K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

School of Medical and Allied Sciences

Bachelor of Pharmacy
(B. Pharm.)
Program Code: 12

(2021-2025)

Approved in the 26th Meeting of Academic Council

held on 11 August 2021

Academic Council
Member Secretary
K.R. Mangalam University

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

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PREFACE

The KRMU envisions all its programs in the best interest of their students and in this endeavour it offers a new vision to all its courses. Through its programs it aims to provide a focused, student-centric syllabus with an agenda to structure the teaching-learning experiences experientially.

The curriculum strengthens students' experiences and prepare the students for both, academia and employability, sustainability and life-long learning.

Each program reflects the promise to accomplish the learning outcomes by studying the courses. The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and also skills for entrepreneurship.

The K.R. Mangalam University hopes the curriculum will help students in making an informed decision at the time of working in the field of pharmacy.

ACKNOWLEDGEMENT

The development of the curriculum for Undergraduate degree courses in the School of Medical and Allied Sciences is a result of thoughtful deliberations at various stages of dedicated and specialized experts. This curriculum has been framed to meet the expectations of an academically challenging environment, develop problem-solving skills by students and align with current standards and to enrich the students to make them self-enablers and/or match job requirements on successful completion of their degrees.

I wish to acknowledge all our experts who have been involved in the process of developing this curriculum for B. Pharmacy. I am greatly gratified Ms. Manvi Arora for her supervision contribution, guidance, and support throughout the development of this curriculum. Special thanks and gratitude to Prof. Aditya Mallik Vice Chancellor, K.R. Mangalam University who have been instrumental and encouraging throughout the process of developing this curriculum. Last, but not the least, I also sincerely thanks to all faculty members for preparation of this handbook for B. Pharmacy program.

Dean

School of Medical and Allied Sciences

List of Contents

1. Introduction

The K.R. Mangalam Group has made a name for itself in the field of education. The K.R. Mangalam story goes back to the chain of schools that offered an alternative option of world-class education, pitching itself against the established elite schools, which had enjoyed a position of monopoly till then. Having blazed a new trail in school education, the focus of the group was aimed at higher education.

K.R. Mangalam University is the fastest-growing higher education institute in Gurugram, India. K. R. Mangalam University was established under the Haryana Private University Act 2006, received the approval of Haryana Legislature vide Amendment Act # 36 of 2013 and consent of the Hon'ble Governor of Haryana on 11th April 2013, which was published in the Gazette notification vide Leg. No.10/2013, dated 3rd May 2013.

Since its inception in 2013, the University has been striving to fulfil its prime objective of transforming young lives through ground-breaking pedagogy, global collaborations, and world-class infrastructure. Resources at K.R Mangalam University have been continuously upgraded to optimize opportunities for the students. Our students are groomed in a truly interdisciplinary environment where they grow up with integrative skills through interaction with students from engineering, social sciences, management and other study streams.

1.1 K. R. Mangalam University is unique because of its

I. Enduring legacy of providing education to high achievers who demonstrate leadership in diverse fields.

II. Protective and nurturing environment for teaching, research, creativity, scholarship, social and economic justice.

1.2 Objectives

1. To impart undergraduate, post-graduate and Doctoral education in identified areas of higher education.
2. To undertake research programs with industrial interface.
3. To integrate its growth with the global needs and expectations of the major stake holders through teaching, research, exchange & collaborative programs with foreign, Indian Universities/Institutions and MNCs.
4. To act as a nodal center for transfer of technology to the industry.

To provide job oriented professional education to the student community with particular focus on Haryana

2. About School

School of Medical and Allied Sciences mainly focused on training to students for various subjects and practical aspects related to drug formulation and testing along with co-curricular development. School offers Diploma, undergraduate, post graduate courses in pharmacy and Bachelor degree in physiotherapy post. We provide an extra edge to our students by teaching and training by leading Pharma industry experts to facilitate industry academia interaction, participation in conferences / workshops / skill development programs, carrier guidance, coaching for GPAT and other competitive examinations. We encourage students to participate in various health camps organized by department to make general awareness amongst people regarding various diseases like diabetes, hypertension, communicable and non-communicable diseases. We provide placement assistance to students for getting jobs in various government and private laboratories. We have tie up with various pharmaceutical industries like Dabur Research Foundation, Sun Pharma, Arbo Pharma, Indian Pharmacopeial Commission, Catalyst Clinical Services, Suraksha Pharma, Medicamen Biotech , Mankind Pharma etc. which provide various carrier opportunities in pharmaceutical production, pharmaceutical quality control, quality assurance, pharmaceutical sales & distribution, drug information services, health insurance, medical coding, supply chain management, forensic sciences, pharmacovigilance, product management team, clinical trials, clinical data management and in Indian Pharmacopeia Commission.

3. School Vision

To contribute towards healthcare needs of the society by producing a skilled, motivated and accessible workforce dedicated towards achieving health for all.

4. School Mission

M1: To produce self-motivated, self-reliant and socially sensitive young healthcare professionals catering to the needs of academia, industry and research.

M2: To create a centre of excellence for learning and research in the field of pharmaceutical and allied health sciences with inter-disciplinary approach in emerging area of science and technology with focus on industry-academia interaction.

M3: To nurture transformational research for the benefit of the society.

M4: To interlink pharmaceutical and allied health sciences with interdisciplinary life sciences.

5. Programs offered by the school

School offers diploma, undergraduate, post-graduate and doctoral Programme in Pharmacy all these programs are designed to impart scientific knowledge to the students and will provide theoretical as well as practical training in their respective fields. The programs offered by the school are approved by Pharmacy Council of India, New Delhi.

5.1 B. Pharmacy

School of Medical and Allied Sciences offers B. Pharmacy degree course which is duly approved by the Pharmacy Council of India (F.No.01.109/2020-PCI, minutes of 109thcentral council meeting on 08-09April,2020, Item No. HR-17 /2020-2021). The curriculum has been specifically designed so as to impart latest knowledge and skills relevant to Pharmaceutical Sciences including Industrial Visits / Training / Guest Lectures of Experts from Industry and Academia.

5.2 Eligibility Criteria:

5.2.1 First year B. Pharm:

Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

5.2.2 B. Pharm lateral entry (to third semester):

A pass in D. Pharmacy course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

4.2.3 Course Outline:

Inorganic chemistry / Organic chemistry / Pharmaceutics / Analysis / Environmental Sciences / Biochemistry /Pharmaceutical Chemistry / Pharmacology/ Pharmacognosy.

4.2.4 Career Options:

Opportunities exist in Drug Inspector Drug Analyst Research & Development of Drugs, Cosmetics, Diagnostics and Vaccines, Drug Patents, Medical Writing, Quality Control, Clinical Research, Hospital Pharmacy, Community Pharmacy/Pharmaceutical Marketing, pharmaceutical industries, regulatory education and forensic drug laboratories.

4.2.5 Program Duration

The course of study for B. Pharmacy shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curriculum and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4.2.6 Class Timings

The classes will be held from Monday to Friday from 09:10 am to 04:00 pm.

5.2.7 Syllabus

The syllabus of B. Pharmacy programs offered by SMAS is as per the norms of Pharmacy Council of India, New Delhi as mentioned below Programme Duration: - 4 Years the maximum period for the completion of the B. Pharmacy Programme offered by the University shall be four years.

5. Syllabus and Scheme of Studies of B. Pharmacy Programme

6.1 Four year B. Pharmacy Programme at a glance

	Semester I	**Semester II**	**Semester III**	**Semester IV**	**Semester V**	**Semester V I**	**Semester VII**	**Semester VIII**	**Total**
Courses	12	10	8	9	9	9	11	6	74
Credits	30	29	24	28	25	22	27	23	208

Semester-I					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP101T	Human Anatomy and Physiology I– Theory	3	1		4

BP102T	Pharmaceutical Analysis I – Theory	3	1		4
BP103T	Pharmaceutics I – Theory	3	1		4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1		4
BP105T	Communication skills – Theory *	2	-		2
BP106RBT/ BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-		2
BP107P	Human Anatomy and Physiology – Practical		-	4	2
BP108P	Pharmaceutical Analysis I – Practical		-	4	2
BP109P	Pharmaceutics I – Practical		-	4	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical		-	4	2
BP111P	Communication skills – Practical*		-	2	1
BP112RBP	Remedial Biology – Practical*		-	2	1
	Total	**16**	**4**	**20**	**30**

Semester-II					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP201T	Human Anatomy and Physiology II – Theory	3	1		4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1		4
BP203T	Biochemistry – Theory	3	1		4
BP204T	Pathophysiology – Theory	3	1		4
BP205T	Computer Applications in Pharmacy – Theory *	3	-		3
BP206T	Environmental sciences – Theory *	3	-		3
BP207P	Human Anatomy and Physiology II –Practical		-	4	2
BP208P	Pharmaceutical Organic Chemistry I– Practical		-	4	2
BP209P	Biochemistry – Practical		-	4	2
BP210P	Computer Applications in Pharmacy – Practical*		-	2	1
Total		**32**	**4**	14	**29**

Semester-III					
Course code	**Course Title**	**L**	**T**	**P**	**C**

BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1		4
BP302T	Physical Pharmaceutics I – Theory	3	1		4
BP303T	Pharmaceutical Microbiology – Theory	3	1		4
BP304T	Pharmaceutical Engineering – Theory	3	1		4
BP305P	Pharmaceutical Organic Chemistry II – Practical		-	4	2
BP306P	Physical Pharmaceutics I – Practical		-	4	2
BP307P	Pharmaceutical Microbiology – Practical		-	4	2
BP 308P	Pharmaceutical Engineering –Practical		-	4	2
Total		**12**	**4**	**16**	**24**

Semester-IV					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1		4
BP402T	Medicinal Chemistry I – Theory	3	1		4
BP403T	Physical Pharmaceutics II – Theory	3	1		4
BP404T	Pharmacology I – Theory	3	1		4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1		4
BP406P	Medicinal Chemistry I – Practical		-	4	2
BP407P	Physical Pharmaceutics II – Practical			4	2
BP408P	Pharmacology I – Practical		-	4	2
BP409P	Pharmacognosy and Phytochemistry I – Practical		-	4	2
Total		15	5	16	28

Semester-V					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP501T	Medicinal Chemistry II – Theory	3	1		4
BP502T	Industrial PharmacyI– Theory	3	1		4
BP503T	Pharmacology II – Theory	3	1		4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1		4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1		4
BP506P	Industrial PharmacyI – Practical		0	4	2
BP507P	Pharmacology II – Practical		0	4	2
BP508P	Pharmacognosy and Phytochemistry II – Practical		0	4	2
Total		15	5	12	26

Semester-VI					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP601T	Medicinal Chemistry III – Theory	3	1		4
BP602T	Pharmacology III – Theory	3	1		4
BP603T	Herbal Drug Technology – Theory	3	1		4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1		4
BP605T	Pharmaceutical Biotechnology – Theory	3	1		4
BP606T	Quality Assurance –Theory	3	1		4
BP607P	Medicinal chemistry III – Practical		0	4	2
BP608P	Pharmacology III – Practical		0	4	2
BP609P	Herbal Drug Technology – Practical		0	4	2
Total		18	5	12	30

Semester-VII					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP701T	Instrumental Methods of Analysis – Theory	3	1		4
BP702T	Industrial PharmacyII – Theory	3	1		4
BP703T	Pharmacy Practice – Theory	3	1		4
BP704T	Novel Drug Delivery System – Theory	3	1		4
BP705P	Instrumental Methods of Analysis – Practical	4	0		2
BP706PS	Practice School		0	12	6
Total		16	4	12	24

Semester-VIII					
Course code	**Course Title**	**L**	**T**	**P**	**C**
BP801T	Biostatistics and Research Methodology	3	1		4
BP802T	Social and Preventive Pharmacy	3	1		4
BP803ET	Pharma Marketing Management				
BP804ET	Pharmaceutical Regulatory Science				
BP805ET	Pharmacovigilance				
BP806ET	Quality Control and Standardization of Herbals				
BP807ET	Computer Aided Drug Design				
BP808ET	Cell and Molecular Biology				
BP809ET	Cosmetic Science				
BP810ET	Experimental Pharmacology				
BP811ET	Advanced Instrumentation Techniques				
BP812ET	Dietary Supplements and Nutraceuticals				
BP813PW	Project Work		-	12	6
Total			**4**	**12**	**22**

Programme Educational Objectives (PEO)

PEO1: To produce pharmacy graduates with profound knowledge and high technical skills to meet various aspects in wide areas of Pharmaceutical industry.

PEO2: To enable pharmacy graduates to gain theoretical and practical knowledge in various subjects to discover novel formulation for the benefits of the society.

PEO3: To prepare entrepreneurs in Pharma sector with effective communication skills, teamwork and ethical attitude with high integrity for the betterment of the community and the society.

PEO4: To promote and train the pharmacy graduates towards contribution of health care system and patient counselling for prevention and treatment of diseases.

PEO5: To encourage the pharmacy graduates for lifelong learning and highly competent career prospect related to interdisciplinary pharmaceutical sciences.

Programme Outcomes

The entire curriculum of B. Pharmacy is planned to have following Programme outcomes

PO 1 Pharmacy Knowledge: Possess the core and basic knowledge associated with the profession of pharmacy.

PO 2 Thinking Abilities: Examine issues rationally and logically; shall acquire, evaluate, and synthesize information and knowledge relevant to an identified problem.

PO3 Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

PO 4 Leadership Skills: Acquire knowledge of leadership traits and skills through curricular and co-curricular activities and develop skills and abilities that will enable him/her to lead or actively contribute to organizational improvement.

PO 5 Professional Identity: Understand, analyze and communicate the value of their professional roles in society.

PO 6 Pharmacy 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 7 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 8 Professional Ethics: Honor personal values and apply ethical principles in professional and social contexts and take responsibility for the outcomes associated with the decisions.

PO 9 Individual or teamwork: Understand the need for leadership and team-building for fulfillment of practice, professional and societal responsibilities.

PO 10 Communication: Develop good communication skills so as to communicate effectively with the pharmacy community and with society at large.

PO 11 Modern & Usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO 12 Life-long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes (PSO)

After completion of the program students are able:

PSO1. To impart theoretical & Practical knowledge among students in the various fields of pharmaceutical sciences viz., Pharmaceutics, Pharmaceutical Chemistry, Pharmacology, Pharmacognosy, Biotechnology, Pharmaceutical jurisprudence and Pharmaceutical marketing etc.

PSO2. To develop the skill acquired in various regulatory aspects related to clinical, preclinical and medical devices used for human use. The students will be able to experience hand on manufacturing, packaging of drugs. After completing this course students will be able to work as a skilled pharmacist in manufacturing of drugs and cosmetics

FOUR YEAR B. PHARM PROGRAMME AT A GLANCE

	Semester I	Semester II	Semester III	Semester IV	Semester V
Courses	**12**	**10**	**8**	**9**	**8**
Credits	**30**	**29**	**24**	**28**	**26**

	Semester V I	Semester VII	Semester VIII	Total
Courses	**9**	**6**	**13**	**75**
Credits	**30**	**24**	**22**	**213**

Semester-I

BP 101T	**Human Anatomy and Physiology-I (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmacology**				
Co-requisites	**Pharmacology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Explain the gross morphology, structure and functions of various organs of the human body
2. Describe the various homeostatic mechanisms and their imbalances
3. Identify the various tissues and organs of different systems of human body
4. Perform the various experiments related to special senses and nervous system
5. Appreciate coordinated working pattern of different organs of each system

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body.

CO2. It also helps in understanding both homeostatic mechanisms

CO3. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

CO4. It enlightens the students about the cells, various types of tissues in human body, skeleton system, skeletal and smooth muscles.

CO5. It also deals with the composition of blood, blood groups, blood coagulation, various disease-causing agents and preventive measures, balanced diet, disorders and treatment involve in nutritional deficiency.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	-	-	2	3	1	-	1	-	2	3	3	3
CO2	3	2	-	-	2	3	-	1	1	-	2	2	2	3
CO3	3	1	-	-	3	3	-	2	1	-	2	-	3	3
CO4	3	1	-	-	3	3	-	2	1	-	2	-	3	3
CO5	3	-	-	-	3	3	-	2	-	-	2	-	2	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP102T	Pharmaceutical Analysis (Theory)	L	T	P	C
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutical Analytical Chemistry**				
Co-requisites	**Analytical Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. To Know the history of Pharmacopoeia
2. Understand the principles of volumetric and electro chemical analysis
3. Carryout various volumetric and electrochemical titrations
4. Develop analytical skills
5. To understand with acid base titration.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. The subject provides the basic knowledge required to understand the various disciplines of Analysis.

CO3. This subject deals with the monographs of inorganic drugs and pharmaceuticals.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory agencies.

CO5. Carryout various volumetric and electrochemical titrations.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	-	-	2	3	1	-	1	-	2	3	3	-
CO2	3	2	-	-	2	3	-	1	1	-	2	2	2	-
CO3	3	1	-	-	3	3	-	2	1	-	2	-	3	-
CO4	3	1	-	-	3	3	-	2	1	-	2	-	3	-
CO5	3	-	-	-	3	3	-	1	-	-	3	-	2	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 103T	Pharmaceutics-I (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmaceutics				

Co-requisites	Posology

Course Objectives

Upon completion of this course the student should be able to:

1. Know the history of profession of pharmacy
2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
3. Understand the professional way of handling the prescription
4. Preparation of various conventional dosage
5. Introduction about novel drug delivery system

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

CO3. It enlightens the students about the dosage, various types of dosage form, NDDS, depot preparation.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory agencies

CO5. Provide Knowledge about metric system and calculation of dosages.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2

CO1	**2**	**1**	**-**	**-**	**2**	**3**	**1**	**2**	**1**	**-**	**2**	**3**	**3**	**-**
CO2	**3**	**2**	**-**	**-**	**2**	**3**	**-**	**1**	**1**	**-**	**2**	**3**	**2**	**-**
CO3	**3**	**1**	**-**	**-**	**3**	**3**	**-**	**2**	**1**	**-**	**2**	**3**	**3**	**-**
CO4	**3**	**1**	**-**	**-**	**3**	**3**	**-**	**2**	**1**	**-**	**2**	**3**	**3**	**-**
CO5	**3**	**-**	**-**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**3**	**2**	**-**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP104T	**Pharmaceutical Inorganic Chemistry (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutical Chemistry**				
Co-requisites	**Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. To Know the history of Pharmacopoeia
2. To know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

3. Understand the medicinal and pharmaceutical importance of inorganic compounds
4. Preparation of various radiopharmaceutical dosage
5. Introduction about Antidotes

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

CO3. This subject deals with the monographs of inorganic drugs and pharmaceuticals.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory agencies.

CO5. Provide Knowledge about metric system and calculation of dosages to understand.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	-	-	3	2	-	2	1	-	2	3	3	-
CO2	3	2	-	-	2	3	-	1	1	-	2	3	3	-
CO3	3	1	-	-	3	3	-	2	1	-	2	3	3	-
CO4	3	1	-	-	3	3	-	2	1	-	2	3	3	-
CO5	3	-	-	-	3	3	-	1	-	-	3	3	3	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP-105T	**Communication Skills (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**2**	**0**	**0**	**2**
Total Contact Hours	30 Hours				
Pre-requisites/Exposure	**Communication Skills**				
Co-requisites	**Communication Skills**				

Course Objectives

Upon completion of this course the student should be able to:

1. Communicate effectively (Verbal and Non-Verbal)

2. Effectively manage the team as a team player

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Understand the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operation

CO2. Develop interview skills

CO3. Develop Leadership qualities and essentials

CO4. Develop confidence in pursuing interdisciplinary

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	3	2	1	3	1	1	3	3	1	2	-	-
CO2	3	1	2	2	1	3	1	1	2	3	1	2	-	-
CO3	1	1	2	2	1	3	1	1	2	3	1	2	-	-
CO4	1	1	1	2	1	3	1	1	1	3	1	2	-	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP106 RBT	**Remedial Biology (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**2**	**0**	**0**	**2**
Total Contact Hours	30 Hours				
Pre-requisites/Exposure	**Biology**				
Co-requisites	**Biology**				

Course Objectives

Upon completion of this course the student should be able to:

1. know the classification and salient features of five kingdoms of life
2. understand the basic components of anatomy & physiology of plant

3. know understand the basic components of anatomy & physiology animal with special reference to human

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To learn and understand the components of living world, structure and functional system of plant kingdom (leaf, root, stem).

CO2. To learn and understand the components Composition of blood, blood groups, coagulation of blood.

CO3. It provides knowledge about structure and function of heart.

CO4. It provides knowledge about Digestive system, Reproductive system.

CO5. It helps in understanding the concept of Respiration system.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	2	-	-	3	2	-	-	-	-	2	3	3	3
CO2	3	2	-	-	2	3	-	-	-	-	2	3	3	3
CO3	3	2	-	-	3	3	-	-	-	-	2	3	3	3
CO4	3	2	-	-	3	3	-	-	-	-	2	3	3	3
CO5	3	2	-	-	3	3	-	-	-	-	3	3	3	3

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP106 RMT			T	P	C

	Remedial Mathematics (Theory)	**L**			
Version 2.0		**2**	**0**	**0**	**2**
Total Contact Hours	30 Hours				
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

Upon completion of this course the student should be able to:

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying
3. Appreciate the important application of mathematics in Pharmacy

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To learn and understand the advance mathematics and its implementation in pharmacy

CO2. It provides knowledge of fraction and its implementation in pharmacy

CO3. It provides knowledge of analytical geometry and calculus

CO4. It helps in understanding the matrices and determinant

Programme and Course Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**

CO1	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**
CO2	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**
CO3	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**
CO4	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP107P	**Human Anatomy and Physiology (HAP) – Practical**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**HAP-1 Practical**				
Co-requisites	**Experimental Pharmacology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Practical physiology is complimentary to the theoretical discussions in Physiology.

2. Practical allows the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings.

3. This is helpful for developing an insight into human anatomy and physiology**.**

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To learn and understand the components of living world, structure and functional system of plant kingdom.

CO2. It provides knowledge about blood, their composition, function and coagulation factor.

CO3. To learn the about bones with special reference to human.

CO4. Provide practical knowledge of biological system and human anatomy

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**
CO2	**3**	3	**3**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**
CO4	**3**	2	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 108P			**T**	**P**	**C**

	Pharmaceutical Analysis-Practical	**L**			
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmaceutical Analysis**				
Co-requisites	**Pharmaceutical Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. To Know the history of Pharmacopoeia
2. Understand the principles of volumetric and electro chemical analysis
3. Carryout various volumetric and electrochemical titrations
4. Develop analytical skills

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. The subject provides the basic knowledge required to understand the various disciplines of Analysis.

CO3. This subject deals with the monographs of inorganic drugs and pharmaceuticals.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory agencies.

CO5. Provide Knowledge about metric system and calculation of dosages.

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO2	**3**	**3**	**3**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**-**
CO3	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO4	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO5	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**-**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 109P	**Pharmaceutics-I (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to:

1. Know the history of profession of pharmacy
2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
3. Understand the professional way of handling the prescription
4. Preparation of various conventional dosage

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. The subject provides the basic knowledge required to understand the various disciplines of Pharmacy.

CO3. It enlightens the students about the dosage, various types of dosage form, NDDS, depot preparation.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory Agencies.

CO5. Provide Knowledge about metric system and calculation of dosages.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	3	2	2	3	2	-	2	2	2	3	3	3	-
CO2	3	2	3	2	2	2	-	1	2	2	3	3	3	-
CO3	3	3	2	2	3	2	-	2	2	2	3	3	3	-

CO4	**3**	2	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO5	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**-**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 110P	**Pharmaceutical Inorganic Chemistry (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Inorganic chemistry**				
Co-requisites	**Pharmaceutical chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. To Know the history of Pharmacopoeia
2. To know the sources of impurities and methods to determine the impurities in pharmaceuticals
3. Understand the medicinal and pharmaceutical importance of inorganic compounds

4. Preparation of different category of pharmaceutical inorganic compounds
5. Analysis of pharmaceutical compounds

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on pharmaceutical preparations.

CO2. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory Agencies.

CO3. Provide practical learning of impurity test in pharmaceuticals

CO4. Provide Knowledge of calculation involved pharmaceutical chemistry subject

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO2	**3**	2	**3**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**-**
CO3	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO4	**3**	2	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP111P	Communication skills – Practical	L	T	P	C
Version 2.0		**0**	**0**	**2**	**1**
Total Contact Hours	30 Hours				
Pre-requisites/Exposure	**Communication Skills**				
Co-requisites	**Communication Skills**				

Course Objectives

Upon completion of this course the student should be able to

1. Communicate effectively (Verbal and Non-Verbal)
2. Effectively manage the team as a team player

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Understand the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operation

CO2. Develop interview skills

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2

CO1	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**-**
CO2	**3**	2	**3**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**-**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 112RBP	**Remedial Biology (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**2**	**1**
Total Contact Hours	30 Hours				
Pre-requisites/Exposure	**Remedial Biology**				
Co-requisites	**Biology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
2. To knowledge of blood, their function and study of bones with special reference to human
3. Understand the basic components of anatomy & physiology of plant
4. Know understand the basic components of anatomy & physiology animal with special reference to human.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To learn and understand the components of living world, structure and functional system of plant kingdom.

CO2. It provides knowledge about blood, their composition, function and coagulation factor.

CO3. To learn the about bones with special reference to human.

CO4. Provide practical knowledge of biological system and human anatomy

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**
CO2	**3**	2	**3**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**
CO4	**3**	2	**2**	**2**	**3**	**2**	**-**	**2**	**2**	**2**	**3**	**3**	**3**	**3**

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-II

BP201T	**Human Anatomy And Physiology-II (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Human Anatomy & Physiology-I**				
Co-requisites	**Pathophysiology and Biology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system.
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Understand fundamental knowledge related to the structure of brain and its functions in the human body.

CO2. Explain basic knowledge related to digestive system.

CO3. Explain basic knowledge required to understand the respiratory system.

CO4. Explain basic knowledge required to understand the reproductive system.

CO5. Explain the basic knowledge required to understand the hormonal system.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1			2	2		2		3	2	3	2	
CO2	3	1			2	2		2		2	2	3	2	
CO3	3	1			1	2		2		2	2	3	2	
CO4	3	1			2	2		2		2	2	3	2	
CO5	3	1			2	2		2		2	2	3	2	

1=lightly mapped	2= moderately mapped	3=strongly mapped

BP202T	**Pharmaceutical Organic Chemistry –I (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Organic chemistry**				
Co-requisites	**Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds,
4. Identify/confirm the identification of organic compound

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Explain fundamental knowledge on isomerism.

CO2. Explain fundamental knowledge of alkanes and alkenes and their stability.

CO3. Explain the Structure, reactions and function of alkyl halides.

CO4. Explain the nucleophilic addition reactions.

CO5. Explain the structure, reaction and effect of various groups acid derivatives

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**3**	**1**			**2**	**2**		**2**		**3**	**2**	**3**	**2**	**2**
CO2	**3**	**1**			**2**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
CO3	**3**	**1**			**1**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
CO4	**3**	**1**			**2**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
CO5	**3**	**1**			**2**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP203T	**Biochemistry (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Chemistry**				
Co-requisites	**Chemistry and biology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.

3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Explain fundamental information related to the structure, function and significance of biomolecules.

CO2. Explain various metabolic pathways based on glucose.

CO3. Explain lipids oxidation, catabolism, anabolism and related diseases.

CO4. Explain biosynthesis and catabolism of purine and pyrimidine nucleotides.

CO5. Explain enzyme kinetics and its various applications.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1			2	2		2		3	2	3	2	2
CO2	3	1			2	2		2		2	2	3	2	2
CO3	3	1			1	2		2		2	2	3	2	2
CO4	3	1			2	2		2		2	2	3	2	2
CO5	3	1			2	2		2		2	2	3	2	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP204T	Pathophysiology (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Cellular and molecular Biology				
Co-requisites	Chemistry and biology				

Course Objectives

Upon completion of this course the student should be able to:

1. Describe the aetiology and pathogenesis of the selected diseases.
2. Understanding of various types of injuries encountered during life.
3. Know the causatives organism of various diseases.
4. Study about STDs

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Learn about the basic principles of Cell injury and Adaptation.

CO2. Understand the Pathophysiology of heart disease and their complication.

CO3. Understand the Pathophysiology of disease related to respiratory and endocrine system.

CO4. Understand the Pathophysiology of Disease related to gastrointestinal, Alzheimer's and cancer disease.

CO5. Understand the Pathophysiology of Sexually transmitted diseases.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1			2	2		2		3	2	3	2	
CO2	3	1			2	2		2		2	2	3	2	
CO3	3	1			1	2		2		2	2	3	2	
CO4	3	1			2	2		2		2	2	3	2	
CO5	3	1			2	2		2		2	2	3	2	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP205T	Computer Applications in Pharmacy (Theory)	L	T	P	C
Version 2.0		3	0	0	3
Total Contact Hours	30 Hours				

Pre-requisites/Exposure	**Computer sciences**
Co-requisites	**Computer sciences**

Course Objectives

Upon completion of this course the student should be able to

1. Know the various types of application of computers in pharmacy.
2. Know various types of databases.
3. Know various applications of databases in pharmacy.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Learn about the basics of computer applications in pharmacy.

CO2. Understand various types of databases.

CO3. Understand the applications of different types of databases in pharmacy.

CO4. Explain the role of computers for data analysis in Preclinical development.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1	2	2		2	2				3	2	3	2	
CO2	1	1	2		2	2				2	2	3	2	
CO3	1	1	2		1	2				2	2	3	2	
CO4	1	2	2		2	2				2	2	3	2	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP206T	Environmental Sciences (Theory)	L	T	P	C
Version 2.0		3	0	0	3
Total Contact Hours	30 Hours				
Pre-requisites/Exposure	Environment studies				
Co-requisites	Social and cultural factors				

Course Objectives

Upon completion of this course the student should be able to:

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.
4. Motivate learner to participate in environment protection and environment improvement.
5. Acquire skills to help the concerned individuals in identifying and solving environmental

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To study of the environmental system and the status of its inherent or induced changes on organisms.

CO 2. Strive to attain harmony with Nature

CO3. Motivate learner to participate in environment protection and environment improvement.

CO4. To Impart basic knowledge about the environment and its allied problems

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2						1							
CO2										3				1
CO3				3										
CO4							1					3	1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP207P	Human Anatomy and Physiology-I (Practical)	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Pharmacology				
Co-requisites	Pathophysiology				

Course Objectives

Upon completion of this course the student should be able to:

1. Practical physiology is complimentary to the theoretical discussions in Physiology.
2. Practical allow the verification of physiological processes discusses in theory classes through experiments on living tissue, intact animals or normal human beings.
3. This is helpful for developing an insight on the human anatomy and physiology subject**.**

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart practical knowledge on the in-theory classes through experiments on living tissue, intact animals or normal human beings.

CO2. The subject provides the basic knowledge required to understand the digestive system

CO3. The subject provides the basic knowledge required to understand the nervous system.

CO4. The subject provides the basic knowledge required to understand the respiratory system and endocrine system

CO5. The subject provides the basic knowledge required to understand reproductive system.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	1			2	2		2		3	2	3	2	2
CO2	3	1			2	2		2		2	2	3	2	2
CO3	3	1			1	2		2		2	2	3	2	2
CO4	3	1			2	2		2		2	2	3	2	2
CO5	3	1			2	2		2		2	2	3	2	2
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP208P	Pharmaceutical Organic Chemistry –I (Practical)	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Organic chemistry (Practical				
Co-requisites	Chemistry				

Course Objectives

Upon completion of this course the student should be able to:

1. Write the reaction, name the reaction and orientation of reactions
2. Account for reactivity/stability of compounds,
3. Identify/confirm the identification of organic compound

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Explain fundamental knowledge on isomerism.

CO2. Explain fundamental knowledge of alkanes and alkenes and their stability.

CO3. Explain the nucleophilic addition reactions.

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**3**	**1**			**2**	**2**		**2**		**3**	**2**	**3**	**2**	**2**
CO2	**3**	**1**			**2**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
CO3	**3**	**1**			**1**	**2**		**2**		**2**	**2**	**3**	**2**	**2**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP209P	**Biochemistry (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Chemistry**				
Co-requisites	**Chemistry and biology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.

3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Learn about the basic principles of Biochemistry

CO2. Understand the Pathophysiology of Urine.

CO3. Understand the basics about Protein Carbohydrate, Fats

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**3**	**1**	**-**	**-**	**2**	**2**	**-**	**2**		**3**	**2**	**3**	**2**	
CO2	**3**	**1**	**-**	**-**	**2**	**2**		**2**		**2**	**2**	**3**	**2**	
CO3	**3**	**1**	**-**	**-**	**1**	**2**		**2**		**2**	**2**	**3**	**2**	
1=lightly mapped 2= moderately mapped 3=strongly mapped														

Semester-III

BP 301T	**Pharmaceutical Organic Chemistry –II**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Chemistry**				
Co-requisites	**Chemistry**				
Course Objectives					
Upon completion of this course the student should be able to:					
1. Write the structure, name and the type of isomerism of the organic compound					
2. Write the reaction, name the reaction and orientation of reactions					
3. Account for reactivity/stability of compounds,					
4. Prepare organic compounds					
Course Outcomes (CO)					
On completion of this course, the student-teacher will be able to:					

CO1. This subject deals with general methods of preparation and reactions of some organic compounds.
CO2. Reactivity and mechanism deal with organic compounds are studied here.
CO3. The syllabus emphasizes on orientation of reactions and application.
CO4. Chemistry of fats and oils are also described here.
CO5. Application and purity of fats and oils also discussed in this subjects.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO2	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO3	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO4	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO5	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 302T	**Physical Pharmaceutics-I (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. The course deals with the various physicochemical properties

CO 2. This subject explains the principles involved in dosage forms/formulations.

CO 3. The theory and practical components of the subject helps the student to get a better insight into various areas of formulation research and development.

CO 4. It helps to understand the various techniques and methods involved in micromeretics.

CO 5. It is also useful for the demonstration of physicochemical properties in the formulation development.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**2**	**-**	**1**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**2**
CO2	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**
CO3	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**
CO4	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**
CO5	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 303T	Pharmaceutical Microbiology (Theory)	L	T	P	C
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure					
Co-requisites	-				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to study the morphology, classification of microorganisms like bacteria, fungi and virus.

CO2. This subject also helps the understanding of bacteria using staining techniques (simple, Gram's & Acid-fast staining) and biochemical tests (IMViC).

CO3. It also helps in understanding of sterility testing of pharmaceutical products.

CO4. The subject provides the designing of aseptic area and Methods for standardization of antibiotics, vitamins and amino acids.

CO5. It also deals with the microbial spoilage, types, sources and methods in pharmaceutical industry.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	-	-	-	-	-	**1**	**1**	**1**	-	-	-	**1**	**1**	-
CO2	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-

CO3	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
CO4	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
CO5	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 304T	**PHARMACEUTICAL ENGINEERING (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure					
Co-requisites	-				

Course Objectives

Upon completion of this course the student should be able to:

1. To know various unit operations used in pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources
6. To appreciate the various preventive methods used for corrosion control in pharmaceutical industries.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

CO2. This subject also deals with the various manufacturing process and material handling techniques.
CO3. It helps in understanding significance of plant layout design for optimum use of resources.
CO4. It also dealt with various preventive methods for corrosion control in pharmaceutical industries.
CO5. It also helps in understanding the different measures to prevent environmental pollution.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**3**	**2**	**3**	**2**
CO2	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**3**	**2**	**3**	**2**
CO3	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**3**	**2**	**3**	**2**
CO4	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**3**	**2**	**3**	**2**
CO5	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**3**	**2**	**3**	**2**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 305P	Pharmaceutical Organic Chemistry II – Practical	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure					
Co-requisites	-				
Course Objectives					
Upon completion of this course the student should be able to:					

1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds, 4. prepare organic compounds
4. Prepare organic compounds
Course Outcomes (CO)
On completion of this course, the student-teacher will be able to:
CO1 Recall the basic knowledge of method of preparation, reactions and properties of Benzene and its derivatives
CO2 Demonstrate a high-level understanding of method of preparation, reactions and properties of phenols, aromatic amines and aromatic acids
CO3 Develop basic knowledge of fats and oils and their analytical constants
CO4 Analyse the synthesis, different reactions, properties, structure and medicinal uses of polynuclear hydrocarbons and substituted alkanes
CO5 Assess the stabilities, theory of strain less rings and reactions of cyclo alkanes

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO2	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO3	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO4	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-
CO5	-	**1**	**1**	-	-	-	-	-	-	-	**1**	**1**	**1**	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 306P	Physical Pharmaceutics-I (Practical)	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Pharmaceutics				
Co-requisites	Pharmaceutics				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand various physicochemical properties of drug molecules involved in the designing of dosage forms
2. Know the principles of chemical kinetics and to use them for stability testing and determination of expiry date of formulations.
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. The course deals with the study of various physicochemical properties, and principles involved in manufacturing dosage forms/formulations.

CO 2. Practical components of the subject help the student to get a better insight into various areas of formulation research and development,

CO 3. It also helps in understanding principles of chemical kinetics and to use them in determining stability of pharmaceutical dosage forms.

CO 4. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

CO 5. This subject also helps in learning physiochemical properties of individual dosage forms.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	-	1	-	2	2	-	-	-	-	-	1	2	2
CO2	2	-	1	-	2	2	-	-	-	-	-	1	2	2
CO3	2	-	1	-	2	2	-	-	-	-	-	1	2	2

CO4	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**
CO5	**2**	-	**1**	-	**2**	2	-	-	-	-	-	**1**	**2**	**2**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 307P	**Pharmaceutical Microbiology (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Pharmaceutics**				
Course Objectives					
Upon completion of this course the student should be able to:					
1. Understand methods of identification, cultivation and preservation of various microorganisms					
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry					
3. Learn sterility testing of pharmaceutical products.					
4. Carried out microbiological standardization of Pharmaceuticals.					
5. Understand the cell culture technology and its applications in pharmaceutical industries.					
Course Outcomes (CO)					

On completion of this course, the student-teacher will be able to:
CO1. These subjects deal with the study of all categories of microorganisms like bacteria and fungi and virus.
CO2. It helps in learning of different techniques of sterilization, BOD detection.
CO3. It deals the culture and microbial assay study.
CO4. This subject deal with the study the mortality and isolation of culture.
CO5. It also deals the sterility testing, Biochemical assay

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	-	-	-	-	-	**1**	**1**	**1**	-	-	-	**1**	**1**	-
CO2	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
CO3	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
CO4	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-
CO5	-	-	-	-	-	1	**1**	**1**	-	-	-	**1**	**1**	-

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 308P	**Pharmaceutical Engineering (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				

Co-requisites	Pharmaceutics

Course Objectives

Upon completion of this course the student should be able to:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To imparts fundamental knowledge of various unit operations used in pharmaceutical industry.

CO2. It deals with the determination of radiation constant of different metals and paints.

CO3. It also helps to understand the steam distillation process and heat transfer constant.

CO4. It is also applicable for the construction of drying curves (Psychometric charts).

CO5. This subject also useful for understanding size reduction methods, size analysis and study industrial instruments used in unit operation processes.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	2	-	3	3	-	2	-	-	3	2	3	2
CO2	3	-	2	-	3	3	-	2	-	-	3	2	3	2
CO3	3	-	2	-	3	3	-	2	-	-	3	2	3	2
CO4	3	-	2	-	3	3	-	2	-	-	3	2	3	2
CO5	3	-	2	-	3	3	-	2	-	-	3	2	3	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-IV

BP401T	Pharmaceutical Organic Chemistry-III (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Organic Chemistry				
Co-requisites	Pharmaceutical Organic Chemistry-III				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the methods of preparation and properties of organic compounds
2. Explain the stereo chemical aspects of organic compounds and stereo chemical reactions
3. Know the medicinal uses and other applications of organic compounds

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Able to explain chemistry of important heterocyclic compounds.

CO2. To describe detailed mechanisms for common naming reactions.

CO3. It imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions.

CO4. To acquire the knowledge and understanding of medicinal and other uses of organic compounds.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2

CO1	**3**					**3**		**1**						
CO2			**3**									**1**		
CO3		**1**			**3**				**1**					
CO4										**1**				**1**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP402T	**Medicinal Chemistry-I (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Chemistry of drugs**				
Co-requisites	**Chemistry**				

Course Objectives

Upon completion of this course the student should be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship (SAR) of different class of drugs
4. Write the chemical synthesis of some drugs

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To understand the chemistry of drugs with respect to their pharmacological activity.

CO2. To understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

CO3. To know the structural activity relationship of different class of drugs.

CO4. Well acquainted with the synthesis of some important class of drugs.

Programme and Course Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**

CO1	**1**													
CO2				**1**	**1**			**2**		**3**			**3**	
CO3		**1**							**3**	**3**				**3**
CO4		**1**	**1**		**2**		**2**		**2**					
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP403T	**Physical Pharmaceutics II – Theory**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Physical Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations

3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Students will be able to understand concept of rheology and flow properties of pharmaceutical preparations.

CO2. Describe the factors leading to instability of disperse systems, effect of particle size distribution of powders on the manufacture of dosage forms

CO3. State the principles of chemical kinetics in stability testing

CO4. Apply the principles of micrometrics, rheology, chemical kinetics & stability, coarse dispersions in the formulation development and evaluation of dosage forms

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1				2									
CO2		1								3		3		
CO3			1			2		3					1	
CO4			1			2				3			1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP404T	Pharmacology-I (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Human anatomy and Physiology				
Co-requisites	Pathophysiology				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments.
5. Appreciate correlation of pharmacology with other bio medical sciences.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Students would have understood the pharmacological actions of different categories of drugs

CO2. They would have studied in detailed about mechanism of drug action at organ system/sub cellular/ macromolecular levels.

CO3. They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases.

CO4. They would get an idea about correlation of pharmacology with other bio medical sciences.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**1**													
CO2						**2**		**3**						
CO3		**1**												
CO4				**2**							**3**			

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP405T	**Pharmacognosy and Phytochemistry I– Theory**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmacognosy**				
Co-requisites	**Pharmacognosy**				

Course Objectives

Upon completion of this course the student should be able to:

1. To know the techniques in the cultivation and production of crude drugs
2. To know the crude drugs, their uses and chemical nature
3. Know the evaluation techniques for the herbal drugs
4. To carry out the microscopic and morphological evaluation of crude drugs

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Student will be aware of the techniques in the cultivation and production of crude drugs

CO2. Have Knowledge of the crude drugs, their uses and chemical nature

CO3. Know the evaluation techniques for the herbal drugs

CO4. Able to carry out the microscopic and morphological evaluation of crude drugs

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1														
CO2	1		2		3			3		3				1
CO3				2										
CO4		1	2			3	3							
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP406P	Medicinal Chemistry I – Practical	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Medicinal Chemistry				
Co-requisites	Medicinal Chemistry				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the synthetic procedure and therapeutic value of drugs
3. Know the mechanism of reaction and Structural Activity Relationship (SAR) of different class of drugs
4. Understand methods and basics required for the assay of some drugs**.**

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. It imparts the knowledge of synthesizing, characterization and purification of medicinal compounds and intermediates.

CO2. To analyse the selected drugs, present in dosage forms and to determine the percentage purity.

CO3. Able to study physiochemical properties of drug.

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1					**1**									
CO2														
CO3	**2**		**2**		**3**							**1**		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP407P	**Physical Pharmaceutics-II (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Physical Pharmaceutics- I**				
Co-requisites	**Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations

3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. State the physicochemical properties of drug molecules

CO2. Analyse the chemical stability tests of various drug products and determination of expiry date of formulations

CO3. Have basic knowledge of physicochemical properties in the formulation development and evaluation of dosage forms.

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**

CO1														
CO2	**1**	**2**												
CO3		**3**	**3**	**1**	**1**									
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP408P	**Pharmacology I – Practical**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmacology**				
Co-requisites	**Pathophysiology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the pharmacological actions of different categories of drugs.

2. Explain the mechanism of drug action at organ system/sub cellular/macromolecular levels.

3. Observe the effect of drugs on animals by simulated experiments.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Knowledge of the practical aspect of general pharmacological techniques.

CO2. Understand the effect of drugs acting on CNS and PNS using animal simulator.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1 1	PSO 2
CO1														
CO2	2							3			3			
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP409P	Pharmacognosy and Phytochemistry I – Practical	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60Hours				
Pre-requisites/Exposure	Remedial Biology Practical				
Co-requisites	Pharmacognosy				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations

3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Outcomes (CO)
On completion of this course, the student-teacher will be able to: **CO1.** State the physicochemical properties of drug molecules **CO2.** Analyze the chemical stability tests of various drug products and determination of expiry date of formulations **CO3.** Have basic knowledge of physicochemical properties in the formulation development and evaluation of dosage forms.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	2	1										1	
CO2	3	2												
CO3	3	3	2										1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-V

BP501T	Medicinal Chemistry-II (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Medicinal Chemistry				
Co-requisites	Chemical Synthesis				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the chemistry of drugs with respect to their pharmacological activity

2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drugs

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Get familiar with the chemistry and synthesis of medicinal substances.

CO2. Understand the concept of structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs.

CO3. Learn about hormone related drugs.

CO4. To impart fundamental knowledge on the structure, chemistry, and therapeutic value of drugs.

CO5. Acquire knowledge regarding Cardiovascular drugs and their structures

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1													
CO2		2												
CO3		1			2					2		2		
CO4	2		1											
CO5	2					2								

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP502T	Industrial Pharmacy-I (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmaceutics				

Co-requisites	Industrial Pharmacy

Course Objectives

Upon completion of this course the student should be able to:

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.

2. Know various considerations in development of pharmaceutical dosage forms.

3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their Quality.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

CO2. To get familiar with Pre formulation studies

CO3. To know formulation and evaluation of solid dosage form like tablets, capsules

CO4. To get familiar with aseptic conditions and formulation of parenteral preparation.

CO5. To understand various considerations in development of cosmetics.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1			1		1		3		3		3			
CO2	1													3
CO3		1				2						3		
CO4			1		2			3		3				
CO5														

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP503T	Pharmacology-II (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmacology-I				
Co-requisites	HAP-II and Pathophysiology				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body.

CO2. To emphasis on the basic concepts of bioassay.

CO3. Apprise the students with the various effects of drugs on human body.

CO4. Acquire knowledge about Metabolism & excretion of drugs, principles of Clinical Pharmacokinetics.

CO5. Understand the pharmacology of CVS.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1			2			3							
CO2		1				2					3			
CO3			1		2				3			3		3
CO4		1	1	2										
CO5														

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP504T	Pharmacognosy and Phytochemistry-II (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmacognosy & Phytochemistry-I				
Co-requisites	Remedial Biology				

Course Objectives

Upon completion of this course the student should be able to:

1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. To understand the preparation and development of herbal formulation.
3. To understand the herbal drug interactions
4. To carryout isolation and identification of phytoconstituents.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Impart the students the knowledge of how the secondary metabolites are produced in the crude drugs.

CO2. Get familiar with isolation and identification and industrially production of secondary metabolites.

CO3. Understand study of producing the plants and phytochemicals through plant tissue culture.

CO4. To give knowledge about application of latest analytical techniques.

CO5. To understand basic principles of traditional system of medicine.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1			2				2						1
CO2									2					
CO3		1	1	2	2							2		2
CO4			1				2							

CO5			**1**										
1=lightly mapped 2= moderately mapped 3=strongly mapped													

BP505T	**Pharmaceutical Jurisprudence (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Jurisprudence**				
Co-requisites	**Rules and Regulation**				

Course Objectives

Upon completion of this course the student should be able to:

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. Various Indian pharmaceutical Acts and Laws.
3. Regulatory authorities & agencies governing the manufacture & sale of Pharmaceuticals.
4. The code of ethics during the pharmaceutical practice

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge on Various Act.

CO2. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

CO3. This subject deals with MTP act.

CO4. Provide Knowledge about Indian Pharmacopoeia, British Pharmacopeia and other Regulatory agencies.

CO5. Provide Knowledge about Narcotic and Psychotropic substance act.

Programme and Course Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**

CO1			**2**		**2**		**2**				**3**			
CO2	**1**		**1**	**2**		**3**			**2**		**3**			
CO3									**2**					
CO4	**3**		**1**			**3**					**1**	**3**		
CO5		**2**			**2**		**1**		**1**					
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP506P	**Pharmacy-I (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to:

1. To get familiarize with technology and production of pharmaceutical dosage form.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Get familiarize with technology and production of pharmaceutical dosage form.

CO2. Learn Elementary Idea on Quality control test of (as per IP) marketed tablets and capsules Inorganic Qualitative Analysis.

CO3. Learn to prepare and evaluate tablets, capsule, cold / vanishing cream, ointment.

CO4. Learn to test containers.

CO5. Learn to prepare eye drops and eye ointment.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO 2
CO1	1					1						3		
CO2		1		2				2						
CO3							1				3			
CO4		1			1								1	
CO5	2					3		2						
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP507P	Pharmacology-II (Practical)	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Pharmacology-I (Practical)				
Co-requisites	HAP				

Course Objectives

Upon completion of this course the student should be able to:

This subject will apprise the students with the following:

1. To get familiar with various effects of drugs on human body.
2. To demonstrate laboratory techniques and animal experiments by simulated experiments by softwares and videos

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Apprise the students with the various effects of drugs on human body.

CO2. Use of computer simulated CDs or Video cassettes for pharmacology practical.

CO3. Learn about different routes of administration of drugs in mice/rats.

CO4. Learn to do bioassay of various drug.

CO5. Know about *in-vitro* pharmacology and physiological salt solutions.

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**1**													
CO2			**1**		**3**	**2**			**2**		**3**		**3**	
CO3				**1**										
CO4		**1**				**2**								
CO5	**1**				**1**					**2**				
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP508P	**Pharmacognosy and Phytochemistry-II (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmacognosy & Phytochemistry-I Practical**				
Co-requisites	**Remedial Biology Practical**				

Course Objectives

Upon completion of this course the student should be able to:

1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents

2. To understand the preparation and development of herbal formulation.

3. To understand the herbal drug interactions

4. To carryout isolation and identification of phytoconstituents

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Get familiar with the practical aspects of characterization and identification of the herbal drugs and phytoconstituents

CO2. Learn about isolation and identification of phytoconstituents

CO3. Learn the preparation and development of herbal formulation.

CO4. Understand Analysis of crude drugs by chemical tests.

CO5. Get familiar with TLC of herbal extracts.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	1		2			2					2			
CO2		3						1						
CO3	1				3			1			2			
CO4														2
CO5	2			2						1				

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-VI

BP601T	Medicinal Chemistry-III (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Medicinal Chemistry and Pharmacology				
Co-requisites	QSAR Drug design				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity.
3. Know the metabolism, adverse effects and therapeutic value of drugs.
4. Know the importance of SAR of drugs.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand fundamental knowledge on the structure, function and significance of Drugs.

CO 2. discuss various mechanism of action of drugs

CO 3. Provide knowledge of Synthesis and Metabolism of drugs.

CO 4. Provide knowledge of Structure Activity Relationships (SAR) therapeutic uses of drugs.

CO 5. Provide knowledge of marketed preparation.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**												**3**	
CO2					**3**									
CO3		**2**			**3**	**3**								**1**
CO4											**3**	**3**		
CO5	**2**											**3**		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP602T	**Pharmacology-III (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmacology-II**				
Co-requisites	**HAP-II and Pathophysiology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Get familiar with the basic biochemical aspects of human body and its relation to diseases.
2. Understand various drugs used for various ailments.
3. Understand mechanism of action adverse drug reactions.
4. Understand the basic strategies to manage the poisoning.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases

CO 2. Comprehend the principles of toxicology and treatment of various poisonings

CO 3. Appreciate correlation of pharmacology with related medical sciences

CO 4. Know the toxicity of the Drugs and their treatments.

CO 5. Know the Concepts of Chronopharmacology

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3												3	
CO2					3									
CO3			2		3	3								
CO4			1								3	3	2	

CO5			**1**		**2**						**2**		**1**	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP603T	**Herbal Drug Technology (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmacognosy & Phytochemistry – II**				
Co-requisites	**Pharmacognosy & Phytochemistry – I**				

Course Objectives

Upon completion of this course the student should be able to:

1. Know to evaluate the quality of raw material.
2. Know the guidelines for quality of herbal drug.
3. Know about herbal cosmetics, natural sweeteners etc.
4. Know about modern concepts such as nutraceuticals

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand raw material as source of herbal drugs from cultivation to herbal drug product.

CO 2. Know the WHO and ICH guidelines for evaluation of herbal drugs.

CO 3. Know the herbal cosmetics, natural sweeteners, nutraceuticals.

CO 4. Appreciate patenting of herbal drugs, GMP.

CO 5. Know about the raw materials used in Herbal cosmetics, and the various excipients used in Herbal cosmetics and to know the significance of neutraceuticals.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3												1	
CO2					2								1	2
CO3					2	3							3	
CO4								2			3	3		
CO5	3											3		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP604T	Biopharmaceutics and Pharmacokinetics (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmaceutics				
Co-requisites	Pharmaceutics				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the basic concepts in Biopharmaceutics and Pharmacokinetics and their significance.

2. Understand the use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.

3 Understand the concepts of bioavailability and bioequivalence of drug products and their significance.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand the basic concepts in Biopharmaceutics and Pharmacokinetics and their significance.

CO 2. Understand the Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.

CO 3. Understand the concepts of bioavailability and bioequivalence of drug products and their significance.

CO 4. Understand various pharmacokinetic parameters, their significance & applications

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**												**3**	
CO2					**3**									**2**
CO3					**3**	**3**								
CO4	**3**											**3**		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP605T	**Pharmaceutical Biotechnology (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmaceutical Microbiology				
Co-requisites	Pharmaceutics				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the importance of Immobilized enzymes in Pharmaceutical Industries

2. Genetic engineering applications in relation to production of pharmaceuticals

3. Importance of Monoclonal antibodies in Industries

4. Appreciate the use of microorganisms in fermentation technology.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

CO2. Applications of genetic engineering and protein engineering in relation to production of pharmaceuticals.

CO3. Importance of Monoclonal antibodies in Industries.

CO4. Appreciate the use of microorganisms in fermentation technology.

CO5. To know the about immunity and various immunoblotting techniques.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3												3	
CO2					3									
CO3					3	3								
CO4	3											3		
CO5											3	3		

1=lightly mapped	2= moderately mapped	3=strongly mapped

BP606T	**Pharmaceutical Quality Assurance (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Industrial Pharmacy - I**				
Co-requisites	**Pharmaceutics**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the cGMP aspects in a pharmaceutical industry
2. Appreciate the importance of documentation
3. Understand the scope of quality certifications applicable to pharmaceutical
4. Understand the responsibilities of QA Industries & QC departments

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand the concept of Quality Control and Quality Assurance.

CO 2. Appreciate the importance of documentation

CO 3. Understand the scope of quality certifications applicable to pharmaceutical industries

CO 4. Understand the responsibilities of QA & QC departments

CO 5. Understand the concept of validation and warehousing practices.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	3											3	
CO2		3			3									3
CO3					3	3								
CO4	3							3				3		
CO5											3	3		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP607P	MEDICINAL CHEMISTRY-III (Practical)	L	T	P	C
Version 2.0		0	0	4	2
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	Medicinal Chemistry-III				
Co-requisites	Medicinal Chemistry				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the importance of drug design and different techniques of drug design.

2. Understand the chemistry of drugs with respect to their biological activity.

3. Know the metabolism, adverse effects and therapeutic value of drugs.

4. Know the importance of SAR of drugs.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understand fundamental knowledge on the structure, function and significance of Drugs.

CO 2. Discuss various mechanism of action of drugs

CO 3. Provide knowledge of Synthesis and Metabolism of drugs.

CO 4. Provide knowledge of Structure Activity Relationships (SAR) therapeutic uses of drugs.

CO 5. Provide knowledge of marketed preparation.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3												3	
CO2					3									

CO3					**3**	**3**								
CO4											**3**	**3**		
CO5												**3**		**1**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP608P	**Pharmacology-III (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmacology-II**				
Co-requisites	**HAP-II and Pathophysiology**				

Course Objectives

Upon completion of this course the student should be able to:

1. Get familiar with the pre-clinical studies in animals
2. Know the animal handling techniques, methods of drugs administration.
3. Understand Dose calculation and administration of drug through IM,IV routes
4. Able to learn and understand CCSEA guidelines

5. Know about the various disease models in order to discover a new drug

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Understanding pharmacology experiments demonstration by simulated experiments / videos.

CO 2. Understand knowledge of dose calculation and acute oral toxicity in pharmacology experiments

CO 3. Study various effects of drugs like anti-ulcer, GIT mobility and anti-allergic activity using various assay based on video recordings

CO 4. Know the biostatistics methods in experimental pharmacology like ANOVA, Chi square test, Wilcoxon Signed Rank test)

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3												3	
CO2		3												2
CO3						3								
CO4												3		

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP609P	Herbal Drug Technology (Practical)	L	T	P	C

Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Pharmacognosy & Phytochemistry – II (Practical)**				
Co-requisites	**Pharmacognosy & Phytochemistry – I (Practical)**				

Course Objectives

Upon completion of this course the student should be able to:

1. Know to evaluate the quality of raw material.
2. Know the guidelines for quality of herbal drug.
3. Know about herbal cosmetics, natural sweeteners etc.
4. Know about modern concepts such as nutraceuticals

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. Gain Practical knowledge of Preliminary phytochemical screening of crude drugs.

CO 2. Carry out Preparation and standardization of Herbal extracts in cosmetic formulation.

CO 3. Understand & study the monograph of various Herbal drugs.

CO 4. Determine the content of components like Aldehyde and alcohol

CO 5. Prepare Ayurvedic formulations

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**3**												**3**	
CO2						**3**								**2**
CO3									**3**					
CO4	**3**													
CO5	**3**													

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-VII

BP 701 T	Instrumental Methods Of Analysis (Theory)	L	T	P	C
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Analytical Chemistry**				
Co-requisites	**Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject deals with the application of instrumental methods in qualitative analysis of drugs.

CO2. This subject deals with the application of instrumental methods in quantitative analysis of drugs.

CO3. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic techniques.

CO4. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of chromatographic techniques.

CO5. This also emphasizes on theoretical knowledge on modern analytical instruments that are used for drug testing.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO11	PO12	PSO	PSO 2

										10			**1**	
CO1	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**2**	**3**	**2**
CO2	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**2**	**3**	**2**
CO3	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**2**	**3**	**2**
CO4	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**2**	**3**	**2**
CO5	**3**	**-**	**2**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**3**	**2**	**3**	**2**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 702 T	**Industrial Pharmacy-II (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Pharmaceutics**				
Course Objectives					
Upon completion of this course the student should be able to:					
1. Know the process of pilot plant and scale up of pharmaceutical dosage forms					
2. Understand the process of technology transfer from lab scale to commercial batch					
3. Know different Laws and Acts that regulate pharmaceutical industry					
4. Understand the approval process and regulatory requirements for drug					
Course Outcomes (CO)					
On completion of this course, the student-teacher will be able to:					
CO1. This course is designed to impart fundamental knowledge on pharmaceutical product development.					
CO2. This course is designed to impart knowledge on final product translation from laboratory to market.					

CO3. This subject gives understanding and idea of various technologies applied to development of dosage forms from small scale to large scale.
CO4. This subject gives understanding and idea of Indian Regulatory Requirements.
CO5. This course imparts knowledge to quality management of pharmaceutical products.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	3	-	3	3	-	1	1	-	3	2	3	2
CO2	3	-	3	-	3	3	-	1	1	-	3	2	3	2
CO3	3	-	3	-	3	3	-	1	1	-	3	2	3	2
CO4	3	-	3	-	3	3	-	1	1	-	3	2	3	2
CO5	3	-	3	-	3	3	-	1	1	-	3	2	3	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 703T	Pharmacy Practice (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmacology				
Co-requisites	Pharmacology				

Course Objectives

Upon completion of this course the student should be able to:

1. Know various drug distribution methods in a hospital

2. Appreciate the pharmacy stores management and inventory control
3. Monitor drug therapy of patient through medication chart review and clinical review
4. Obtain medication history interview and counsel the patients
5. Identify drug related problems
6. Detect and assess adverse drug reactions
7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. Know pharmaceutical care services
9. Do patient counseling in community pharmacy.
10. Appreciate the concept of rational drug therapy.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. The course imparts knowledge of drug distribution in hospitals.

CO2. The course imparts knowledge of drug store management in Hospitals.

CO3. The course imparts knowledge of therapeutic drug monitoring for improved patient care.

CO4. The course imparts knowledge of dispensing of drugs and responding to minor ailments by providing suitable safe medications.

CO5. The course highlights the importance of patient counseling for improved patient care in the community

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	3	-	3	3	-	2	-	-	-	3	3	1
CO2	3	-	3	-	3	3	-	2	-	-	-	3	3	1
CO3	3	-	3	-	3	3	-	2	-	-	-	3	3	1
CO4	3	-	3	-	3	3	-	2	-	-	-	3	3	1

CO5	**3**	**-**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**3**	**3**	**1**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 704 T	**Novel Drug Delivery System – Theory**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hrs				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	-				

Course Objectives

Upon completion of this course the student should be able to:

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart basic knowledge on the area of various conventional drug delivery systems.

CO2. The course imparts knowledge on sustained release drug delivery systems.

CO3. The course imparts knowledge on targeted drug delivery systems.

CO4. The course imparts knowledge on organ specific drug delivery systems.

CO5. The course imparts knowledge on newer drug delivery systems

Programme and Course Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO**	**PO11**	**PO12**	**PSO**	**PSO 2**

										10			**1**	
CO1	**3**	**2**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**2**	**3**	**3**	**1**
CO2	**3**	**2**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**2**	**3**	**3**	**1**
CO3	**3**	**2**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**2**	**3**	**3**	**1**
CO4	**3**	**2**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**2**	**3**	**3**	**1**
CO5	**3**	**2**	**3**	**-**	**3**	**3**	**-**	**2**	**-**	**-**	**2**	**3**	**3**	**1**
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 705 P	**Instrumental Methods Of Analysis (Practical)**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**4**	**2**
Total Contact Hours	60 Hours				
Pre-requisites/Exposure	**Analytical Chemistry-I Practical**				
Co-requisites					
Course Objectives					
Upon completion of this course the student should be able to:					
1. Quantitative & Qualitative Analysis of drugs using various analytical instruments.					
2. Demonstration of HPLC instrument					
3. Separations of sugars and amino acids by chromatography.					
Course Outcomes (CO)					
On completion of this course, the student-teacher will be able to:					
CO1. This subject deals with the practical knowledge of application of instrumental methods in qualitative analysis of drugs.					
CO2. This subject deals with the practical knowledge of application of instrumental methods in quantitative analysis of drugs.					

CO3. This subject is designed to impart a practical knowledge on the principles and instrumentation of spectroscopic techniques.
CO4. This subject is designed to impart a practical knowledge on the principles and instrumentation of chromatographic techniques.
CO5. This also emphasizes on practical knowledge on modern analytical instruments that are used for drug testing.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	2	-	3	3	-	1	-	-	3	2	3	2
CO2	3	-	2	-	3	3	-	1	-	-	3	2	3	2
CO3	3	-	2	-	3	3	-	1	-	-	3	2	3	2
CO4	3	-	2	-	3	3	-	1	-	-	3	2	3	2
CO5	3	-	2	-	3	3	-	1	-	-	3	2	3	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

Semester-VIII

BP801T	**Biostatisitcs And Research Methodology (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure					
Co-requisites	**Any analytical Software**				
Course Objectives					
Upon completion of this course the student should be able to:					

1. Know the operation of M.S. Excel, SPSS, R and MINITAB ® , DoE (Design of Experiment)
2. Know the various statistical techniques to solve statistical problems.
3. Appreciate statistical techniques in solving the problems.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To establish a formulation helping to predict one variable in terms of the other that is, correlation and linear regression.

CO2. To understand of Parametric and Non-Parametric models for developing relevant inferences on associated parameters

CO3. To know advanced level topics in statistical inference on testing of statistical hypotheses for both randomized and non-randomized tests

CO4. To use appropriate experimental designs to analyze the experimental data

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2			2	2							2	2	
CO2			2				2		2		2			
CO3	2			2	2							2	2	
CO4		2	2				2							

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 802 T	Social and Preventive Pharmacy (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				

Pre-requisites/Exposure	**Pharmacology**
Co-requisites	**Remedial Biology**

Course Objectives

Upon completion of this course the student should be able to:

1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
2. Have a critical way of thinking based on current healthcare development.
3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. The purpose of this course is to introduce to students number of health issues and their challenges.

CO2. Give information regarding Public health, preventive medicine, social medicine and community medicine their historical background.Giving information about the significance of food and its various components.

CO3. Tounderstand the various principles for the prevention and control of various diseases.

CO4. In this course introduced various National health programs like HIV, AIDS, TB, IDSP, NLCP, NMHP etc. and its objectives, functioning and their outcome

CO5. The roles of the pharmacist in the Community services in rural, urban and school health awareness program.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	**2**	**2**			**2**	**2**								**2**
CO2			**2**				**2**		**2**		**2**			
CO3	**2**	**2**			**2**	**2**							**2**	
CO4		**2**	**2**				**2**							
CO5	**2**	**2**			**2**	**2**								**2**

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 803 ET	Pharmaceutical Marketing Management (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmaceutical Marketing				
Co-requisites	Marketing				

Course Objectives

Upon completion of this course the student should be able to:

1. Understanding the marketing concepts and techniques and their applications in the pharmaceutical industry.
2. Explain the role of Industry competitive analysis, marketing mix and promotion strategy
3. To learn about price strategy, marketing distribution channel, sales distribution concepts in pharma marketing management
4. To learn and understand the principle and function of DPCO and NPPA authority for pharmaceutical product

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. In this topic is devoted the general questions of market concepts, including pharmaceutical, also understand the choice of physician and retail pharmacist.

CO2. To learn and understand the product line and product mix decisions, product life cycle stage, product portfolio analysis; product positioning, marketing mix and promotion mix strategy in companies.

CO3. To learn and understand the principle and function of DPCO and NPPA authority for better understanding essential commodities act.

CO4. The knowledge of theoretical based marketing pricing, prices classification, demand, supply and prices and establishment of the price for the goals.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2			2	2								2
CO2	2	1	2			1	2		2		2			

CO3	**2**	**2**			**2**	**2**							**2**	
CO4		**2**	**2**				**2**							
1=lightly mapped 2= moderately mapped 3=strongly mapped														

BP 804 ET	**Pharmaceutical Regulatory Science (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Pharmaceutics**				
Co-requisites	**Regulatory Sciences**				

Course Objectives

Upon completion of this course the student should be able to:

1. Know about the process of drug discovery and development
2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
3. Know the regulatory approval process and their registration in Indian and International markets

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This course is designed to impart the fundamental knowledge on the Origin, development, scope, objectives and nature of Pharmaceutical legislation in India.

CO2. A study of regulatory aspects that affect drug product design, manufacture and distribution in India with special emphasis on the following Acts / Laws (with latest amendments)

CO3. Need Product development stage documentation, factory procedures – Standard operating procedures (SOPs) and standard test Procedures (STPs).

CO4. Regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU,

Japan, Australia, UK etc.

CO5. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			
CO3	2	2		2	2	2				2			2	
CO4			2	2		2	2	2				2		
CO5		2	2		2	2	2				2			2

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP805ET	Pharmacovigilance (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Toxicology study				
Co-requisites	ADR				

Course Objectives

Upon completion of this course the student should be able to:

1 Why drug safety monitoring is important?

2. History and development of pharmacovigilance

3. National and international scenario of pharmacovigilance

4. Dictionaries, coding and terminologies used in pharmacovigilance

5. Detection of new adverse drug reactions and their assessment problems

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. International standards for classification of diseases and drugs

CO 2. Adverse drug reaction reporting systems and communication in pharmacovigilance

CO 3. Methods to generate safety data during pre-clinical, clinical and post approval phases of drugs' life cycle

CO 4. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation

CO 5. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			
CO3	2	2		2	2	2				2			2	
CO4	2	2		2	2	2				2			2	
CO5	2	3	2	2	2	2	1			2			2	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 806 ET	Quality Control And Standardization Of Herbals (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Herbal Drug Technology				
Co-requisites	Pharmacognosy & Phytochemistry				

Course Objectives

Upon completion of this course the student should be able to:

1. Know WHO guidelines for quality control of herbal drugs
2. Know Quality assurance in herbal drug industry
3. Know the regulatory approval process and their registration in Indian and international markets
4. Appreciate EU and ICH guidelines for quality control of herbal drugs

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs like Moisture Content, Ash Values, Determination of Extractive Value, Swelling Index, Hemolytic Activity etc.

CO2. The subject also provides an opportunity for the student to learn the quality assurance of crude drugs in herbal industry and follow the following guide line cGMP, GAP and GLP in traditional system of medicines.

CO3. Knowledge about the Quality control of following guideline like EU and ICH guidelines.

CO4. Knowledge about the stability testing of herbal medicines and application of various chromatographic techniques for evaluation of crude

drgs.

CO5. Regulatory requirement for development of herbal medicine as per WHO guide lines.

Programme and Course Mapping													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**2**	**2**		**1**	**2**	**2**		**2**		**2**			**2**	**2**
CO2	**2**	**1**	**2**			**1**	**2**		**2**		**2**			**2**
CO3	**2**	**2**		**2**	**2**	**2**				**2**			**2**	
CO4	**2**	**1**	**2**			**1**	**2**		**2**		**2**		**1**	
CO5	**2**	**1**	**2**			**1**	**2**		**2**		**2**		**2**	**2**
1=lightly mapped			2= moderately mapped				3=strongly mapped							

BP 807 ET	**Computer aided drug design (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Computer application**				
Co-requisites	**Medicinal Chemistry**				

Course Objectives

Upon completion of this course the student should be able to:

1. Design and discovery of lead molecules
2. The role of drug design in drug discovery process
3. The concept of QSAR and docking

4. Various strategies to develop new drug like molecules.
5. The design of new drug molecules using molecular modeling software

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO 1. The course offers to provide knowledge on history of computers in pharmaceutical research.

CO2. The course gives fundamental learning of basic computer skills required in pharmaceutical research and drug development.

CO 3. This course is designed to impart knowledge on the principles of informatics as applicable to the drug development process.

CO 4. The subject aims at imparting knowledge on computational modeling, and computer aided biopharmaceutical characterization.

CO 5. The subject offers to develop an understanding of drug-product performance.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			2
CO3	2	2		2	2	2				2			2	
CO4	2	1	2			1	2		2		2		1	
CO5	2	1	2			1	2		2		2		2	2

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 808 ET	Cell and molecular biology (Theory)	L	T	P	C
Version 2.0		3	1	0	4

Total Contact Hours	45 Hours
Pre-requisites/Exposure	
Co-requisites	

Course Objectives

Upon completion of this course the student should be able to:

1. Explain the receptor signal transduction processes.
2. Explain the molecular pathways affected by drugs.
3. Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.
4. Demonstrate molecular biology techniques as applicable for pharmacology

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. The subject imparts a fundamental knowledge on the structure and functions of cellular components and help to understand the interaction of these components with drugs.

CO2. The subject also designed to impart knowledge about the various cell death pathways.

CO3. It helps in detail understaning of molecular biology techniques like western blotting and PCR

CO4. The students will be able to undesrstand about the cell culture techniques.

CO5. This information will further help the student to apply the knowledge in drug discovery process.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			3

CO3	**2**	**2**		**2**		**2**				**2**			**2**	
CO4		**1**			**2**	**1**	**2**		**2**		**2**		**1**	
CO5	**2**	**1**	**2**			**1**	**2**		**2**		**2**		**2**	**3**
1=lightly mapped			2= moderately mapped				3=strongly mapped							

BP 809 ET	**Cosmetic science (Theory)**	**L**	**T**	**P**	**C**
Version 2.0		**3**	**1**	**0**	**4**
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	**Herbal Drug Technology**				
Co-requisites					

Course Objectives

Upon completion of this course the student should be able to:

1. Key ingredients used in cosmetics and cosmeceuticals.
2. Key building blocks for various formulations.
3. Current technologies in the market
4. Various key ingredients and basic science to develop cosmetics and cosmeceuticals
5. Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. To make the student know about the various cosmetics products, their principles & formulation.

CO2.To make the student understand the functioning of natural herbs using in cosmetics and cosmeceuticals

CO3. To enable the student with the knowledge of cosmetics as per Indian and EU regulations.

CO4. To make the student know about Principles of Cosmetic Evaluation.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			3
CO3	2	2		2		2				2			2	
CO4		1			2	1	2		2		2		1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 810 ET	Experimental Pharmacology (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Pharmacology and Toxicology				
Co-requisites	HAP-I				

Course Objectives

Upon completion of this course the student should be able to:

1. Appreciate the applications of various commonly used laboratory animals.
2. Appreciate and demonstrate the various screening methods used in preclinical research

3. Appreciate and demonstrate the importance of biostatistics and researchmethodology
4. Design and execute a research hypothesis independently

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. This subject is designed to impart fundamental knowledge about the pharmacological experiments, animal's handlings and about different animals used in the experimental pharmacology.

CO2. It imparts the practical knowledge on molecular biology techniques

CO3. It helps the students to learn about different roots a drug administration and methods of blood withdrawal

CO4. The subject also designed to impart knowledge about the regulatory bodies governing experiments on animals like CPCSEA.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			2
CO3	2	2		2	2	2				2			2	
CO4	2	1	2			1	2		2		2		1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 811 ET	Advanced instrumentation techniques	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				

Pre-requisites/Exposure	Pharmaceutical Analysis
Co-requisites	

Course Objectives

Upon completion of this course the student should be able to:

1. Appreciate the applications of various commonly used laboratory animals.
2. understand the advanced instruments used and its applications in drug analysis
3. Understand the chromatographic separation and analysis of drugs.
4. Understand the calibration of various analytical instruments
5. Know analysis of drugs using various analytical instruments.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Theory and practical knowledge of UV spectrophotometer and IR spectrophotometer.

CO2. The analysis of various drugs in single and combination dosage forms by various spectroscopic and chromatographic techniques.

CO3. Understanding NMR and Mass spectroscopy.

CO4. Theoretical and practical skills of the instruments.

Programme and Course Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	2		1	2	2		2		2			2	2
CO2	2	1	2			1	2		2		2			2
CO3	2	2		2	2	2				2			2	
CO4	2	1	2			1	2		2		2		1	

1=lightly mapped 2= moderately mapped 3=strongly mapped

BP 812 ET	Dietary supplements and Neutraceuticals (Theory)	L	T	P	C
Version 2.0		3	1	0	4
Total Contact Hours	45 Hours				
Pre-requisites/Exposure	Herbal Drug Technology				
Co-requisites					

Course Objectives

Upon completion of this course the student should be able to:

1. Understand the need of supplements by the different group of people to maintain Healthy life.

Course Outcomes (CO)

On completion of this course, the student-teacher will be able to:

CO1. Understand the need of nutrients by the different group of people to maintain Healthy life.
CO2. Understand the outcome of deficiencies in dietary supplements.
CO3. Appreciate the components in dietary supplements and the application.
CO4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims

Programme and Course Mapping														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	**2**	**2**		**1**	**2**	**2**		**2**		**2**			**2**	**2**
CO2	**2**	**1**	**2**			**1**	**2**		**2**		**2**			**2**
CO3	**2**	**2**		**2**	**2**	**2**				**2**			**2**	
CO4	**2**	**1**	**2**			**1**	**2**		**2**		**2**		**1**	
1=lightly mapped			2= moderately mapped				3=strongly mapped							

BP 813 PW	**Project work**	**L**	**T**	**P**	**C**
Version 2.0		**0**	**0**	**12**	**6**
Total Contact Hours	45 Hours				
Herbal Drug Technology					
Co-requisites					