	Information Management	Report writing and Presentation
14.	Personal Management	Report writing and Presentation
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcome

9. Course Resources

a. Essential Reading

1. Barry White, 2011, *Mapping Your Thesis: The Comprehensive Manual of Theory andTechniques for Masters and Doctoral Research*, ACER press, Australia.
2. Maximiano M. Rivera, Jr. and Roela Victoria Rivera, 2007, *Practical Guide to Thesis andDissertation Writing*, KATHA Publishing, Philippines.
3. Lecture sessions on Dissertation, Thesis preparation delivered by the concerned Head of the Dept.

b. Recommended Reading

1. Relevant books pertaining to research problem

c. Magazines and Journals

1. Relevant magazines and journals pertaining to research problem

d. Websites

1. Relevant websites pertaining to research problem

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SEMESTER 4

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Course Specifications: Journal Club

Course Title	Journal club
Course Code	PPF618
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to equip a student to critically appraise the research article published in reputed journals. Students are trained for inquiry based learning and critical thinking skills. Students will also be trained to access journals adopting search engines and made to choose a topic of interest, collect relevant data, analyze and assess the quality of scientific paper and comment on the internal and external validity of the findings. Student will be able to base their opinion on evidence based literature.

2. Course Size and Credits:

Number of Credits	01
Credit Structure (Lecture: Tutorial: Practical)	1:0:0
Total Hours of Interaction	15
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	**Total Marks: 25** **Component 1: 15 Marks** Report Evaluation: 15 marks **Component 2: 10 Marks** Presentation: 10 marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Utilize scientific databases and digital research tools to identify relevant pharmaceutical and biomedical publications
- **CO-2** Validate the scientific literature for quality and relevance
- **CO-3** Create a presentation on the critically appraised article
- **CO-4** Demonstrate effective communication skills by presenting findings in appropriate forum

4. Course Contents

Selection of suitable topic of their specialization
Identify suitable journal for the research data
Collect and appraise the relevant data from the scientific article
Develop a report on the critical observations and present / debate in Journal club
Practical/Laboratory content: NA

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1			3							1	2	1
CO-2				2								2	
CO-3		1		2				3			1	2	2
CO-4		1						3			1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		00
Practical Work		00
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		10
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	10	
5. Group Discussions	00	
6. Discussing Possible Innovations	00	
Report preparation/ Report Evaluation & Presentations		05
Total Duration in Hours		**15**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

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Focus of Cos on each Component or Subcomponent of Evaluation		
	Component 1: Report evaluation (15% Weightage)	Component 2: Presentation (10% Weightage)
Subcomponent Type ▶	Report Evaluation	Presentation
Maximum Marks ▶	15	10
CO-1	×	×
CO-2	×	×
CO-3	×	×
CO-4	×	×

Component - 1: 15 marks

Report submitted will be evaluated by a committee of examiners consisting not less than 2 members with in the Department appointed by the Head of the Department in consultation with the Academic Registrar of the Faculty

Component - 2: 10 marks

Evaluation of presentation by a committee of examiners consisting not less than 2 members within the Department appointed by the Head of the Department in consultation with the Academic Registrar of the Faculty.

Both components will be moderated by concerned course leader/s.

Re-assessment

1.If a student fails in the course, it is considered fail and he /she has to re-register in the next opportunity. The marks awarded will be recapped to 50%.

2.The maximum number of such opportunities are limited and as per the academic regulations governing this Programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading
2.	Understanding	Reading
3.	Critical Skills	Review on Seminar topic
4.	Analytical Skills	Comments on the reviewed topic
5.	Problem Solving Skills	--
6.	Practical Skills	--
7.	Group Work	--
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Paper writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Interactions
13.	Information Management	Group discussions and planning of Laboratory Tasks
14.	Information Management	Paper writing
15.	Leadership Skills	Presentation, Handling Questions during presentation, Interaction with peers

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9. Course Resources

a. Class Notes

b. Essential Reading

1. Jennifer Raff, 2013, How to read and understand a scientific paper: A guide for non- scientists.

c. Recommended Reading

1. Relevant articles pertaining to the programme domain.

d. Magazines and Journals

1. Relevant magazines and journals pertaining to the programme domain

e. Websites

1. www.elsevier.com
2. www.ncbi.nlm.nih.gov
3. www.pubmed.com

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Course Specifications: Discussion /Presentation

Course Title	Discussion /Presentation
Course Code	PPF619
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to enrich a student to critically solve the research problem/project proposal. Students will be trained to plan and execute the solution for the research problem through discussion and presentation with their mentor and peers using acquired knowledge, skills, evidence based literature and experience.

2. Course Size and Credits:

Number of Credits	03
Credit Structure (Lecture: Tutorial: Practical)	3:0:0
Total Hours of Interaction	45
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	75 Marks
Pass Criterion	As per the Academic Regulations
Attendance Requirement	NA

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Apply appropriate research methodologies to conduct research and achieve the stated objectives
- **CO-2** Develop innovative ideas and methodologies to improve the identified research problem
- **CO-3** Compile and present research findings effectively in an appropriate forum

4. Course Contents

a. Conduct of research work in the laboratories and collection of data/findings
b. Record the findings/data for solving research problem with scientific based results
c. Develop a report on the critical observations and discuss with mentor /peer
d. Presentation of the reports/findings in appropriate forum
e. Practical/Laboratory content : Research work in the Post Graduate Laboratories

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1	3	3	2			2		1	1	1	2	2
CO-2	1	2	2	1			1			1	1	2	2
CO-3						2		3				2	2

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

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6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		05
Practical Work		25
1. Course Laboratory	25	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	05	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		15
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	05	
5. Group Discussions	10	
6. Discussing Possible Innovations	00	
Written Examination / Presentation		05
Total Duration in Hours		**50**

7. Course Assessment and Reassessment

Process:

Log book of the research work/Group Project / Colloquium presentation to be evaluated along with the supporting documents by the Head of the Department/ Nominated Examiner by the HoD/Academic Registrar/Dean along with the Supervisor. Panel to evaluate and endorse. Dean of the Faculty to approve and submit to the University

The remarks/queries/suggestions made by the examiner during discussion / colloquium should be attended by the candidate in consultation with the Research Supervisor and must be re-submitted for evaluation process.

Re-assessment

1. If a student fails in the course, it is considered fail and re-registration to the course is required
2. The maximum number of such opportunities is limited as per the academic regulations governing this programme.

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8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S.No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading and Research
2.	Understanding	Reading and Research
3.	Critical Skills	Literature Review
4.	Analytical Skills	Research
5.	Problem Solving Skills	Research
6.	Practical Skills	Research
7.	Group Work	Data analysis
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Paper writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Interactions
13.	Information Management	Paper writing
14.	Leadership Skills	Effective management of learning, time management, achieving the learning outcomes

9. Course Resources

a. Essential Reading

1. Research Papers
2. Visits to websites relevant to research

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Course Specifications: Research Work

Course Title	Research Work
Course Code	PPF620
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to encourage students to develop skills in identification of a research problem in the chosen domain. This course also emphasizes the application of principles of research methodology, preparation of research project proposal, research project management, execution of research project with effective technical documentation and presentation.

2. Course Size and Credits:

Number of Credits	16
Credit Structure (Lecture: Tutorial: Practical)	0:0:31
Total Hours of Interaction	31
Number of Weeks in a Semester	15
Department Responsible	Pharmacy Practice
Total Course Marks	**Total Marks: 400** **Component -1: 250 Marks** Evaluation of Final Dissertation Book **Component -2: 150 Marks** Evaluation of Final Dissertation Presentation
Pass Criterion	As per the Academic Regulations
Attendance Requirement-	As per the Academic Regulations

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- **CO-1** Apply appropriate research methodologies to conduct research and achieve the stated objectives
- **CO-2** Develop innovative ideas and methodologies to improve the identified research problem
- **CO-3** Compile and present research findings effectively in an appropriate forum

4. Course Contents

a. Information search, retrieval and review
b. Research problem identification
c. Project definition and project planning with objectives
d. Use of conceptual models/methodologies and frameworks
e. Problem solving and evaluation
f. Interpretations and drawing conclusions
g. Proposing ideas or methods for further work
h. Dissertation writing
i. Oral presentation
j. Practical/Laboratory content: Yes

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1	3	3	2			2		1	1	1	2	2
CO-2	1	2	2	1			1			1	1	2	2
CO-3				2		2		3				2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		00
Demonstrations		00
1. Demonstration using Videos	00	
2. Demonstration using Physical Models / Systems	00	
3. Demonstration on a Computer	00	
Tutorials		00
Practical Work		430
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	00	
4. Clinical Laboratory	30	
5. Hospital	400	
6. Model Studio	00	
Others		20
1. Case Study Presentation	00	
2. Guest Lecture	00	
3. Industry / Field Visit	00	
4. Brain Storming Sessions	10	
5. Group Discussions	10	
6. Discussing Possible Innovations	00	
Written Examination		05
Total Duration in Hours		**465**

7. Course Assessment and Reassessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the M. Pharm Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

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Focus of Cos on each Component or Subcomponent of Evaluation		
	Component 1: CE (500 Marks)	Component 2: SEE (250 Marks)
CO-1	X	X
CO-2	X	X
CO-3	X	X

Component - 1: Evaluation of Dissertation Book

Methodology: Experimental work &Evaluation studies	50 Marks
Results & Discussion	150 Marks
Conclusion & final outcomes	50 Marks
Total	**250 Marks**

Component - 2: Evaluation of Dissertation Presentation

Presentation of work	50 Marks
Communication skills	50 Marks
Question and Answer skills	50 Marks
Total	**150 Marks**

The components will be evaluated by two examiners, one would be the Guide/ Supervisor (Internal Examiner) and the other External examiner would be the senior faculty member (within Department/Faculty for Component-1 & outside external to the University for Component-2.

However the process of Dissertation evaluation in the IV semester should be carried out only after the student passes all the courses till III semester.

Re-assessment

1. If a student fails in the course, it is considered fail and re-registration to the course is required
2. The maximum number of such opportunities is limited as per the academic regulations governing this programme.

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.
Course reassessment policies are presented in the Academic Regulations document.

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Dissertation
2.	Understanding	Dissertation
3.	Critical Skills	Dissertation
4.	Analytical Skills	Dissertation
5.	Problem Solving Skills	Dissertation
6.	Practical Skills	Dissertation
7.	Group Work	Dissertation
8.	Self-Learning	Dissertation
9.	Written Communication Skills	Report writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Presentation
13.	Information Management	Group discussions and presentations, preparation for examination and presentations
14.	Personal Management	Report writing and Presentation
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcome

9. Course Resources

a. Essential Reading

1. Barry White, 2011, Mapping Your Thesis: The Comprehensive Manual of Theory and Techniques for Masters and Doctoral Research, ACER press, Australia.
2. Maximiano M. Rivera, Jr. and Roela Victoria Rivera, 2007, Practical Guide to Thesis and Dissertation Writing, KATHA Publishing, Philippines.

b. Lecture sessions on Dissertation, Thesis preparation delivered by the concerned Head of the Department.

c. Recommended Reading

1. Relevant book pertaining to research

d. Magazines and Journals

1. Relevant magazines and journals pertaining to research problem

e. Websites

1. Relevant websites pertaining to research problem

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Course Specifications: Participation/ Presentation in Research Forum

Course Title	Participation/ Presentation in Research Forum
Course Code	PPF621
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to make a student participate / present a research paper in a conference /seminar/workshop/symposium based on his/her research work specialization during his/her programme. The student is required to carry out original research, author a conference paper and present it. The student is also required to submit the paper to a conference approved by the department.

2. Course Size and Credits:

Number of Credits	03 National level participation: 01 International level participation: 02
Credit Structure (Lecture: Tutorial: Practical)	NA
Total Hours of Interaction	NA
Number of Weeks in a Semester	NA
Department Responsible	Pharmacy Practice
Total Course Marks	NA
Pass Criterion	Participation/Presentation certificate
Attendance Requirement	NA

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Analyze scientific research findings and prepare structured conference presentations

CO-2 Demonstrate professional and communication skills by presenting research work in scientific forums

CO-3 Build professional development skills and stay updated with emerging advancements

4. Course Contents

Unit 1
Identification of suitable conference of research domain

Unit 2
Participation in a conference/symposium/workshop

Unit 3
Presentation of research work in a conference

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1			3			1		3				2	2
CO-2			1		3	3		3				2	2
CO-3					1	2					3	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

6. Course Teaching and Learning Methods

Self-Learning

Description	Number of credits
Participation in National Level Seminar/Conference / Workshop /Symposium/ Training Programs (related to the specialization of the student)	01
Participation in outside India International Level Seminar/ Conference/Workshop / Symposium /Training Programs (related to the specialization of the student)	02

7. Course Assessment and Reassessment

Process: To be nominated by the Head of the department/Course Supervisor with the supporting documents. Panel to evaluate and endorse. Dean of the Faculty to approve the credit awarded and submit to the University.

Re-assessment: NA

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading and Research
2.	Understanding	Reading and Research
3.	Critical Skills	Literature Review
4.	Analytical Skills	Research
5.	Problem Solving Skills	Research
6.	Practical Skills	Research
7.	Group Work	Data analysis
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Paper writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Interactions
13.	Information Management	Paper writing
14.	Personal Management	--
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcomes

9. Course Resources

a. **Essential Reading**

1. Research Papers
2. Visits to websites relevant to research

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Course Specifications: Publication: National/International Journals

Course Title	Publication: National/International Journals
Course Code	PPF622
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The aim of this course is to make a student submit a research paper to a journal based on his/her research work during the programme. The student is required to carry out original research or explicit review of an article, author a journal paper for publication. The student is required to submit the research paper to a journal approved by the department.

2. Course Size and Credits:

Number of Credits	Scopus indexed National Journal : 01 Scopus indexed International Journal : 02
Credit Structure (Lecture: Tutorial: Practical)	NA
Total Hours of Interaction	NA
Number of Weeks in a Semester	NA
Department Responsible	Pharmacy Practice
Total Course Marks	NA
Pass Criterion	Acceptance of research work manuscript in a Scopus indexed journal
Attendance Requirement	NA

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Analyze and interpret scientific research data to prepare well-structured manuscripts

CO-2 Identify suitable journal and apply modern tools in the preparation and submission of manuscripts

CO-3 Develop communication skills by responding to peer-review feedback, revising manuscripts and engaging in continuous learning

4. Course Contents

Publish the research work manuscript in a reputed journal
Collection, presentation and analysis of relevant research data
Preparation of manuscript according to the Journal instructions
Submission of manuscript for publication and further review

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1			3			1		3				2	2
CO-2			1	3			3	1				2	2
CO-3			1			3		2			3	2	2

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

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6. Course Teaching and Learning Methods

Self-directed

Description	Number of credits
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

7. Course Assessment and Reassessment

NA
Process: To be nominated by the Head of the department/Course Supervisor with the supporting documents. Panel to evaluate and endorse. Dean of the Faculty to approve the credit awarded and submit to the University.

Re-assessment
NA

8. Achieving COs

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Reading and Research
2.	Understanding	Reading and Research
3.	Critical Skills	Literature Review
4.	Analytical Skills	Research
5.	Problem Solving Skills	Research
6.	Practical Skills	Research
7.	Group Work	Data analysis
8.	Self-Learning	Reading and Research
9.	Written Communication Skills	Paper writing
10.	Verbal Communication Skills	Presentation
11.	Presentation Skills	Presentation
12.	Behavioral Skills	Interactions
13.	Information Management	Paper writing
14.	Personal Management	--
15.	Leadership Skills	Effective management of learning, time management, achieving the learning outcomes

9. Course Resources

a. Essential Reading

1. Research Papers/Publications from reputed journals
2. Visits to websites relevant to research

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Course Specifications: Academic /Research Award/MOOC

Course Title	Academic /Research Award/MOOC
Course Code	PPF623
Course Type	Faculty Common
Department	Pharmacy Practice
Faculty	Pharmacy

1. Course Summary

The students with extraordinary academic achievement/ research accomplishment are provided an opportunity to portrait in a State/National / International awarding agencies or platforms as a means to further encourage sound scholarship. The students are trained to develop required documents like statement of purpose and resume and also developing concept note / abstract of their accomplishment.

2. Course Size and Credits:

Number of Credits	State/National agency awarded : 01 International agency awarded : 02
Credit Structure (Lecture: Tutorial: Practical)	NA
Total Hours of Interaction	NA
Number of Weeks in a Semester	NA
Department Responsible	Pharmacy Practice
Total Course Marks	NA
Pass Criterion	Certificate of Excellence Award from the appropriate agency
Attendance Requirement	NA

3. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1 Identify areas for professional development and independent learning

CO-2 Improve communication and presentation skills

CO-3 Develop professional advancement and lifelong learning practices

4. Course Contents

Skill of developing report on the content of their domain for academic achievement / research accomplishment.

Technical communication skills for submission of the documents /records for the award.

5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)											Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
CO-1	1										3	1	2
CO-2						2		2			2	1	2
CO-3					2	2		3			2	1	2

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

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6. Course Teaching and Learning Methods
Self-directed

Description	Number of credits
Academic /Research award from State/National level agencies	01
Academic/Research award from International level agencies	02
Completion of MOOC courses	01

7. Course Assessment and Reassessment
NA
Process: To be nominated by Head of the department/ Couse Supervisor with supporting documents. Panel to evaluate and endorse. Dean of faculty to approve and submit to the University.

Re-assessment
NA

8. Course Resources

a. Essential Reading

1. Richard J Stelzer, 2002, How to write winning personal statement of purpose for graduate and professional school, 3rd edition, United States of America.
2. Yana Parker and Beth Brown, 2012, The Damn Good Resume Guide: A crash course in Resume writing, 5th edition, United States of America.
3. Leah M. Akins and Jefferson H. Akins, 2009, Technical Report Writing Guidelines, Dutchess Community College, Poughkeepsie, New York.

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