MAHARASHTRA EDUCATIONAL SOCIETY'S

H. K. COLLEGE OF PHARMACY

PRATIKSHA NAGAR OSHIWARA, JOGESHWARI (W), MUMBAI 400102

Affiliated to Mumbai University, Approved by A.I.C.T.E. , P.C. I., D.T.E. & Govt. of Maharashtra

University Code: 738 A.I.C.T.E Approval No. 06/07/MS/PHARM/2008/007 D.T.E Code No. PH3234

VISION: To Be recognized as the Institution providing quality education in Pharmacy to serve the health care sector

2.6.1

Program Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

TEL NO.: 022-2688462 / 26788709 / 26774639 / 26776221 FAX NO. 022-26790095

Email: pharmacy.director@hkcp.edu.in website: www.hkcp.edu.in

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Program Outcomes

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Program Outcomes

PO 1: Pharmacy Knowledge

Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO 2: Planning Abilities

Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO 3: Problem analysis

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

PO 4: Modern tool usage

Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO 5: Leadership skills

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

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PO 6: Professional Identity

Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO 7: Pharmaceutical Ethics

Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO 8: Communication

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

PO 9: The Pharmacist and society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO 10: Environment and sustainability

Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 11: Life-long learning

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

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Course Outcomes- B.Pharm

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Semester I

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Human Anatomy and Physiology I – Theory	S5.101T	S5.101T.22-23.CO1	Understand the human body & basic life process & structure & functions of different types of cells & tissues.	3	0	1	0	0	1	0	0	0	0	0
		S5.101T.22-23.CO2	Describe the structure & functions of skin & different types of bones & joints.	3	0	1	0	0	1	0	0	0	0	0
		S5.101T.22-23.CO3	Understand the various types of body fluids, blood & different blood groups.	3	0	1	0	0	1	0	0	0	0	0
		S5.101T.22-23.CO4	Understand the peripheral nervous system & structure & functions of special sense organs.	3	0	1	0	0	1	0	0	0	0	0
		S5.101T.22-23.CO5	To understand the anatomy & physiology of cardiovascular system	3	0	1	0	0	1	0	0	0	0	0
Pharmaceutical Analysis I – Theory	S5.102T	S5.102T.22-23.CO1	Remember conventional methods of quantitative analysis and the sources of error	3	0	1	1	0	1	1	0	1	1	1
		S5.102T.22-23.CO2	Understand the principles of volumetric analysis and electrochemical analysis	3	1	2	1	0	0	1	0	0	1	1
		S5.102T.22-23.CO3	Apply the principles of volumetric titration in titrimetric analysis	3	1	2	1	0	1	1	1	1	1	1
		S5.102T.22-23.CO4	Apply appropriate method of titration in raw material analysis	3	1	2	1	0	1	1	1	1	1	1
		S5.102T.22-23.CO5	Calculate the strength of solutions,pH and present result in suitable concentration units	3	0	3	1	0	0	1	2	1	1	1
Pharmaceutics I – Theory	S5.103T	S5.103T.22-23.CO1	Know the history and current status of profession of pharmacy including pharmacopoeia	3	0	0	0	0	1	1	0	1	0	1
		S5.103T.22-23CO2	Understand the professional way of handling the prescription using pharmaceutical calculations and pharmaceutical incompatibilities.	3	0	1	0	0	0	0	0	0	0	1
		S5.103T.22-23.CO3	Classify dosage form and Understand the preparation and types of powders as dosage form.	3	1	1	0	0	0	1	0	0	0	1
		S5.103T.22-23.CO4	Understand the definition , classification and formulations of monophasic and biphasic liquid dosage form.	3	1	1	0	0	0	1	0	0	0	1
		S5.103T.22-23.CO5	Study the definition , classification and preparations of semisolid dosage form and suppositories.	3	0	0	1	0	0	1	0	1	1	1
Pharmaceutical Inorganic Chemistry – Theory	S5.104T	S5.104T.22-23.CO1	Know the sources and methods to determine the impurities in inorganic drugs	3	2	1	0	0	1	1	1	1	1	2
		S5.104T.22-23.CO2	Understand the medicinal and pharmaceutical importance of inorganic compounds in Dental products	3	1	1	0	0	1	1	1	1	1	2
		S5.104T.22-23.CO3	Understand the classification of electrolytes and its physiological role in replacement therapy, acid- base balance	3	1	1	0	0	1	1	1	1	1	2
		S5.104T.22-23.CO4	Remember definition, classification, mechanism of action, properties, uses, official products and applications of Gastrointestinal Agents, Topical Agents, Saline Cathartics.	3	1	1	0	0	1	1	1	1	1	2
		S5.104T.22-23.CO5	Remember definition, classification, mechanism of action, properties, uses, official products and applications of Expectorants, Emetics, Sclerosing agents and Complexing agents, Inorganic Radio Pharmaceuticals, Essential and Trace Elements.	3	1	1	0	0	1	1	1	1	1	2
Communication skills – Theory	S5.105T	S5.105T.22-23.CO1	Understand the concept of communication skill with respect to barriers and perspectives in communication skills	0	0	0	0	0	0	0	3	0	0	1
		S5.105T.22-23.CO2	Understand various ways of verbal and non-verbal communication	0	0	0	0	0	0	0	3	0	0	2
		S5.105T.22-23.CO3	Understand the techniques for effective listening and writing skills	0	0	0	0	1	0	0	2	0	0	1
		S5.105T.22-23.CO4	Understand the methods for effective interview skills and presentation	0	0	0	0	0	0	2	1	0	0	1
		S5.105T.22-23.CO5	Understand the practices required to participate in group discussion	0	0	0	0	0	0	0	3	0	0	0
Remedial Mathematics – Theory	S5.106RMT	S5.106P.22-23.CO1	Understand the concept of Partial fraction, Logarithms, Function, Limits and continuity and its applications in pharmacy.	1	0	3	0	0	0	0	0	0	0	2
		S5.106P.22-23.CO2	Understand the concept of Matrices and Determinant and its applications in pharmacy.	1	0	3	0	0	0	0	0	0	0	2
		S5.106P.22-23.CO3	Understand the concept of Calculus and its applications in pharmacy.	1	0	3	0	0	0	0	0	0	0	2
		S5.106P.22-23.CO4	Understand the concept of Analytical Geometry and its applications in pharmacy.	1	0	3	0	0	0	0	0	0	0	2
		S5.106P.22-23.CO5	Understand the concept of Differential equation and Laplace transform and its applications in pharmacy.	1	0	3	0	0	0	0	0	0	0	2

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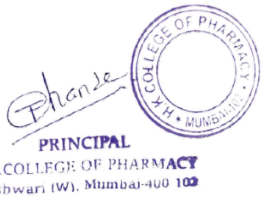
Remedial Biology Theory	S5.106RBT	S5.106RBT.22-23.CO1	Know the classification and salient features of five kingdoms of life.	1	0	0	0	0	0	0	0	0	0	0
		S5.106RBT.22-23.CO2	Understand the basic components of anatomy & physiology of plant.	1	0	0	0	0	0	0	0	0	0	0
		S5.106RBT.22-23.CO3	Know understand the basic components of anatomy & physiology animal with special reference to human.	1	0	0	0	0	0	0	0	0	0	0
Human Anatomy and Physiology – Practical	S5.107P	S5.BP107P.22-23.CO1	Understand the compound microscope	3	0	1	1	1	0	0	0	0	0	0
		S5.BP107P.22-23.CO2	Remember the structure & functions of epithelial, connective tissue, ,muscular and nervous tissue	3	0	1	1	1	0	0	0	0	0	0
		S5.BP107P.22-23.CO3	Remember the names ,structures & functions of bones.	3	0	1	1	1	0	0	0	0	0	0
		S5.BP107P.22-23.CO4	Understand the enumeration/counting of RBCs & WBCs of human blood, determination of bleeding time , clotting time, blood group and estimation of haemoglobin content of human blood.	3	0	1	1	1	0	0	0	0	0	0
		S5.BP107P.22-23.CO5	Understand the determination of heart rate & pulse rate & recording of blood pressure & blood contents.	3	0	1	1	1	0	0	0	0	0	0
Pharmaceutical Analysis I – Practical	S5.108P	S5.108P.22-23.CO1	Understand limit test for determination of trace amount of impurity present in Pharmaceutical substances	3	3	1	0	0	0	1	2	1	0	1
		S5.108P.22-23.CO2	Apply the appropriate titrimetric method for analysis of compounds	3	1	1	0	0	2	2	2	1	0	1
		S5.108P.22-23.CO3	Apply Pharmacopeial limits to interpret and prepare report of analysis of compounds	3	3	1	0	0	0	0	0	0	0	1
		S5.108P.22-23.CO4	Apply principles of electroanalytical method for determination of normalities of acids, mixture of acids.	3	3	1	0	0	1	1	2	1	0	1
		S5.108P.22-23.CO5	Calculate the strength of solutions and interchange concentration units	3	0	2	0	0	2	0	2	1	0	1
Pharmaceutics I – Practical	S5.109P	S5109P. 22-23. CO 1	Compound monophasic liquid dosage form for internal and external use using solubilization techniques,as per pharmacopoeial standards.	3	3	3	1	1	2	2	1	1	1	3
		S5109P. 22-23. CO 2	Formulate biphasic liquid dosage form for internal and external use, as per pharmacopoeial standards	3	3	3	1	1	2	2	1	1	1	3
		S5109P. 22-23. CO 3	Prepare power dosage form with appropriate packaging and labeling	3	3	3	1	1	2	2	1	1	1	3
		S5109P. 22-23. CO 4	Understand the calculations and formulation of suppository as a dosage form.	3	3	3	1	1	2	2	1	1	1	3
		S5109P. 22-23. CO 5	Formulate and Prepare semisolid dosage form	3	3	3	1	1	2	2	1	1	1	3
Pharmaceutical Inorganic Chemistry – Practical	S5.110P	S5.110P.22-23.CO1	Perform Limit Test as per Indian Pharmacopoeia for identification of various inorganic impurities present in inorganic pharmaceuticals	3	3	3	1	1	2	2	1	1	1	3
		S5.110P.22-23.CO2	Perform the purification of selected inorganic pharmaceuticals	3	3	3	1	1	2	2	1	1	1	3
		S5.110P.22-23.CO3	Prepare selected inorganic pharmaceuticals	3	3	3	1	1	2	2	1	1	1	3
		S5.110P.22-23.CO4	Calculate the percentage yield and practice ethics in reporting the yield	3	3	3	1	1	2	2	1	1	1	3
		S5.110P.22-23.CO5	Identify the cations and anions present in a given salt through identification tests and confirmatory test.	3	3	3	1	1	2	2	1	1	1	3
Communication skills – Practical	S5.111P	S5.111P.22-23.CO1	Understand basic communication skills during public speaking	0	0	0	0	0	0	0	3	0	0	1
		S5.111P.22-23.CO2	Understand Pronunciation for Consonant, Nouns, and Vowels.	0	0	0	0	0	0	0	3	0	0	2
		S5.111P.22-23.CO3	Understand listening & speech skills	0	0	0	0	1	0		2	0	0	1
		S5.111P.22-23.CO4	Remember the important instructions for effective writing skills.	0	0	0	0	0	0	2	1	0	0	1
		S5.111P.22-23.CO5	Learn the techniques to improve the interview skills.	0	0	0	0	0	0	0	3	0	0	0
Remedial Biology Practical	S5.112RBP	S5.112P.22-23.CO1	Understand the compound microscope, section cutting techniques, mounting & staining & permanent slide	3	0	0	3	0	0	0	0	0	0	1
		S5.112P.22-23.CO2	Remember the cell & its inclusion	1	0	0	3	0	0	0	0	0	3	1
		S5.112P.22-23.CO3	Understand the study of Stem, Root, Leaf, Seed, Fruit, Flower and their modifications & identification	3	0	0	3	0	0	0	0	0	3	1
		S5.112P.22-23.CO4	Understand the detailed study of frog & identification of bones	3	0	0	3	0	1	0	0	2	0	1
		S5.112P.22-23.CO5	Understand the determination of blood group, blood pressure & tidal volume	3	0	0	3	0	1	0	0	3	0	1



Semester II

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Human Anatomy and Physiology II – Theory	S5.201T	S5.201T.21-22.CO1	Understand the Organization of nervous system & parts & working of brain & spinal cord	3	0	2	0	0	3	1	2	2	2	1
		S5.201T.21-22.CO2	Understand the parts of Digestive system & formation of HCl in stomach & remember the formation & role of ATP, CrP & BMR	3	0	2	0	0	3	1	2	2	2	1
		S5.201T.21-22.CO3	Remember the parts & functions of Respiratory system & Urinary system & understand the mechanism of respiration & formation of urine	3	0	2	0	0	3	1	2	2	2	1
		S5.201T.21-22.CO4	Understand the different types of endocrine glands & remember the names & functions of various hormones secreted by glands	3	0	2	0	0	3	1	2	2	2	1
		S5.201T.21-22.CO5	Remember the parts & functions of Reproductive system & understand the physiology of menstruation	3	0	2	0	0	3	1	2	2	2	1
Pharmaceutical Organic Chemistry I – Theory	S5.202T	S5.202T.22-23.CO1	Write the structure, name and type of isomerisation of the organic compound	3	1	1	2	0	1	1	2	1	0	1
		S5.202T.22-23.CO2	Write the reaction, name the reaction and orientation of the reaction	3	1	1	2	0	1	1	2	1	1	1
		S5.202T.22-23.CO3	Remember the account for reactivity/stability of compounds	3	1	2		0	1	1	2	1	0	1
		S5.202T.22-23.CO4	Able to identifyand confirm the organic compounds	3	1	1	1	0	1	1	2	1	1	1
		S5.202T.22-23.CO5	Remember the acidity and basicity of various functional groups	3	1	2	0	0	1	1	1	1	0	1
Biochemistry – Theory	S5.203T	S5.203T.22-23.CO1	Understand the role of biomolecules and bioenergetics in functioning of metabolic pathways	3	0	0	0	0	0	0	0	1	1	2
		S5.203T. 22-23.CO2	Remember the metabolic pathways for Carbohydrates, Lipids, Amino acids and proteins and nucleic acids in humans and their energetics	3	0	0	0	0	0	0	0	1	1	2
		S5.203T. 22-23.CO3	Understand the disorders/ diseases caused by catabolism of Carbohydrates, Lipids, Amino acids and proteins and nucleic acids.	3	0	0	0	0	0	0	0	1	1	2
		S5.203T. 22-23.CO4	Understand the DNA replication, and protein biosynthesis process	3	0	0	0	0	0	0	0	1	1	2
		S5.203T. 22-23.CO5	Understand the catalytic role of enzymes in the regulation of metabolic pathways, importance of enzyme inhibitors, therapeutics and diagnostic applications of enzymes.	3	0	0	0	0	0	0	0	1	1	2
Pathophysiology – Theory	S5.204T	S5.204T.22-23.CO1	Understand the concepts of inflammation and healing, immune responses	3	1	1	1	0	2	1	3	3	1	2
		S5.204T.22-23.CO2	Understand the etiology, manifestation and pathogenesis of the CVS, resp	3	1	1	1	0	2	1	3	3	1	2
		S5.204T.22-23.CO3	Understand the etiology, manifestation, and pathogenesis of the hematolo	3	1	1	1	0	2	1	3	3	1	2
		S5.204T.22-23.CO4	Understand the etiology, manifestation and pathogenesis of the Inflamma	3	1	1	0	0	2	1	3	3	1	2
		S5.204T.22-23.CO5	Understand the etiology, manifestation, and pathogenesis of the various infectious & sexual transmitted diseases.	3	1	1	0	1	2	1	3	3	1	2
Computer Applications in Pharmacy – Theory	S5.205T	S5.205T.20-21.CO1	Understand the concept of number system, information system and software	0	1	0	2	0	0	0	0	0	0	2
		S5.205T.16-17.CO2	Understand the concept of web technologies and database	0	1	0	2	0	0	0	0	0	0	1
		S5.205T.20-21.CO3	Understand the various types of applications of computer in Pharmacy	2	1	0	2	0	0	0	0	0	0	1
		S5.205T.20-21.CO4	Understand the concept of bioinformatics	2	1	0	2	0	0	0	0	0	0	1
		S5.205T.20-21.CO5	Understand the concept of data analysis in preclinical development	2	1	0	2	0	0	0	0	0	0	1
Environmental sciences – Theory	S5.206T	S5.206T.22-23.CO1	Understand the natural resources and associated problems	3	0	0	0	3	0	0	1	2	3	3
		S5.206T.22-23.CO2	Understand the role of an individual in conservation of natural resources	3	0	0	0	0	0	3	1	2	3	3
		S5.206T.22-23.CO3	Understand the basic concept of ecology, types, characteristic features, structure and function of the individual ecosystems	3	0	2	0	0	3	0	1	2	3	3
		S5.206T.22-23.CO4	Analyse and solve problems related to Environmental pollution.	3	2	0	2	0	0	0	1	2	3	3
Human Anatomy and Physiology II –Practical	S5.207P	S5.207P.22-23.CO1	Understand the integumentary, nervous & endocrine systems & special senses using specimen, model etc.	3	0	0	0	3	0	0	0	0	0	1
		S5.207P.22-23.CO2	Remember the different types of taste & functions of olfactory nerve.	0	2	0	0	0	0	0	0	0	0	0
		S5. 207P.22-23 CO3	Understanding the varios systems of human being with the help of models, charts & specimens.	3	0	0	0	0	0	0	0	0	0	0
		S5. 207P.22-23.CO4	Remember the family planning devices & pregnancy diagnosis test.	0	0	0	3	0	3	0	0	0	0	0
		S5. 207P.22-23.CO5	Understand the positive & negative feedback mechanism & recording of body temperature.	1	0	0	1	0	0	0	0	0	0	0
Pharmaceutical Organic Chemistry I– Practical	S5.208P	S5.208P.22-23.CO1	Practice and follow safety rules and precautionary measures in laboratory	3	1	1	0	0	1	1	2	1	1	1
		S5.208P.22-23.CO2	Understand theretical aspects of physical constant determination, detection of functional groups and preparation of derivatives	3	1	1	0	0	1	1	2	1	1	1
		S5.208P.22-23.CO3	Characterize functional groups and compounds by element analysis, physical constants	3	2	1	0	0	1	1	2	1	1	1
		S5.208P.22-23.CO4	Learn the technique of constructing molecular models	3	1	1	1		1	1	2	1	1	1
		S5.208P.22-23.CO5	Carry out the preparation of suitable solid derivatives from organic compounds	3	2	1	0	0	1	1	2	1	1	1
Biochemistry – Practical	S5.209P	S5.209P.22-23.CO1	Apply chemical tests for identification of carbohydrates, proteins and urine for abnormal constituents.	3	0	0	0	0	0	0	0	1	1	2
		S5.209P.22-23.CO2	Analyze carbohydrates, proteins, blood sugar, blood creatinine and blood cholesterol by colorimetry	3	0	0	0	0	0	0	0	1	1	2
		S5.209P.22-23.CO3	Understand the effect of temperature, substrate concentration on the activity of the salivary amylase enzyme.	3	0	0	0	0	0	0	0		1	2
		S5.209P.22-23.CO4	Understand the effect of salivary amylase on the hydrolysis of starch and activity of salivary amylase.	3	0	0	0	0	0	0	0	1	1	2

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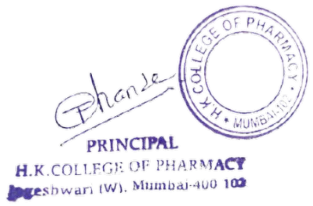
Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
		S5.209P.22-23.CO5	Understand preparation of buffer solutions.	3	0	0	0	0	0	0	0	1	1	2
Computer Applications in Pharmacy – Practical	S5.210P	S5.210P.20-21.CO1	Understand how to create HTML web page, XML page	0	1	0	2	0	0	0	0	0	0	2
		S5.210P.20-21.CO2	Understand applicationof Ms Access	0	1	0	2	0	0	0	0	0	0	1
		S5.210P.20-21.CO3	Understand the concept of database	0	1	0	2	0	0	0	0	0	0	1
		S5.210P.20-21.CO4	Generate reports from database	0	1	0	2	0	0	0	0	0	0	1
		S5.210P.20-21.CO5	Export information to web and XML pages	0	1	0	2	0	0	0	0	0	0	1



Semester III

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Pharmaceutical Organic Chemistry II – Theory	S5.301T	S5.301T.22-23.CO1	Explain the general principles and mechanisms involved in organic reactions	3	0	0	0	0	0	0	0	0	0	1
		S5.301T.22-23.CO2	Discuss the reactivity, orientation and stability of organic reactions	3	0	0	0	0	0	0	0	0	0	1
		S5.301T.20-21.CO3	Describe the chemistry of fats and oils	3	0	0	0	0	0	0	0	0	0	1
		S5.301T.22-23.CO4	Remember the structure and uses of important organic compounds	3	0	0	0	0	0	0	0	0	0	1
		S5.301T.22-23.CO5	Differentiate the polynuclear organic compounds with respect to their chemistry	3	0	0	0	0	0	0	0	0	0	1
Physical Pharmaceutics I – Theory	S5.302T	S5.302T.22-23.CO1	State the role of physicochemical properties of drug molecules including solubility and colligative properties and theories related to solutions of electrolyte in the designing of the dosage forms.	3	0	2	1	0	1	1	2	1	1	2
		S5.302T.22-23.CO2	Understand the concept of distribution, diffusion, patterns of molecule and the effect of complexation phenomenon on the drug action	3	0	2	1	0	1	1	2	1	1	2
		S5.302T.22-23.CO3	Understand the concept of intermolecular forces and different States of matter	3	0	2	1	0	1	1	2	1	1	2
		S5.302T.22-23.CO4	Explain the role of surfactants, interfacial phenomenon and thermodynamics in the formulation of colloids. Surface and electrical properties	3	0	2	1	0	1	1	2	1	1	2
		S5.302T.22-23.CO5	Understand the physical properties of buffers, isotonicity in pharmaceutical	3	0	2	0	0	1	1	2	1	1	2
Pharmaceutical Microbiology – Theory	S5.303T	S5.303T.22-23.CO1	Understand History,branches, development of microbiology. Morphology, classification, reproduction, methods of identification, cultivation and preservation of bacteria, fungi and Virus microorganisms and different types of advanced microscopes.	3	0	0	0	0	2	0	0	1	0	2
		S5.303T.22-23.CO2	Understand the methods, importance and implementation of sterilization in pharmaceutical processing and industry	3	0	0	0	0	2	0	0	1	0	2
		S5.303T.22-23.CO3	Understand the aseptic technique, sterility testing of pharmaceutical products, microbiological assays, microbiological standardization of Pharmaceuticals.	3	0	0	0	0	2	0	0	1	0	2
		S5.303T.22-23.CO4	Understand spoilage, preservation, evaluation of pharmaceutical products.	3	0	0	0	0	2	0	0	1	0	2
		S5.303T.22-23.CO5	Understand the cell culture technology and its applications in pharmaceutical industries.	3	0	0	0	0	2	0	0	1	0	2
Pharmaceutical Engineering – Theory	S5.304T	S5.305T.21-22.CO1	Understand the principle, working, instruments of fluid flow and pressure and its instruments.	3	0	1	0	0	0	0	0	0	0	1
		S5.305T.21-22.CO2	Understand the principle of size separation, size reduction, mixing material and energy balance and its relevance in a pharmaceutical industry.	3	0	1	0	0	0	0	0	0	0	1
		S5.305T. 21-22.CO3	Understand the theory of unit operations such as, heat transfer, evaporation, distillation and drying and its equipment used for these operations.	3	0	1	0	0	0	0	0	0	0	1
		S5.305T. 21-22.CO4	Understand the material of construction used in pharmaceutical equipment in filtration, centrifugation and study the various preventive methods used for corrosion control in Pharmaceutical industries	3	0	0	0	0	0	0	0	0	1	1
		S5.305T. 21-22.CO5	Inculcate the importance of safety in handling hazards encountered while handling pharmaceutical equipment in the industry and comprehend significance of plant lay out design for optimum use of resources in pharmaceutical industry	3	0	0	0	0	0	0	0	0	2	1
Pharmaceutical Organic Chemistry II – Practical	BP305P	S5.305P.22-23.CO1	Take up synthesis of various organic compounds by different chemical reactions	3	2	1	0	0	1	1	2	1	2	1
		S5.305P.22-23.CO2	Purify organic compounds using various procedures like recrystallization and steam distillation	3	2	1	0	0	1	1	2	1	2	1
		S5.305P.22-23.CO3	Determine the purity of fats and oils	3	2	2	0	0	1	1	2	1	2	1
		S5.305P.22-23.CO4	Calculate the percentage yields of the products obtained by synthesis	3	2	2	0	0	1	1	2	1	1	1
		S5.305P.22-23.CO4	Apply recrystallization and steam distillation methods for purification of synthesized organic compounds	3	2	1	0	0	1	1	2	1	2	1
Physical Pharmaceutics I – Practical	S5.306P	S5 306P. 22-23 CO1	Determine physical properties as solubility, dissociation constant of drug	3	2	1	0	1	0	0	2	0	0	1
		S5 306P. 22-23 CO2	Understand partitioning of drug in immiscible and partially miscible liquids	3	2	2	0	1	0	0	2	0	0	1
		S5 306P. 22-23 CO3	Identify physical constants such as surface tension , HLB value, critical miscelle concentration	3	2	2	0	1	0	0	2	0	0	1
		S5 306P. 22-23CO4	Understand surface property such as adsorption.	3	2	1	0	1	0	0	2	0	0	1
		S5 306P. 22-23CO5	Determine stability constants by different methods	3	2	1	0	1	0	0	2	0	0	1
Pharmaceutical Microbiology – Practical	S5.307P	S5.307T.22-23.CO1	Undertsand the principle and working of equipments used in microbiology laboratory.	3	0	0	1	0	0	0	0	0	0	2
		S5.307T.22-23.CO2	Understand the preparation, serilization and use of culture media.	3	0	0	0	0	0	0	0	0	0	2
		S5.307T.22-23.CO3	Characterization and identification of bacteria using various staining techniques and biochemical methods.	3	0	1	0	0	0	0	0	0	0	2
		S5.307T.22-23.CO4	Understand the principle and method of microbiological assay and evaluate sterility of pharmaceutical products.	3	0	0	0	0	0	0	0	0	0	2
		S5.307T.22-23.CO5	Analyze quality of water and understand principle and method to determine motility of microorganisms.	3	0	0	1	0	0	0	0	0	0	2
		S5.308P.22-23.CO1	Understand the principle, working, instruments radiation constant, steam distillation, heat of evaporation	3	0	0	0	0	0	0	0	0	0	2

Pharmaceutical Engineering –Practical	S5.308P	S5.308P.22-23.CO2	Understand the principle and determination of moisture content, humidity of air and construction of drying rate curve	3	0	1	0	0	0	0	0	0	0	2
		S5.308P.22-23.CO3	Understand the theory of unit operations like size separation, size reduction, milling their description of Construction working and application of Pharmaceutical Machinery	3	0	1	0	0	0	0	0	0	0	2
		S5.308P.22-23.CO4	Understand the principle, working, instruments of filtration, evaporation and crystallization	3	0	0	0	0	0	0	0	0	0	2
		S5.308P.22-23.CO5	Understand the phenomenon of Uniformity index in mixing operations	3	0	0	0	0	0	0	0	0	0	2

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Semester IV

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Pharmaceutical Organic Chemistry III– Theory	S5.401T	S5.401T.22-23.CO1	Understand the steriochemical aspects, steriochemical reactions and nomenclature of optical isomers	3	1	1	1	0	2	1	1	1	1	1
		S5.401T.22-23.CO2	Understand the steriochemical aspects, steriochemical reactions and and	3	1	1	1	0	2	1	1	1	1	1
		S5.401T.22-23.CO3	Know the nomenclature and classification of heterocyclic compounds	3	1	1	1	0	1	1	1	1	1	1
		S5.401T.22-23.CO4	Understand the methods of preperation, reactions and medicinal uses of heterocyclic compounds	3	1	1	1	0	1	1	1	1	1	1
		S5.401T.22-23.CO5	Understand the mechanism of reactions of synthetic importance	3	1	1	1	0	1	1	1	1	1	1
Medicinal Chemistry I – Theory	S5.402T	S5.402.22-23.CO1	Understand the chemistry of drugs with respect to their pharmacological activity	3	2	2	1	0	2	1	1	1	1	2
		S5.402.22-23.CO2	Understand the drug metabolic pathways, adverse effect, and therapeutic value	3	2	2	2	0	1	1	1	1	1	2
		S5.402.22-23.CO3	Remember the history, development of medicinal chemistry, physiological properties in relation to biological activities and basic concept of drug metabolism.	3	2	2	1	0	1	1	1	1	1	2
		S5.402.22-23.CO4	Remember the route of synthesis of prototypes of Central Nervous System Drugs and Autonomic Nervous System Drugs.	3	2	2	1	0	1	1	1	1	1	2
		S5.402.22-23.CO5	Understand the mechanism of action, Structural Activity Relationship, stereochemistry of Central Nervous System Drugs and Autonomic Nervous System Drugs. .	3	2	2	2	0	2	1	1	1	1	2
Physical Pharmaceutics II – Theory	S5.403T	S5.403T.22-23.CO1	Student will be able to understands colloidal dispersions their properties and formulation aspects.	3	1	1	1	0	1	1	2	1	1	2
		S5.403T.22-23.CO2	Student will be able to Explain the concept of rheology and viscosity in pharmacy, the types of flow of pharmaceutical liquids, concepts of Newtonian and non-Newtonian flow.	3	1	1	1	0	1	1	2	1	1	2
		S5.403T.22-23.CO3	Student will be able to understands coarse dispersions their properties and formulation aspects.	3	1	1	1	0	1	1	2	1	1	2
		S5.403T.22-23.CO4	Student will be able to understands science of particles their fundamental and derived properties.	3	1	1	1	0	1	1	2	1	1	2
		S5.403T.22-23.CO5	Student will be able to understands reaction rate kinetics its derivation importance and application in pharmacy.	3	1	1	1	0	1	1	2	1	1	2
Pharmacology I – Theory	S5.404T	S5.404T.22-23.CO1	To understand the basics of pharmacology including pharmacokinetics and pharmacodynamics	3	1	2	2	1	2	1	1	1	1	2
		S5.404T.22-23.CO2	Easily explain the mechanism of drug receptor action and brief about clinical trials	3	1	3	2	2	2	2	1	2	1	2
		S5.404T.22-23.CO3	Understand pharmacology of drugs acting on autonomic nervous system.	3	1	2	2	0	2	1	1	1	1	2
		S5.404T.22-23.CO4	Understand pharmacology of CNS related drug	3	1	2	2	0	2	1	1	1	1	2
		S5.404T.22-23.CO5	Understand pharmacology of Psychopharmacological agents & opioids drug	3	1	2	2	0	2	1	1	1	1	2
Pharmacognosy and Phytochemistry I– Theory	S5.405T	S5.405T.22-23.CO1	Understand history, development, sources of drugs, forms of crude drugs and significance of Pharmacognosy and Phytochemistry in the alternative systems of medicine.	3	0	0	0	0	0	0	1	1	0	0
		S5.405T.22-23.CO2	Discuss classification and evaluation of DONO.	3	0	0	0	0	0	0	1	0	0	1
		S5.405T.22-23.CO3	Discuss cultivation, collection, processing of crude drugs, plant hormones, plant tissue culture for better quality of plant based raw material, cultivation of medicinal plants.	3	1	1	0	0	1	0	1	2	1	1
		S5.405T.22-23.CO4	Discuss classification, properties and test for identification of secondary metabolites.	3	0	0	0	0	0	0	0	0	0	0
		S5.405T.22-23.CO5	Discuss carbohydrate, fibres, enzymes, protein and marine sources containing DONO.	3	0	0	0	0	0	0	1	1	0	0
Medicinal Chemistry I – Practical	S5.406P	S5.406P.22-23.CO1	Develop the synthetic skills for preparation of synthetic products	3	2	0	0	1	1	3	1	1	2	2
		S5.406P.22-23.CO2	Understand the chemistry of drug molecules	3	0	3	0	0	1	0	1	2	2	2
		S5.406P.22-23.CO3	Understand the theoretical and practical skills to use the analytical instruments	3	2	1	2	0	1	3	1	0	0	2
		S5.406P.22-23.CO4	Develop tha analytical skills to carry out analytical work	3	2	0	0	1	1	3	1	1	2	2
		S5.406P.22-23.CO5	Learn the practical skills for determining partition coefficient of any two drugs.	3	2	0	0	0	1	3	1	1	0	2
Physical Pharmaceutics II – Practical	S5.407P	S5.407P.20-21.CO1	Apply the knowledge of particle size, particle size distribution.	3	0	1	0	0	0	0	0	0	0	2
		S5.407P.20-21.CO2	Understand derived properties of powder materials.	3	0	1	0	0	0	0	0	0	0	2
		S5.407P.20-21.CO3	Understand flow properties of liquids and semisolids.	3	0	1	0	0	1	0	0	1	0	1
		S5.407P.20-21.CO4	Understand the concept of chemical kinetics and able to calculate reaction rate constants.	3	0	1	0	0	0	0	0	0	0	2
		S5.407P.20-21.CO5	Understand degradation kinetics and able to calculate expiry date and shelf life of formulations.	3	0	1	0	0	1	0	0	0	0	2
Pharmacology I – Practical	S5.408P	S5.408P.20-21.CO1	Remember the pharmacological terms, instruments and common laboratory animals used in experimental pharmacology.	3	2	1	3	0	1	1	1	1	0	2
		S5.408P.20-21.CO2	Understand common laboratory techniques and different routes of drugs administration in mice/rats	3	2	1	3	0	1	1	1	1	0	2
		S5.408P.20-21.CO3	Remember ethical guideline (CPCSEA) for handling of laboratory animals	3	2	1	3	1	1	3	1	1	0	2
		S5.408P.20-21.CO4	Understand role of microsomal inducer and effect of drugs on eye and gastrointestinal motility	3	2	1	3	1	1	3	1	1	0	2
		S5.408P.20-21.CO5	Understand preclinical models used to evaluate potency of drugs acting on central nervous system.	3	2	1	3	1	1	3	1	1	0	2
Pharmacognosy		S5.409P.22-23.CO1	Understand the chemical evaluation methods for identification of crude drugs.	2	0	0	1	0	0	1	0	0	0	0
		S5.409P.22-23.CO2	Understand the Pharmacopeial procedure for physical evaluation of crude drugs.	2	0	0	0	0	0	0	0	0	0	0

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and Phytochemistry I – Practical	S5.409P	S5.409P.22-23.CO3	Understand the Qualitative microscopical evaluation methods for identification of crude drugs.	2	0	0	0	0	0	0	0	0	0	0
		S5.409P.22-23.CO4	Understand the Quantitative microscopical evaluation of crude drugs.	2	0	0	0	0	0	0	0	0	0	0
		S5.409P.22-23.CO5	Understand the measurement of dimensions of diagnostic characters of the crude drugs.	2	0	1	0	0	0	0	0	0	0	0

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Semester V

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Medicinal Chemistry-II	S5.501T	S5.501T.22-23.CO1	Understand the chemical and mechanistic classification, structure, generic name of Anti-Cancer agents, Cardiovascular Drugs, Antihistaminics, Antidiabetics, and Drugs acting on Endocrine System	3	3	3	1	0	1	1	2	1	1	2
		S5.501T.22-23.CO2	To understand the mechanism of action, drug metabolic pathways, adverse effect, and therapeutic value of drugs.	3	3	3	1	0	1	1	2	1	1	2
		S5.501T.22-23.CO3	Understand the rational development of Anti-histaminics drugs	3	3	3	1	0	1	1	2	1	1	2
		S5.501T.22-23.CO4	Remember route of synthesis of prototypes of Anti-Cancer agents, Cardiovascular Drugs, Antihistaminics, Antidiabetics, and Drugs acting on Endocrine System	3	3	3	1	0	1	1	2	1	2	2
		S5.501T.22-23.CO5	Understand the Structure Activity Relationship of Cardiovascular Drugs, Antihistaminics, Antidiabetics, Local Anaesthetics and Drugs acting on Endocrine System	3	3	3	1	0	1	1	2	1	1	2
Industrial Pharmacy I Theory	S5.502T	S5.502T.22-23.CO1	To understand Physicochemical principles of Drug substances for development and manufacturing of dosage forms	3	0	1	0	0	0	1	0	0	0	1
		S5.502T.22-23.CO2	Understand the formulation, manufacturing and evaluation of Tablets and Oral liquids.	3	0	1	0	0	0	1	0	0	0	1
		S5.502T.22-23.CO3	Understand characteristics, formulation manufacturing and evaluation of Capsule Dosage Forms and Pellets.	3	0	1	0	0	0	1	0	0	0	1
		S5.502T.22-23.CO4	Learn the components, manufacturing process and evaluation of Parenteral dosage	3	0	2	0	0	0	1	0	0	0	1
		S5.502T.22-23.CO5	Understand the basic concepts of Cosmetics, aerosol products. and Packaging material science.	3	0	2	0	0	0	1	0	0	0	1
Pharmacology II Theory	S5.503T	S5.503T.21-22.CO1	Understand the hemodynamic & pharmacology of drugs acting in the treatment of different types of cardiovascular diseases.	3	0	1	0	0	2	0	0	1	0	1
		S5.503T.21-22.CO2	Understand the pharmacology of drugs used in the therapy of shock, blood related diseases & urinary system.	3	0	0	0	0	0	0	0	1	0	1
		S5.503T.21-22.CO3	Understand the pharmacology of autocoid drugs	3	0	0	0	0	0	0	0	1	0	1
		S5.503T.21-22.CO4	Understand the pharmacology of drugs acting on endocrine system.	3	0	0	0	0	0	0	0	1	0	1
		S5.503T.21-22.CO5	Understand the pharmacology of drugs acting on uterus, androgens, anabolic steroids, estrogen, progesterone & contraceptive pills & principles & types of bioassay.	3	0	0	0	0	0	0	0	1	0	1
Pharmacognosy & Phytochemistry II Theory	S5.504T	S5.504T.22-23.CO1	Remember biosources, composition, chemical class therapeutic uses and commercial applications of plant drugs.	3	0	2	2	0	0	0	0	0	1	1
		S5.504T.22-23.CO2	Understand the metabolic pathway, chemistry & and utilization of radioactive isotopes.	3	0	2	2	0	0	0	0	0	1	1
		S5.504T.22-23.CO3	Understand the extraction, isolation and purification.	3	0	2	2	0	0	0	0	0	1	1
		S5.504T.22-23.CO4	Understand the Industrial production, estimation and utilization of phytoconstituents.	3	0	2	2	0	0	0	0	0	1	1
		S5.504T.22-23.CO5	Understand modern techniques for identification of phytoconstituents.	3	0	2	2	0	0	0	0	0	1	1
Pharmaceutical Jurisprudence Theory	S5.505T	S5.505T.22-23.CO1	To describe the significance Drugs and Cosmetics Act 1940 & Rules 1945; Pharmacy Act 1948; Medical and Toilet preparation Act 1955; Narcotic Drugs and Psychotropic substances Act 1985 & Rules thereunder; Drugs magic remedies Act & its Rules and Prevention of cruelty to animals Act 1960.	3	0	0	1	0	1	0	2	0	0	3
		S5.505T.22-23.CO2	To remember various definition, schedules and provisions for sale, import, manufacture as well as prohibitions, offenses and Penalties under Drugs and Cosmetics Act 1940 and Rules 1945.	3	0	0	1	0	1	0	2	0	0	3
		S5.505T.22-23.CO3	To apply knowledge of various licenses required for Drugs and Cosmetics in pharmacy profession.	3	0	0	1	0	1	0	2	0	0	3
		S5.505T.22-23.CO4	To explain the role of various regulatory bodies like advisory, analytical, executive bodies and National Pharmaceutical Pricing Authority.	3	0	0	1	0	1	0	2	0	0	3
		S5.505T.22-23.CO5	To describe the Intellectual Property Rights (IPR), patent process, Pharmaceutical Legislation, Code of Pharmaceutical Ethics, Medical Termination of Pregnancy Act and Right to Information Act.	3	0	0	1	0	1	0	2	0	0	3
Industrial Pharmacy I Practical	S5.506P	S5.506P.22-23.CO1	Have knowledge of preformulation studies of drug used for formulation of product.	3	3	3	0	0	0	1	0	1	0	1
		S5.506P.22-23.CO2	Able to prepare granules for formulating tablets and coating of tablet for different drugs and their evaluation.	3	3	3	0	0	0	1	0	1	0	1
		S5.506P.22-23.CO3	Have knowledge of evaluation of final products of tablets and capsules.	3	3	3	0	0	0	1	0	1	0	1
		S5.506P.22-23.CO4	Able to prepare and have knowledge of evaluation of injections, ointment and cosmetic product.	3	3	3	0	0	0	1	0	1	0	1
		S5.506P.22-23.CO5	Able to perform the evaluation test for glass container as per IP.	3	3	3	0	0	0	1	0	1	0	1
Pharmacology II Practical	S5.507P	S5.507P.21-22.CO1	Understand the mechanism of drug action & its relevance in the treatment of different diseases.	3	0	0	3	0	3	0	3	1	1	1
		S5.507P.21-22.CO2	Demonstrate isolation of different organs/tissues from the laboratory animals by stimulated experiments.	3	0	0	3	0	1	0	1	1	1	1
		S5.507P.21-22.CO3	Demonstrate the various receptor actions using isolated tissue preparation.	3	0	0	3	0	1	0	1	1	1	1
		S5.507P.21-22.CO4	Appreciate co-relation of pharmacology with related medical sciences.	3	0	0	3	0	3	0	1	1	1	1
		S5.507P.21-22.CO5	Understand the different types of instruments/apparatus used in relevant experiments.	3	0	0	3	0	1	0	1	1	1	1
Pharmacognosy & Phytochemistry	S5.508P	S5.508P.22-23.CO1	Understand the morphology, histology, powder characteristics, chemical tests of crude drugs.	3	0	2	2	0	0	0	0	0	1	1
		S5.508P.22-23.CO2	Understand the isolation and detection of the active principles from crude drugs.	3	0	2	2	0	0	0	0	0	1	1

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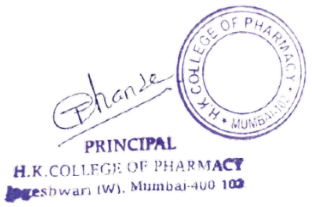
II Practical		S5.508P.22-23.CO3	Understand identification of phytoconstituents by using chromatography.	3	0	2	2	0	0	0	0	0	1	1
		S5.508P.22-23.CO4	Analyse unorganized herbal crude drugs by using chemical tests.	3	0	2	2	0	0	0	0	0	1	1
Universal human value	S5.509UHV	S5.509T.22-23.CO1	To develop understanding of the concepts of Universal Human Values	0	1	3	0	1	1	0	1	1	0	1
		S5.509T.22-23.CO2	To recognize the relevance of Universal Human Values.	1	1	3	0	1	1	0	1	1	0	1
		S5.509T.22-23.CO3	To develop understanding of value systems that are shared by our culture.	1	1	3	0	1	1	0	1	1	0	1
		S5.509T.22-23.CO4	To critically analyze current issues related to values	1	1	3	0	1	1	0	1	1	0	1
		S5.509T.22-23.CO5	To develop a sense of personal self in harmony with society and nature through integration of Universal Human Values.	1	1	3	0	1	1	0	1	1	0	1
		S5.509T.22-23.CO6	To explore ways to integrate human values in personal and professional life.	1	1	3	0	1	1	1	1	1	0	1



Semester VI

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Medicinal Chemistry-III Theory	S5.601T	S5.601T.22-23.CO1	Understand the development, chemical and mechanistic classification, structure, generic name of Antibiotics, Anti tubercular, Urinary tract anti-infective, Antiviral, Antifungal, Anti-protozoal,Anti-helmintics drugs	3	3	3	1	0	1	1	2	1	1	2
		S5.601T.22-23.CO2	To understand the mechanism of action, drug metabolic pathways, adverse effect, and therapeutic value of drugs.	3	3	3	1	0	1	1	2	1	1	2
		S5.601T.22-23.CO3	Remember route of synthesis of prototypes of Antibiotics, Anti tubercular, Urinary tract anti-infective, Antiviral, Antifungal, Anti-protozoal,Anti-helmintics drugs	3	3	3	1	0	1	1	2	1	2	2
		S5.601T.22-23.CO4	Understand the Structure Activity Relationship of Antibiotics, Anti tubercular, Urinary tract anti-infective, Antiviral, Antifungal, Anti-protozoal,Anti-helmintics drugs	3	3	3	1	0	1	1	2	1	2	2
		S5.601T.22-23.CO5	Understand the importance of drug design and different techniques of drug design	3	3	3	3	0	1	1	2	1	3	2
Pharmacology III Theory	S5.602T	S5.602T.22-23.CO1	Understand the pharmacology of drugs acting on Respiratory system & GIT.	3	1	2	1	1	3	2	2	3	1	3
		S5.602T.22-23.CO2	Understand the general concepts and pharmacology of various drug used in chemotherapy.	3	1	2	1	1	3	2	2	3	1	3
		S5.602T.22-23.CO3	Understand pharmacology of drug used in infectious diseases.	3	1	2	1	1	3	2	2	3	1	3
		S5.602T.22-23.CO4	Understand the immunopharmacology of drugs.	3	1	2	1	1	3	2	2	3	1	3
		S5.602T.22-23.CO5	Understand the basic concepts of toxicology with especially reference to acute and genotoxicity and chronotherapy	3	1	2	1	1	3	2	2	3	1	3
Herbal Drug Technology Theory	S5.603T	S5.603T.22-23.CO1	Understand raw material as source of herbal drugs from cultivation to herbal drug product, cultivation techniques & Indian systems of medicines.	3	0	0	0	0	2	3	0	1	1	1
		S5.603T.22-23.CO2	Understand WHO and ICH guidelines for evaluation of herbal drugs & herbal formulation.	3	0	0	0	0	2	3	-	1	1	1
		S5.603T.22-23.CO3	Remember herbal cosmetics, natural sweeteners, nutraceuticals	3	0	0	0	0	2	3	-	1	1	1
		S5.603T.22-23.CO4	Understand patenting & GMP of herbal drugs & introduction to Herbal Industry.	3	0	0	0	0	2	3	-	1	1	1
		S5.603T.22-23.CO5	Remember Herb-Drug & Herb-Food interactions.	3	0	0	0	0	2	3	-	1	1	1
Biopharmaceutics and Pharmacokinetics – Theory	S5.604T	S5.604T.22-23.CO1	Introduction to biopharmaceutics and understanding of various branches	3	0	0	0	0	0	0	0	0	0	2
		S5.604T.22-23.CO2	Understand various pharmacokinetic parameters like Absorption, Distribution, Elimination their significance & applications	3	0	0	0	0	0	0	0	0	0	2
		S5.604T.22-23.CO3	Understand the concepts of bioavailability and bioequivalence of drug products and their significance	3	0	1	0	0	0	0	0	0	0	2
		S5.604T.22-23.CO4	Understand and apply the concepts of multi-compartment models	3	0	1	0	0	0	0	0	0	0	2
		S5.604T.22-23.CO5	Understand concepts of Non-linear pharmacokinetics and Biotransformation of drugs	3	0	1	0	0	0	0	0	0	0	2
Pharmaceutical Biotechnology – Theory	S5. 605T	S5.605T.22-23.CO1	Understanding of enzymes, enzyme production and importance of Immobilized enzymes in Pharmaceutical Industries	3	0	0	0	0	0	1	1	1	0	2
		S5.605T.22-23.CO2	Introduction to Genetic engineering and its application in production of enzyme, vaccines or hormones	3	0	0	2	0	0	1	1	1	0	2
		S5.605T.22-23.CO3	Understanding of Immune system and importance of Monoclonal antibodies in Industries	3	0	0	2	0	0	0	1	1	0	2
		S5.605T.22-23.CO4	Understanding of genetic organization, immunoblotting techniques, microbial genetics and mutation	3	0	0	0	0	0	0	0	0	0	2
		S5.605T.22-23.CO5	Introduction and understanding of Fermentation technology and its use in production of different pharmaceutical ingredients	3	0	0	2	0	0	1	0	1	0	2
Pharmaceutical Quality Assurance –Theory	S5.606T	S5.606T.22-23.CO1	Remember the concept of QMS, QA, QC, ICH. NABL and QbD	3	1	2	0	2	1	3	3	2	2	1
		S5.606T.22-23.CO2	Understand the requirements of personnel, premises, raw materials and equipment in a Pharmaceutical Organization	3	1	2	0	1	0	3	2	0	2	1
		S5.606T.22-23.CO2	Understand the Good laboratory Practices and Quality control of packagings	3	1	2	0	2	1	3	2	2	1	1
		S5.606T.22-23.CO4	Understand handling of complaints and maintenance of documents in Pharmaceutical Industry	3	1	2	0	1	1	3	3	2	0	1
		S5.606T.22-23.CO5	Understand warehouse management, concepts of calibration and validation with respect to pH meter, UV visible spectrophotometer	3	1	2	2	1	0	2	1	0	0	1
Medicinal chemistry III – Practical	S.5.607.P	S.5.607.P.22-23.CO1	Perform the synthesis of various drugs and intermediates by different chemical reactions	3	3	3	2	1	1	3	3	3	2	2
		S.5.607.P.22-23.CO2	Perform assay of various drugs according to IP	3	3	3	1	1	1	3	3	3	2	2
		S.5.607.P.22-23.CO3	Calculate the percentage yields of the products obtained by synthesis and assay of drugs	3	3	3	1	1	1	3	3	2	1	2
		S.5.607.P.22-23.CO4	Perform synthesis of medicinally important compounds or intermediates by Microwave irradiation technique	3	3	3	3	1	1	3	3	3	2	2

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Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
		S.5.607.P.22-23.CO5	Understand structures, reactions and physicochemical properties of drugs using different softwares	3	3	3	3	1	1	3	3	3	3	2
Pharmacology III – Practical	S5.608P	S5.608P.22-23.CO1	Understand and perform the dose calculation and various pharmacokinetic parameters used in experimental pharmacology.	3	0	0	0	0	0	0	0	0	0	1
		S5.608P.22-23.CO2	Perform the different screening methods of antiallergic, antiulcer, git in pharmacology.	3	0	0	0	0	0	0	0	0	0	1
		S5.608P.22-23.CO3	Understand & perform the insulin hypoglycemic and pyrogens effect in rabbit.	3	0	0	0	0	0	0	0	0	0	1
		S5.608P.22-23.CO4	Perform the acute toxicity testing and determination of acute irritation of substance as per OECD guideline.	3	0	0	0	0	0	0	0	0	0	1
		S5.608P.22-23.CO5	Understand the various biostatistics methods used in experimental pharmacology	3	0	0	0	0	0	0	0	0	0	1
Herbal Drug Technology – Practical	S5.609P	S5.609P.22-23.CO1	Understand phytochemical screening of Herbal drugs.	3	0	0	0	0	2	3	0	1	1	1
		S5.609P.22-23.CO2	Understand the preparation of herbal extracts & formulate herbal formulation.	3	0	0	0	0	2	3	0	1	0	1
		S5.609P.22-23.CO3	Analyse the herbal & ayurvedic formulation.	3	0	0	0	0	2	3	0	1	1	1
		S5.609P.22-23.CO4	Analyse the monograph of herbal drug & excipient as per Indian Pharmacopoeia	3	0	0	0	0	2	3	0	1	1	1
		S5.609P.22-23.CO5	Understand the determination of phenol, aldehyde & alkaloid content in herbal drugs.	3	0	0	0	0	2	3	0	1	1	1
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Semester VII

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Instrumental Methods of Analysis Theory	S5.701T	S5.701T.22-23.CO1	Understand the interaction of matter with UV light radiations, phenomenon of fluorescence and its applications in drug analysis.	3	1	3	3	0	1	2	2	2	1	2
		S5.701T.22-23.CO2	Remember the principle, instrumentation and applications of IR spectroscopy, Atomic spectroscopy & Nepheloturbidometry	3	1	3	3	0	1	2	2	2	1	2
		S5.701T.22-23.CO3	Understand the principle and applications of planar chromatography & electrophoresis	3	1	3	3	0	1	2	2	2	1	2
		S5.701T.22-23.CO4	Understand the instrumentation, principle and applications of GC and HPLC	3	1	3	3	0	1	2	2	2	1	2
		S5.701T.22-23.CO5	Understand the principle and applications for separation of components using Gel, Affinity & Ion exchange chromatography.	3	1	3	3	0	1	2	1	2	1	2
Industrial PharmacyII – Theory	S5.702T	S5.702T.22-23.CO1	Understand the pilot plant scale up techniques for pharmaceutical dosage forms.	3	3	2	2	3	2	2	3	2	0	1
		S5.702T.22-23.CO2	Understand the practice and the process of technology transfer from lab scale to commercial.	3	3	2	0	0	0	1	0	0	0	1
		S5.702T.22-23.CO3	Explain the different regulatory aspects that regulate pharmaceutical industry in approval process and regulatory requirements of drug products.	3	3	2	0	0	0	1	0	0	0	1
		S5.702T.22-23.CO4	Explain the different regulatory aspects that regulate pharmaceutical industry in approval process and regulatory requirements of drug products.	3	3	2	0	0	0	1	0	0	0	1
		S5.702T.22-23.CO5	Describe the organization and responsibilities of Central and state licensing authority.	3	3	2	0	0	0	1	0	0	0	1
Pharmacy Practice – Theory	S5.703T	S5.703T.22-23.CO1	Explain various drug distribution systems in hospitals and pharmaceutical care services.	3	0	0	0	0	1	1	2	1	0	3
		S5.703T.22-23.CO2	Remember knowledge about classification of hospitals, organisation structure of hospitals, functions of hospital pharmacy, community pharmacy, patient counselling, hospital formulary, rational drug therapy along with its applications and pharmacy store management .	3	0	0	0	0	1	1	1	1	0	2
		S5.703T.22-23.CO3	Describe drug information services , Therapeutic committee, rational use of over the counter medicines, legal requirements with reference to prescribed medication order and apply acquired knowledge on organising training programs for the hospital staff.	3	0	0	0	0	1	1	2	1	0	3
		S5.703T.22-23.CO4	Classification of adverse drug reaction, Interpretation of biochemical test in relation with progress of pathophysiological state of patient.	3	0	0	1	0	1	1	1	0	0	1
		S5.703T.22-23.CO5	Identify drug related problems, Importance of patient counselling and Rational use of medications	3	0	0	1	0	1	1	1	0	0	2
Novel Drug Delivery System – Theory	S5.704T	S5.704T.22-23.CO1	Applying the basic concept of NDDS in selection of drugs and polymers for the development of novel drug delivery systems and controlled release formulations based on diffusion, dissolution and ion exchange principles.	3	1	1	2	0	1	1	2	1	2	2
		S5.704T.22-23.CO2	Understand the concept and formulation of microencapsulation techniques, mucosal drug delivery and implantable drug delivery systems.	3	1	1	2	0	1	1	2	1	2	2
		S5.704T.22-23.CO3	Apply the concept of transdermal drug delivery, gastroretentive drug delivery systems and nasopulmonary drug delivery system.	3	1	1	2	0	1	1	2	1	2	2
		S5.704T.22-23.CO4	Understand the concept of formulation and evaluation of liposomes, niosomes, nanoparticles, monoclonal antibodies and importance of various approaches of Implant system and elaborate on nasal, pulmonary and ocular drug delivery.	3	1	1	2	0	1	1	2	1	2	2
		S5.704T.22-23.CO5	Understand the formulation of pharmaceutically and physiologically acceptable ophthalmic dosage forms and Intrauterine Drug Delivery Systems.	3	1	1	2	0	1	1	2	1	2	2
Instrumental Methods of Analysis –Practical	S5.705P	S5.705P.22-23.CO1	Apply the UV - visible spectroscopy, fluorescence spectroscopy & flame photometric techniques for estimation of drugs.	3	3	3	3	1	1	3	3	2	2	2
		S5.705P.22-23.CO2	Separate and identify constituents using planar & column chromatography.	3	3	3	2	1	1	3	3	2	2	2
		S5.705P.22-23.CO3	Understand the principle and instrumentation for estimation of drugs using HPLC and gas chromatography.	3	3	3	3	1	1	3	3	2	2	2
		S5.705P.22-23.CO4	Apply principles of scattering of light for estimation of constituents using nephelometer	3	3	3	3	1	1	3	3	2	2	2
		S5.705P.22-23.CO5	Understand the effect of solvents on absorption spectra of drugs	3	3	3	3	1	1	3	3	2	2	2
Practice School	S5.706PS	S5.706PS.22-23.CO1	Remember fundamental knowledge in preparing conventional dosage forms	1	0	0	1	0	0	0	0	0	0	2
		S5.706PS.22-23.CO2	Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.	1	0	1	0	0	0	2	0	0	0	1
		S5.706PS.22-23.CO3	Develop the communication skills to appear for job interview.	1	0	0	0	0	0	0	1	0	0	2
		S5.706PS.22-23.CO4	Explain the various aspects reference work.	1	0	0	1	0	0	0	0	0	0	2
		S5.706PS.22-23.CO5	Describe analytical techniques used drug identification and quantitative estimation	1	0	1	1	0	0	0	0	0	0	2

Semester VIII

Subject	Subject Code	CO No.	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Biostatistics and Research Methodology	S5.801T	S5.801T.22-23.CO1	Able to know the various statistical techniques to solve statistical problems	3	0	0	0	0	2	0	1	2	1	1
		S5.801T.22-23.CO2	Able to know the various statistical techniques to solve Pharmaceutical problems	3	0	0	0	2	2	0	1	2	1	1
		S5.801T.22-23.CO3	Able to know the various statistical techniques used in pharmaceutical experiment design	3	0	0	0	2	3	0	1	2	1	1
		S5.801T.22-23.CO4	Understand the concept of optimization	3	0	0	0	0	2	0	1	2	0	1
		S5.801T.22-23.CO5	Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)	3	0	0	0	2	2	0	1	2	1	1
Social and Preventive Pharmacy	S5.802T	S5.802T.22-23.CO1	To review Concept of Social and Health Education.	3	0	0	0	0	2	0	1	2	1	0
		S5.802T.22-23.CO2	To Examine general Principle of Prevention and Control of Various viral disease.	3	0	0	0	2	2	0	1	2	1	0
		S5.802T.22-23.CO3	To Assess General principle of Prevention and control of various lifestyle related and other disease.	3	0	0	0	2	3	0	1	2	1	0
		S5.802T.22-23.CO4	Understand the importance and concept of various National health programme	3	0	0	0	0	2	0	1	2	0	0
		S5.802T.22-23.CO5	To manage community service in rural ,urban and school health.	3	0	0	0	2	2	0	1	2	1	0
Pharmaceutical Marketing Management	S5.803ET	S5.803ET.22-23.CO1	Understand the Pharmaceutical market and marketing in pharmaceutical industry.	1	2	0	0	0	0	0	0	0	0	0
		S5.803ET.22-23.CO2	Remember the product decision for the growth of the industry.	0	0	1	0	0	0	0	0	0	0	1
		S5.803ET.22-23.CO3	Understand the promotional techniques for taking a challenging role in sales and product management	0	0	0	2	2	2	0	2	0	0	1
		S5.803ET.22-23.CO4	Understand Pharmaceutical marketing channels and role of pharmaceutical sales representatives.	0	0	0	0	0	1	2	0	0	0	0
		S5.803ET.22-23.CO5	Remember the pricing methods and marketing concepts in pharmaceutical industry	1	0	0	1	1	0	0	0	2	0	0
Cosmetic Science	S5.809ET	S5E.809T. 22-23CO1	Apply the applications of various commonly used cosmetic excipients.	3	0	0	0	0	0	2	0	0	0	1
		S5E.809T. 22-23CO2	Understand the principle of formulation and building blocks of skin and hair care product.	3	0	0	0	0	1	0	0	0	0	1
		S5E.809T. 22-23CO3	To know the roll of herbs.	3	0	0	0	0	0	0	0	0	0	1
		S5E.809T. 22-23CO4	To know analytical specification in cosmetics and principle of cosmetic evaluation.	3	0	0	1	0	0	0	0	1	0	1
		S5E.809T. 22-23CO5	To Know the cosmetic problem associated with hair and skin.	3	0	0	0	0	0	0	0	0	0	1

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University Code: 738 A.I.C.T.E Approval No. 06/07/MS/PHARM/2008/007 D.T.E Code No. PH3234

VISION: To Be recognized as the Institution providing quality education in Pharmacy to serve the health care sector

Program Specific Outcomes

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Email: pharmacy.director@hkcp.edu.in **website:** www.hkcp.edu.in

Program Specific Outcomes- M.Pharm		
Department of Pharmaceutics)		
Sr. No.	**PSO Term**	**Statement**
PSO 1	**Competence to analyses critically and solve problems**	Understand and be able utilize understanding to novel and advanced drug delivery systems in single and combination dosage forms for their formulation development, quality control testing and evaluation, selection of polymers and excipients, demonstration of skills for dose calculations, dose adjustments, use of computers in pharmaceutical research and development, and application of knowledge of biopharmaceutics and pharmacokinetics in real-world problem solving for development of formulations
PSO 2	**Innovate and develop your ideas**	Create various regulatory filing paperwork, develop generic or innovative dosage forms, and obtain approval. Clinical trials, Pharmacovigilance, and the process of monitoring in clinical trials. Preparation of dossiers.
PSO 3	**Research to be integrative and quality-focused**	Understand the foundations of preformulation studies, optimization techniques, pilot plant scale-up, industrial management, and GMP considerations. Be able to conduct research projects under the direction of a faculty member for practical training and application of knowledge that results in the publication of papers. Students should learn both theoretical and practical instrument skills.

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University Code: 738 A.I.C.T.E Approval No. 06/07/MS/PHARM/2008/007 D.T.E Code No. PH3234

VISION: To Be recognized as the Institution providing quality education in Pharmacy to serve the health care sector

Course Outcomes-

M.Pharm

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Semester I

Subject	Subject Code	CO No.	CO Statement	PSO 1	PSO 2	PSO 3
Modern Pharmaceutical Analytical Techniques	MPH.101T	MPH.101T.22-23.CO1	To understand the basic concept, principle and Instrumentation, working and application of UV visible, IR, Spectrofluorimetry, Flame emission and Atomic absorption spectroscopy.	3	2	3
		MPH.101T.22-23.CO2	To understand the basic concept, principle, instrumentation, working and application of NMR spectroscopy.	3	3	3
		MPH.101T.22-23.CO3	To learn the basic principle, instrumentation, working and application of Mass spectroscopy.	2	1	2
		MPH.101T.22-23.CO4	To understand the basic concept, principle, instrumentation, working and application of chromatographic technique.	3	3	3
		MPH.101T.22-23.CO5	To understand the basic concept, principle, instrumentation, working and application of Electrophoresis.	2	1	1
		MPH.101T.22-23.CO6	To understand the basic concept, principle, working and application of Immunological Assay.	1	1	2
Drug Delivery System	MPH.102T	MPH 102T.22-23.CO1	Understand various barriers in drug delivery and to overcome the barrier	3	0	1
		MPH 102T.22-23.CO2	The various advantages and disadvantage for development of novel drug delivery system.	3	0	1
		MPH 102T.22-23.CO3	The criteria for selection of drugs and polymers for the development of delivering system	3	0	1
		MPH 102T.22-23.CO4	The need, concept, design, and mechanism of various customized, sustained, and controlled release dosage forms.	3	0	1
		MPH 102T.22-23.CO5	To Formulate and evaluate various novel drug delivery system	3	0	2
Modern Pharmaceutics	MPH.103T	MPH.103T.22-23.CO1	Understands the preformulation concept and optimization technique in pharmaceutical formulation.	3	1	1
		MPH.103T.22-23.CO2	Learn the concept of validation and ICH & WHO guidelines for validation of equipment and pharmaceutical product.	3	1	1
		MPH.103T.22-23.CO3	Understands the current good manufacturing process and industrial management for pharmaceutical product	3	1	1
		MPH.103T.22-23.CO4	To understand the compression compaction theories for tablet.	3	1	1
		MPH.103T.22-23.CO5	To understand the consolidation parameters for solid dosage forms.	3	1	1
Regulatory Affairs	MPH.104T	MPH.104T.22-23.CO1	Understanding the concept of regulatory affairs and regulatory requirement for product approval	3	1	0
		MPH.104T.22-23.CO2	To learn ICH guidelines ,CMC , post regulatory affairs and different regulatory requirement	3	1	0
		MPH.104T.22-23.CO3	To understand non clinical drug development , IMPD , IB	3	1	0
		MPH.104T.22-23.CO4	To undersstand developing clinuical trial protocol , IRB, IEC,IC and pharmacovigilance in clinical trial	3	1	0
Pharmaceutics Practical I	MPH.105P	MPH.105P.22-23.CO1	Students will understand various spectroscopic methods for estimation of drug in a pharmaceutical formulation	3	1	3
		MPH.105P.22-23.CO2	Students will understand various form of NDDS which improves the drugs sustainability and effectiveness	3	2	3
		MPH.105P.22-23.CO3	Students able to understand concept of invitro dissolution, Apparatus of dissolution test & types of dissolution shaft as per I.P, USP & B.P, Effect of particle size on dissolution.	3	2	3
		MPH.105P.22-23.CO4	Students will understand the concept of preformulation study. Understand the effect of compressional force on surface structure, crushing strength etc	3	2	3
		MPH.105P.22-23.CO5	Understand various method estimation of drug kinetics	3	2	3

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Semester II

Subject	Subject Code	CO No.	CO Statement	PSO 1	PSO 2	PSO 3
NTDDS	MPH.201T	MPH.201T.22-23.CO1	To understand, appreciate and able to explain the Concepts of Targeted Drug Delivery System.	3	2	2
		MPH.201T.22-23.CO2	To understand and explain the various approaches for development of Novel drug delivery system.	3	2	2
		MPH.201T.22-23.CO3	To understand and explain the criteria for selection of drugs and polymers for the development of NDDS.	3	2	2
		MPH.201T.22-23.CO4	To explain the formulation and evaluation of novel drug delivery systems.	3	2	2
Advanced Biopharmaceutics and Pharmcokinetics	MPH.202T	MPH.202T.22-23.CO1	The basic concepts in biopharmaceutics and pharmacokinetics.	3	2	2
		MPH.202T.22-23.CO2	The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination	3	2	3
		MPH.202T.22-23.CO3	The critical evaluation of biopharmaceutic studies involving drug product equivalency.	3	2	3
		MPH.202T.22-23.CO4	The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters	3	2	3
		MPH.202T.22-23.CO5	The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic	3	2	2
Computr Aided Drug Delivery	MPH.203T	MPH.203T.22-23.CO1	Understand the history of computers in pharmaceutical research and development	3	1	1
		MPH.203T.22-23.CO2	Explain the concept computational modeling of drug disposition and computers use in preclinical development	3	1	1
		MPH.203T.22-23.CO3	Apply the concept optimization techniques in pharmaceutical formulation and learn the benefits of computers in market analysis	3	1	1
		MPH.203T.22-23.CO4	Understand the use computers in clinical development and learn the concept of computer-aided biopharmaceutical characterization and gastrointestinal absorption simulation	3	1	1
		MPH.203T.22-23.CO5	Understand the concept of Artificial Intelligence (AI), Robotics, and Computational fluid dynamics (CFD)	3	1	1
Cosmetic and cosmeceuticals	MPH 204T	MPH.204T.22-23.CO1	To learn about the key ingredient used in cosmetics and cosmeceuticals.	3	1	0
		MPH.204T.22-23.CO2	To learn about key building blocks for various formulations	3	0	0
		MPH.204T.22-23.CO3	Understanding current technologies in the market	1	0	0
		MPH.204T.22-23.CO4	Learning various key ingredients and basic science to develop cosmetics and cosmeceuticals	3	2	0
		MPH.204T.22-23.CO5	Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.	3	0	1
Pharmaceutics Practical II	MPH.205P	MPH.205P.22-23.CO1	Formulate & develop various novel microparticulate drug delivery systems like microspheres, beads, liposomes, spherules etc.	3	2	3
		MPH.205P.22-23.CO2	Construct the experimental design for any formulation using Design Expert® Software and other statistical techniques.	3	2	3
		MPH.205P.22-23.CO3	Elaborate methods to enhance solubility of poorly water soluble drugs and can perform dissolution studies of various pharmaceutical dosage forms.	3	2	3
		MPH.205P.22-23.CO4	Develop & evaluate various cosmetic products viz. Shampoo, Skin creams, Toothpaste etc.	3	2	3
		MPH.205P.22-23.CO5	Understand Dissolution paramrters like similarity and diference factor	3	2	3

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Semester III

Subject	Subject Code	CO No.	CO Statement	PSO 1	PSO 2	PSO 3
Research Methodology	MRM301T	MRM.301TT.22-23.CO1	Understand the behavioural needs for a Research operation.	3	2	3
		MRM.301TT.22-23.CO2	Summarizing and understanding the concept, different Problem solving.	3	2	1
		MRM.301TT.22-23.CO3	Implementing concepts and different techniques.	3	2	3
		MRM.301TT.22-23.CO4	Recognizing the different techniques, Communicate effectively Verbal and Non-verbal and application of required research Structure.	3	2	1