1.1.2 Percentage of change in syllabus revision for all Courses

NAME OF THE PROGRAMME:	**Bachelor of Pharmacy**	**PROGRAMME CODE:**	**4203**
NAME OF THE DEPARTMENT:	**SCHOOL OF PHARMACY**	**YEAR OF INTRODUCTION:**	**2019**

BACHELOR OF PHARMACY

[A]	**Total Number of Courses**	**76**
[B]	**Number of Courses with Syllabus revision about 20%**	**76**
[C]	**Percentage of Courses revised** Formula: [B/A] * 100	**100%**
[D]	**Average Percentage of Syllabus revised considering the percentage of syllabus revision in each course**	**100%**

In B.PHARMA Programme, out of 76 number of Courses, 76 number of Courses have undergone syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.

SEMESTER I

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS *
1	B. PHARMA	PHM21001	Human Anatomy and Physiology I – Theory	100%
2	B. PHARMA	PHM21002	Pharmaceutical Analysis I – Theory	100%
3	B. PHARMA	PHM21003	Pharmaceutics I – Theory	100%
4	B. PHARMA	PHM21004	Pharmaceutical Inorganic Chemistry – Theory	100%
5	B. PHARMA	PHM21005	Communication skills – Theory	100%
6	B. PHARMA	PHM21013	Remedial Biology – Theory	100%
7	B. PHARMA	PHM21006	Remedial Mathematics – Theory	100%
8	B. PHARMA	PHM21007	Human Anatomy and Physiology I – Practical	100%
9	B. PHARMA	PHM21008	Pharmaceutical Analysis I – Practical	100%
10	B. PHARMA	PHM21009	Pharmaceutics I - Practical	100%
11	B. PHARMA	PHM21010	Pharmaceutical Inorganic Chemistry – Practical	100%
12	B. PHARMA	PHM21011	Communication skills – Practical	100%
13	B. PHARMA	PHM21012	Remedial Biology – Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER II

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS *
1	B. PHARMA	PHM22014	Human Anatomy and Physiology II – Theory	100%
2	B. PHARMA	PHM22015	Pharmaceutical Organic Chemistry I – Theory	100%
3	B. PHARMA	PHM22016	Biochemistry – Theory	100%
4	B. PHARMA	PHM22017	Pathophysiology – Theory	100%
5	B. PHARMA	PHM22018	Computer Applications in Pharmacy - Theory	100%
6	B. PHARMA	PHM22019	Environmental sciences – Theory	100%
7	B. PHARMA	PHM22020	Human Anatomy and Physiology II – Practical	100%
8	B. PHARMA	PHM22021	Pharmaceutical Organic Chemistry I – Practical	100%
9	B. PHARMA	PHM22022	Biochemistry – Practical	100%
10	B. PHARMA	PHM22023	Computer Application in Pharmacy – Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER III

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	**B. PHARMA**	PHM23024	Pharmaceutical Organic Chemistry II – Theory	100%
2	**B. PHARMA**	PHM23025	Physical Pharmaceutics I - Theory	100%
3	**B. PHARMA**	PHM23026	Pharmaceutical Microbiology - Theory	100%
4	**B. PHARMA**	PHM23027	Pharmaceutical Engineering - Theory	100%
5	**B. PHARMA**	PHM23028	Pharmaceutical Organic Chemistry II – Practical	100%
6	**B. PHARMA**	PHM23029	Physical Pharmaceutics I – Practical	100%
7	**B. PHARMA**	PHM23030	Pharmaceutical Microbiology - Practical	100%
8	**B. PHARMA**	PHM23031	Pharmaceutical Engineering – Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER IV

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	B. PHARMA	PHM24032	Pharmaceutical Organic Chemistry III – Theory	100%
2	B. PHARMA	PHM24033	Medicinal Chemistry I – Theory	100%
3	B. PHARMA	PHM24034	Physical Pharmaceutics II – Theory	100%
4	B. PHARMA	PHM24035	Pharmacology I – Theory	100%
5	B. PHARMA	PHM24036	Pharmacognosy and Phytochemistry I – Theory	100%
6	B. PHARMA	PHM24037	Medicinal Chemistry I – Practical	100%
7	B. PHARMA	PHM24038	Physical Pharmaceutics II – Practical	100%
8	B. PHARMA	PHM24039	Pharmacology I – Practical	100%
9	B. PHARMA	PHM24040	Pharmacognosy and Phytochemistry I – Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER V

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	**B. PHARMA**	PHM25041	Medicinal Chemistry II – Theory	100%
2	**B. PHARMA**	PHM25042	Industrial Pharmacy I – Theory	100%
3	**B. PHARMA**	PHM25043	Pharmacology II – Theory	100%
4	**B. PHARMA**	PHM25044	Pharmacognosy and Phytochemistry II - Theory	100%
5	**B. PHARMA**	PHM25045	Pharmaceutical Jurisprudence – Theory	100%
6	**B. PHARMA**	PHM25046	Industrial Pharmacy I – Practical	100%
7	**B. PHARMA**	PHM25047	Pharmacology II – Practical	100%
8	**B. PHARMA**	PHM25048	Pharmacognosy and Phytochemistry II– Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER VI

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	B. PHARMA	PHM26049	Medicinal Chemistry III – Theory	100%
2	B. PHARMA	PHM26050	Pharmacology III – Theory	100%
3	B. PHARMA	PHM26051	Herbal Drug Technology – Theory	100%
4	B. PHARMA	PHM26052	Biopharmaceutics and Pharmacokinetics – Theory	100%
5	B. PHARMA	PHM26053	Pharmaceutical Biotechnology – Theory	100%
6	B. PHARMA	PHM26054	Quality Assurance – Theory	100%
7	B. PHARMA	PHM26055	Medicinal chemistry III – Practical	100%
8	B. PHARMA	PHM26056	Pharmacology III – Practical	100%
9	B. PHARMA	PHM26057	Herbal Drug Technology – Practical	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER VII

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	**B. PHARMA**	PHM27058	Instrumental Methods of Analysis – Theory	100%
2	**B. PHARMA**	PHM27059	Industrial Pharmacy – Theory	100%
3	**B. PHARMA**	PHM27060	Pharmacy Practice – Theory	100%
4	**B. PHARMA**	PHM27061	Novel Drug Delivery System – Theory	100%
5	**B. PHARMA**	PHM27062	Instrumental Methods of Analysis - Practical	100%
6	**B. PHARMA**	PHM27063	Practice School	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER VIII

SL.NO.	PROGRAM	COURSE CODE	COURSE TITLE	PERCENTAGE OF CHANGE IN SYLLABUS*
1	B. PHARMA	PHM28064	Biostatistics and Research Methodology – Theory	100%
2	B. PHARMA	PHM28065	Social and Preventive Pharmacy – Theory	100%
3	B. PHARMA	PHM28066	Pharma Marketing Management– Theory	100%
4	B. PHARMA	PHM28067	Pharmaceutical Regulatory Science – Theory	100%
5	B. PHARMA	PHM28068	Pharmacovigilance – Theory	100%
6	B. PHARMA	PHM28069	Quality Control and Standardization of Herbals – Theory	100%
7	B. PHARMA	PHM28070	Computer Aided Drug Design – Theory	100%
8	B. PHARMA	PHM28071	Cell and Molecular Biology – Theory	100%
9	B. PHARMA	PHM28072	Cosmetic Science – Theory	100%
10	B. PHARMA	PHM28073	Experimental Pharmacology – Theory	100%
11	B. PHARMA	PHM28074	Advanced Instrumentation Techniques – Theory	100%
12	B. PHARMA	PHM28075	Dietary Supplements and Nutraceuticals - Theory	100%
13	B. PHARMA	PHM28076	Project Work	100%

*** The syllabus revision with more than 20% is highlighted in YELLOW COLOUR. And the other courses in which the syllabus revision is less than 20% are highlighted in GRAY COLOUR which is not considered in the above-mentioned percentage of syllabus revisions.**

SEMESTER AS PER 2020	NAME OF THE COURSE		% OF VARIATION	REMARKS
		2019		
I SEM		Human Anatomy and Physiology I – Theory	100	New Course Introduced View Document
		Pharmaceutical Analysis I – Theory	100	New Course Introduced View Document
		Pharmaceutics I – Theory	100	New Course Introduced View Document
		Pharmaceutical Inorganic Chemistry – Theory	100	New Course Introduced View Document
		Communication skills – Theory	100	New Course Introduced View Document
		Remedial Biology – Theory	100	New Course Introduced View Document
		Remedial Mathematics – Theory	100	New Course Introduced View Document
		Human Anatomy and Physiology I – Practical	100	New Course Introduced View Document
		Pharmaceutical Analysis I – Practical	100	New Course Introduced View Document
		Pharmaceutics I - Practical	100	New Course Introduced View Document
		Pharmaceutical Inorganic Chemistry – Practical	100	New Course Introduced View Document
		Communication skills – Practical	100	New Course Introduced View Document

		Remedial Biology – Practical	**100**	New Course Introduced View Document
II SEM		Human Anatomy and Physiology II – Theory	**100**	New Course Introduced View Document
		Pharmaceutical Organic Chemistry I – Theory	**100**	New Course Introduced View Document
		Biochemistry – Theory	**100**	New Course Introduced View Document
		Pathophysiology – Theory	**100**	New Course Introduced View Document
		Computer Applications in Pharmacy - Theory	**100**	New Course Introduced View Document
		Environmental sciences – Theory	**100**	New Course Introduced View Document
		Human Anatomy and Physiology II – Practical	**100**	New Course Introduced View Document
		Pharmaceutical Organic Chemistry I – Practical	**100**	New Course Introduced View Document
		Biochemistry – Practical	**100**	New Course Introduced View Document
		Computer Application in Pharmacy – Practical	**100**	New Course Introduced View Document
III SEM		Pharmaceutical Organic Chemistry II – Theory	**100**	New Course Introduced View Document
		Physical Pharmaceutics I - Theory	**100**	New Course Introduced View Document
		Pharmaceutical Microbiology -	**100**	New Course Introduced

		Theory		View Document
		Pharmaceutical Engineering - Theory	**100**	New Course Introduced View Document
		Pharmaceutical Organic Chemistry II – Practical	**100**	New Course Introduced View Document
		Physical Pharmaceutics I – Practical	**100**	New Course Introduced View Document
		Pharmaceutical Microbiology - Practical	**100**	New Course Introduced View Document
		Pharmaceutical Engineering – Practical	**100**	New Course Introduced View Document
IV SEM		Pharmaceutical Organic Chemistry III – Theory	**100**	New Course Introduced View Document
		Medicinal Chemistry I – Theory	**100**	New Course Introduced View Document
		Physical Pharmaceutics II – Theory	**100**	New Course Introduced View Document
		Pharmacology I – Theory	**100**	New Course Introduced View Document
		Pharmacognosy and Phytochemistry I – Theory	**100**	New Course Introduced View Document
		Medicinal Chemistry I – Practical	**100**	New Course Introduced View Document
		Physical Pharmaceutics II – Practical	**100**	New Course Introduced View Document
		Pharmacology I – Practical	**100**	New Course Introduced View Document

		Pharmacognosy and Phytochemistry I – Practical	**100**	New Course Introduced View Document
V Sem		Medicinal Chemistry II – Theory	**100**	New Course Introduced View Document
		Industrial Pharmacy I – Theory	**100**	New Course Introduced View Document
		Pharmacology II – Theory	**100**	New Course Introduced View Document
		Pharmacognosy and Phytochemistry II - Theory	**100**	New Course Introduced View Document
		Pharmaceutical Jurisprudence – Theory	**100**	New Course Introduced View Document
		Industrial Pharmacy I – Practical	**100**	New Course Introduced View Document
		Pharmacology II – Practical	**100**	New Course Introduced View Document
		Pharmacognosy and Phytochemistry II– Practical	**100**	New Course Introduced View Document
VI Sem		Medicinal Chemistry III – Theory	**100**	New Course Introduced View Document
		Pharmacology III – Theory	**100**	New Course Introduced View Document
		Herbal Drug Technology – Theory	**100**	New Course Introduced View Document
		Biopharmaceutics and Pharmacokinetics – Theory	**100**	New Course Introduced View Document
		Pharmaceutical Biotechnology –	**100**	New Course Introduced

		Theory		View Document
		Quality Assurance – Theory	**100**	New Course Introduced View Document
		Medicinal chemistry III – Practical	**100**	New Course Introduced View Document
		Pharmacology III – Practical	**100**	New Course Introduced View Document
		Herbal Drug Technology – Practical	**100**	New Course Introduced View Document
VII Sem		Instrumental Methods of Analysis – Theory	**100**	New Course Introduced View Document
		Industrial Pharmacy – Theory	**100**	New Course Introduced View Document
		Pharmacy Practice – Theory	**100**	New Course Introduced View Document
		Novel Drug Delivery System – Theory	**100**	New Course Introduced View Document
		Instrumental Methods of Analysis – Practical	**100**	New Course Introduced View Document
		Practice School	**100**	New Course Introduced View Document
VIII Sem		Biostatistics and Research Methodology – Theory	**100**	New Course Introduced View Document
		Social and Preventive Pharmacy – Theory	**100**	New Course Introduced View Document
		Pharma Marketing Management– Theory	**100**	New Course Introduced View Document

		Pharmaceutical Regulatory Science – Theory	**100**	New Course Introduced View Document
		Pharmacovigilance – Theory	**100**	New Course Introduced View Document
		Quality Control and Standardization of Herbals – Theory	**100**	New Course Introduced View Document
		Computer Aided Drug Design – Theory	**100**	New Course Introduced View Document
		Cell and Molecular Biology – Theory	**100**	New Course Introduced View Document
		Cosmetic Science – Theory	**100**	New Course Introduced View Document
		Experimental Pharmacology – Theory	**100**	New Course Introduced View Document
		Advanced Instrumentation Techniques – Theory	**100**	New Course Introduced View Document
		Dietary Supplements and Nutraceuticals – Theory	**100**	New Course Introduced View Document
		Project Work	**100**	New Course Introduced View Document
AVERAGE PERCENTAGE OF REVISION DONE CONSIDERING ALL COURSES (B.PHARMA)			**100%**	

SEMESTER - 1

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HUMAN ANATOMY AND PHYSIOLOGY I – THEORY**	**100%**
COURSE CODE		**PHM21001**	**100%**
Module I		**Introduction to human body** Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology. **Cellular level of organization** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine **Tissue level of organization** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.	**100%**

Module II		**Integumentary system** Structure and functions of skin **Skeletal system** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction **Joints** Structural and functional classification, types of joints movements and its articulation	**100%**
Module III		**Body fluids and blood** Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system. **Lymphatic system** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	**100%**
Module IV		**Peripheral nervous system:** Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. **Special senses** Structure and functions of eye, ear, nose and tongue and their disorders.	**100%**

Module V		**Cardiovascular system** Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ANALYSIS I – THEORY**	**100%**
COURSE CODE		**PHM21002**	**100%**
Module I		**Pharmaceutical analysis-** Definition and scope i) Different techniques of analysis ii) Methods of expressing concentration iii) Primary and secondary standards. iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate **Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.	**100%**

Module II		**Acid base titration:** Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves **Non aqueous titration:** Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	**100%**
Module III		**Precipitation titrations:** Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride. **Complexometric titration:** Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. **Gravimetry:** Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principles, methods and application of diazotisation titration.	**100%**

Module IV		**Redox titrations** (a) Concepts of oxidation and reduction (b) Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate	**100%**
Module V		**Electrochemical methods of analysis** **Conductometry-** Introduction, Conductivity cell, Conductometric titrations, applications. **Potentiometry -** Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. **Polarography -** Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICS I – THEORY**	**100%**
COURSE CODE		**PHM21003**	**100%**
Module I		Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. Dosage forms: Introduction to dosage forms, classification and definitions Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription. Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.	**100%**

Module II		**Pharmaceuticalcalculations:** Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	**100%**

Module III		**Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions. **Biphasic liquids:** **Suspensions**: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.	**100%**
Module IV		**Suppositories:** Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. **Pharmaceutical incompatibilities:** Definition, classification, physical, chemical and therapeutic incompatibilities with examples.	**100%**

Module V		**Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL INORGANIC CHEMISTRY – THEORY**	**100%**
COURSE CODE		**PHM21004**	**100%**
Module I		**Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate General methods of preparation, assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes	**100%**

Module II		**Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity. **Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance. **Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	**100%**

Module III		**Gastrointestinal agents** **Acidifiers:** Ammonium chloride* and Dil. HCl **Antacid:** Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture **Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite **Antimicrobials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations	**100%**
Module IV		**Miscellaneous compounds** **Expectorants**: Potassium iodide, Ammonium chloride*. **Emetics:** Copper sulphate*, Sodium potassium tartarate **Haematinics:** Ferrous sulphate*, Ferrous gluconate **Poison and Antidote:** Sodium thiosulphate*, Activated charcoal, Sodium nitrite333 **Astringents:** Zinc Sulphate, Potash Alum	**100%**

Module V		**Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage conditions, precautions & pharmaceutical application of radioactive substances.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COMMUNICATION SKILLS – THEORY**	**100%**
COURSE CODE		**PHM21005**	**100%**
Module I		**Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	**100%**

Module II		**Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style	**100%**
Module III		**Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message	**100%**

Module IV		**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery	**100%**
Module V		**Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**REMEDIAL BIOLOGY – THEORY**	**100%**
COURSE CODE		**PHM21013**	**100%**
Module I		**Living world:** Definition and characters of living organisms Diversity in the living world Binomial nomenclature Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus. **Morphology of Flowering plants** Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed. General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.	**100%**

Module II		**Body fluids and circulation** Composition of blood, blood groups, coagulation of blood Composition and functions of lymph Human circulatory system Structure of human heart and blood vessels Cardiac cycle, cardiac output and ECG **Digestion and Absorption** Human alimentary canal and digestive glands Role of digestive enzymes Digestion, absorption and assimilation of digested food **Breathing and respiration** Human respiratory system Mechanism of breathing and its regulation Exchange of gases, transport of gases and regulation of respiration Respiratory volumes	**100%**

Module III		**Excretory products and their elimination** Modes of excretion Human excretory system- structure and function Urine formation Rennin angiotensin system. **Neural control and coordination** Definition and classification of nervous system Structure of a neuron Generation and conduction of nerve impulse Structure of brain and spinal cord Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata. **Chemical coordination and regulation** Endocrine glands and their secretions Functions of hormones secreted by endocrine glands. **Human reproduction** Parts of female reproductive system Parts of male reproductive system Spermatogenesis and Oogenesis Menstrual cycle	**100%**

Module IV		**Plants and mineral nutrition:** Essential mineral, macro and micronutrients Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation. **Photosynthesis** Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.	**100%**
Module V		**Plant respiration:** Respiration, glycolysis, fermentation (anaerobic). **Plant growth and development** Phases and rate of plant growth, Condition of growth, Introduction to plant growth Regulators **Cell - The unit of life** Structure and functions of cell and cell organelles.Cell division **Tissues** Definition, types of tissues, location and functions.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**REMEDIAL MATHEMATICS – THEORY**	**100%**
COURSE CODE		**PHM21006**	**100%**
Module I		**Partial fraction** Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics **Logarithms** Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. **Function:** Real Valued function, Classification of real valued functions. **Limits and continuity :** Introduction , Limit of a function, Definition of limit of a function (□□-□□□ *n n* □ □ definition) , lim *x* □□*a* □□*nan*□1 , lim sin□□□□□1, *x*□*a x* □□*a* □□0 □□□	**100%**

Module II		**Matrices and Determinant:** Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants , Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem, Applicationof Matrices in solving Pharmacokinetic equations	**100%**
Module III		**Calculus** **Differentiation :** Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function , Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of x^n w.r.tx,where n is any rational number, Derivative of e^x,, Derivative of $\log_e x$, Derivative of a^x, Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application	**100%**

Module IV		**Analytical Geometry** **Introduction:** Signs of the Coordinates, Distance formula, **Straight Line** : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line **Integration:** Introduction, Definition, Standard formulae, Rules of integration , Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application	**100%**
Module V		**Differential Equations :** Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations **Laplace Transform :** Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HUMAN ANATOMY AND PHYSIOLOGY I – PRACTICAL**	**100%**
COURSE CODE		**PHM21007**	**100%**
		1. Study of compound microscope. 2. Microscopic study of epithelial and connective tissue 3. Microscopic study of muscular and nervous tissue 4. Identification of axial bones 5. Identification of appendicular bones 6. Introduction to hemocytometry. 7. Enumeration of white blood cell (WBC) count 8. Enumeration of total red blood corpuscles (RBC) count 9. Determination of bleeding time 10. Determination of clotting time 11. Estimation of hemoglobin content 12. Determination of blood group. 13. Determination of erythrocyte sedimentation rate (ESR). 14. Determination of heart rate and pulse rate. 15. Recording of blood pressure.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		PHARMACEUTICAL ANALYSIS I – PRACTICAL	100%
COURSE CODE		PHM21008	100%
		Limit Test of the following (1) Chloride (2) Sulphate (3) Iron (4) Arsenic **Preparation and standardization of** (1) Sodium hydroxide (2) Sulphuric acid (3) Sodium thiosulfate (4) Potassium permanganate (5) Ceric ammonium sulphate **Assay of the following compounds along with Standardization of Titrant** (1) Ammonium chloride by acid base titration (2) Ferrous sulphate by Cerimetry (3) Copper sulphate by Iodometry (4) Calcium gluconate by complexometry (5) Hydrogen peroxide by Permanganometry (6) Sodium benzoate by non-aqueous titration (7) Sodium Chloride by precipitation titration **Determination of Normality by electro-analytical methods** (1) Conductometric titration of strong acid against strong base (2) Conductometric titration of strong acid and weak acid against strong base (3) Potentiometric titration of strong acid against strong base	100%

AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES	100%

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICS I - PRACTICAL**	**100%**
COURSE CODE		**PHM21009**	**100%**

		Syrups a) Syrup IP'66 b) Compound syrup of Ferrous Phosphate BPC'68 **Elixirs** a) Piperazine citrate elixir b) Paracetamol pediatric elixir **Linctus** a) Terpin Hydrate Linctus IP'66 b) Iodine Throat Paint (Mandles Paint) **Solutions** a) Strong solution of ammonium acetate b) Cresol with soap solution c) Lugol's solution **Suspensions** a) Calamine lotion b) Magnesium Hydroxide mixture c) Aluminimum Hydroxide gel **Emulsions** a) Turpentine Liniment b) Liquid paraffin emulsion **Powders and Granules** a) ORS powder (WHO) b) Effervescent granules c) Dusting powder d)Divded powders **Suppositories** a) Glycero gelatin suppository b) Coca butter suppository c) Zinc Oxide suppository **Semisolids** a) Sulphur ointment b) Non staining-iodine ointment with methyl salicylate c) Carbopal gel **Gargles and Mouthwashes** a) Iodine gargle b) Chlorhexidine mouthwash	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL INORGANIC CHEMISTRY – PRACTICAL**	**100%**
COURSE CODE		**PHM21010**	**100%**
		Limit tests for following ions Limit test for Chlorides and Sulphates Modified limit test for Chlorides and Sulphates Limit test for Iron Limit test for Heavymetals Limit test for Lead Limit test for Arsenic **Identification test** Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate **Test for purity** Swelling power of Bentonite Neutralizing capacity of aluminum hydroxide gel Determination of potassium iodate and iodine in potassium Iodide **Preparation of inorganic pharmaceuticals** Boric acid Potash alum Ferrous sulphate	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COMMUNICATION SKILLS – PRACTICAL**	**100%**
COURSE CODE		**PHM21011**	**100%**
		Basic communication covering the following topics Meeting People Asking Questions Making Friends What did you do? Do's and Dont's **Pronunciations covering the following topics** Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds) **Advanced Learning** Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**REMEDIAL BIOLOGY – PRACTICAL**	**100%**
COURSE CODE		**PHM21012**	**100%**
		1. Introduction to experiments in biology a) Study of Microscope b) Section cutting techniques c) Mounting and staining d) Permanent slide preparation 2. Study of cell and its inclusions 3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications 4. Detailed study of frog by using computer models 5. Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower 6. Identification of bones 7. Determination of blood group 8. Determination of blood pressure 9. Determination of tidal volume	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 2

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HUMAN ANATOMY AND PHYSIOLOGY II – THEORY**	**100%**
COURSE CODE		**PHM22014**	**100%**
Module I		**Nervous system**Organization of nervoussystem, neuron, neuroglia,classification and propertiesofnervefibre,electrophysiology, actionpotential, nerve impulse,receptors, synapse,neurotransmitters. Central nervous system:Meninges, ventricles ofbrain and cerebrospinalfluid.structure andfunctions of brain(cerebrum,brain stem, cerebellum), spinalcord (gross structure,functionsof afferent and efferent nervetracts,reflexactivity)	**100%**
Module II		**Digestive system**Anatomy of GI Tract withspecial reference toanatomyandfunctionsof stomach, (Acid productionin the stomach, regulationof acid production throughparasympathetic nervoussystem, pepsin role inprotein digestion) smallintestine and largeintestine, anatomy andfunctions of salivary glands,pancreas and liver,movements of GIT,digestion and absorption ofnutrients and disorders ofGIT. **Energetics** Formation and role of ATP,CreatininePhosphateand BMR.	**100%**

Module III		**Respiratory system**Anatomy of respiratorysystem with specialreference to anatomy oflungs, mechanism ofrespiration, regulation ofrespiration Lung Volumesand capacities transport ofrespiratory gases, artificialrespiration, andresuscitationmethods. **Urinarysystem** Anatomy of urinary tractwith special reference toanatomy of kidney andnephrons, functions ofkidney and urinary tract,physiology of urineformation, micturitionreflex and role of kidneys inacid base balance, role ofRASinkidneyanddisorders ofkidney	**100%**
Module IV		**Endocrine system**Classification of hormones,mechanism of hormoneaction, structure andfunctions of pituitary gland,thyroid gland, parathyroidgland, adrenal gland,pancreas, pineal gland, thymusandtheirdisorders.	**100%**
Module V		**Reproductive system**Anatomy of male andfemalereproductivesystem, Functions of maleand female reproductivesystem, sex hormones,physiology of menstruation,fertilization,spermatogenesis,oogenesis, pregnancy andparturition **Introduction to genetics**Chromosomes, genes andDNA, protein synthesis,geneticpatternof inheritance	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ORGANICCHEMISTRY I–THEORY**	**100%**
COURSE CODE		**PHM22015**	**100%**
Module I		**Classification, nomenclature and isomerism** Classification of OrganicCompounds Common and IUPACsystems of nomenclature oforganiccompounds (up to 10 Carbons openchain and carbocycliccompounds) Structural isomerisms in organiccompounds	**100%**
Module II		**Alkanes*, Alkenes* andConjugateddienes*** SP^3 hybridization inalkanes, Halogenation ofalkanes, uses of paraffins.Stabilities of alkenes, SP^2hybridization in alkenesE_1andE_2 reactions– kinetics, order of reactivityof alkyl halides,rearrangement ofcarbocations, Saytzeffsorientation and evidences.E_1verses E_2reactions, Factors affecting E_1andE_2reactions. Ozonolysis, electrophilicaddition reactions ofalkenes, Markownikoff'sorientation, free radicaladdition reactions ofalkenes,Anti Markownikoff'sorientation.Stability of conjugateddienes, Diel-Alder,electrophilic addition, freeradicaladdition reactions of conjugateddienes, allylicrearrangement	**100%**

Module III		**Alkylhalides*** SN_1 and SN_2 reactions -kinetics, order of reactivityof alkyl halides,stereochemistry andrearrangement ofcarbocations. SN_1 versusSN_2 reactions, Factorsaffecting SN_1 and SN_2reactions Structure anduses of ethylchloride,Chloroform,trichloroethylene,tetrachloroethylene,dichloromethane, tetrachloromethane andiodoform. **Alcohols*** Qualitative tests, Structureand uses of Ethyl alcohol,Methyl alcohol,chlorobutanol, Cetosterylalcohol, Benzylalcohol, Glycerol,Propylene glycol	**100%**
Module IV		**(Carbonyl compounds*(Aldehydes and ketones)**Nucleophilic addition,Electromeric effect, aldolcondensation, Crossed Aldolcondensation, Cannizzaroreaction,CrossedCannizzarorea ction,Benzoin condensation,Perkin condensation,qualitative tests, Structureand uses of Formaldehyde,Paraldehyde, Acetone,Chloral hydrate, Hexamine,Benzaldehyde,Vanilin, Cinnamaldehyde.	**100%**
Module V		**Carboxylicacids*** Acidity of carboxylic acids,effect of substituents onacidity, inductive effect andqualitative tests forcarboxylic acids ,amide andester Structure and Uses ofAcetic acid, Lactic acid,Tartaric acid, Citric acid,Succinic acid. Oxalic acid,Salicylic acid, Benzoic acid,Benzyl benzoate, Dimethylphthalate, Methyl salicylateand Acetyl salicylic acid**Aliphatic amines*** Basicity, effect ofsubstituent on Basicity.Qualitative test, Structureand uses of Ethanolamine,Ethylenediamine, Amphetamine	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**BIOCHEMISTRY –THEORY**	**100%**
COURSE CODE		**PHM22016**	**100%**
Module I		**Biomolecules**Introduction, classification,chemical nature andbiologicalroleof carbohydrate, lipids, nucleicacids,aminoacids andproteins. **Bioenergetics** Concept of free energy,endergonic and exergonicreaction, Relationshipbetweenfreeenergy,enthalpy and entropy;Redox potential. Energy richcompounds; classification;biologicalsignificancesof ATP andcyclicAMP	**100%**
Module II		**Carbohydrate metabolism**Glycolysis – Pathway,energetics and significanceCitric acid cycle- Pathway,energetics and significanceHMP shunt and itssignificance; Glucose-6-Phosphate dehydrogenase(G6PD) deficiency Glycogenmetabolism Pathways andglycogen storage diseases(GSD) Gluconeogenesis-Pathway and its significanceHormonal regulation ofblood glucose level andDiabetesmellitus **Biologicaloxidation**Electron transport chain(ETC) and its mechanism.Oxidative phosphorylation &its mechanism and substratephosphorylation InhibitorsETCandoxidative phosphorylation/Uncouplers	**100%**

Module III		**Lipidmetabolism** β-Oxidation of saturatedfatty acid (Palmitic acid)Formation and utilization ofketone bodies; ketoacidosisDe novo synthesis of fattyacids (Palmitic acid)Biological significance ofcholesterol and conversionof cholesterol into bile acids,steroidhormoneandvitamin D Disorders of lipidmetabolism:Hypercholesterolemia,atherosclerosis, fatty liverandobesity. **Amino acid metabolism**General reactions of aminoacid metabolism:Transamination,deamination &decarboxylation, urea cycleand its disorders Catabolismof phenylalanine andtyrosine and their metabolicdisorders (Phenyketonuria,Albinism, alkeptonuria,tyrosinemia) Synthesis andsignificance of biologicalsubstances; 5-HT,melatonin, dopamine,noradrenaline, adrenalineCatabolism of heme;hyperbilirubinemia and jaundice	**100%**
Module IV		**Nucleic acid metabolismand genetic informationtransfer** Biosynthesis of purine andpyrimidine nucleotidesCatabolism of purinenucleotides andHyperuricemia and Goutdisease Organization of mammaliangenome Structure of DNA and RNAandtheir functions DNA replication (semiconservative model)Transcription or RNAsynthesis Genetic code, Translation orProtein synthesis andinhibitors	**100%**

Module V		**Enzymes Introduction, properties,** nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes – Structure and biochemical functions	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PATHOPHYSIOLOGY–THEORY**	**100%**
COURSE CODE		**PHM22017**	**100%**
Module I		**Basic principles of Cellinjury and Adaptation:**Introduction, definitions,Homeostasis, Componentsand Types of Feedbacksystems, Causes of cellularinjury,Pathogenesis (Cellmembrane damage,Mitochondrial damage,Ribosome damage, Nucleardamage),Morphology of cellinjury – Adaptive changes(Atrophy, Hypertrophy,hyperplasia, Metaplasia,Dysplasia),Cell swelling,Intra cellular accumulation,Calcification, Enzymeleakage and Cell DeathAcidosis&Alkalosis,Electrolyteimbalance **Basic mechanism involvedin the process ofinflammation and repair:**Introduction,Clinicalsignsof inflammation, Differenttypes ofInflammation, Mechanism of Inflammation – Alteration invascular permeability andbloodflow,migrationof WBC's, Mediators ofinflammation, Basicprinciples of wound healingin the skin, PathophysiologyofAtherosclerosis	**100%**

Module II		**CardiovascularSystem:**Hypertension, congestiveheart failure, ischemic heartdisease (angina, myocardialinfarction, atherosclerosisand arteriosclerosis)**Respiratory system:**Asthma, Chronic obstructiveairwaysdiseases. **Renalsystem:** Acute and chronic renalfailure	**100%**
Module III		**Haematological Diseases**:Iron deficiency,megaloblastic anemia (VitB12andfolicacid),sicklecell anemia, thalasemia,hereditary acquired anemia,hemophilia **Endocrine system:**Diabetes, thyroid diseases,disordersofsex hormones **Nervoussystem:** Epilepsy, Parkinson'sdisease, stroke, psychiatricdisorders: depression,schizophreniaand Alzheimer'sdisease. **Gastrointestinalsystem:** PepticUlcer	**100%**
Module IV		**Inflammatory boweldiseases** Jaundice, hepatitis(A,B,C,D,E,F) alcoholic liverdisease **Diseaseofbonesandjoints:** Rheumatoid arthritis,osteoporosisandgout **Principles of cancer:**classification, etiology andpathogenesisofcancer **Disease of bones andjoints:** Rheumatoid arthritis,osteoporosisandgout **PrinciplesofCancer:** Classification,etiologyand pathogenesisofCancer	**100%**
Module V		**Infectious diseases:**Meningitis,Typhoid,Leprosy, Tuberculosis,Urinarytractinfections **Sexuallytransmitted** diseases:AIDS, Syphilis,Gonorrhea	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COMPUTER APPLICATIONS INPHARMACY-THEORY**	**100%**
COURSE CODE		**PHM22018**	**100%**
Module I		**Numbersystem:** Binary number system,Decimal number system,Octal number system,Hexadecimal numbersystems, conversiondecimal to binary, binary todecimal, octal to binary etc,binary addition, binarysubtraction– One's complement ,Two'scomplementmethod,binarymultiplication,binary division **Concept of InformationSystems and Software :**Information gathering,requirement and feasibilityanalysis, data flowdiagrams, processspecifications, input/outputdesign, process life cycle,planningandmanagingthe project	**100%**
Module II		**Web technologies:** Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database	**100%**

Module III		**Application of computers inPharmacy–** Drug information storageand retrieval,Pharmacokinetics,Mathematical model inDrug design, Hospital andClinical Pharmacy,Electronic Prescribing anddischarge (EP) systems,barcode medicineidentification andautomated dispensing ofdrugs,mobiletechnologyand adherence monitoringDiagnostic System, Lab-diagnostic System, PatientMonitoringSystem,Pharma InformationSystem	**100%**
Module IV		**Bioinformatics:**Introduction, Objective ofBioinformatics,Bioinformatics Databases,Concept of Bioinformatics,ImpactofBioinformaticsin VaccineDiscovery	**100%**
Module V		**Computers as data analysisinPreclinicaldevelopment:**Chro matographic dadaanalysis(CDS), LaboratoryInformation managementSystem (LIMS)andText Information ManagementSystem(TIMS)	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		ENVIRONMENTAL SCIENCES –THEORY	100%
COURSE CODE		PHM22019	100%
Module I		**The Multidisciplinarynature of environmentalstudies** Natural ResourcesRenewableandnon-renewable resources:Natural resources andassociated problems a)Forest resources; b) Waterresources; c) Mineralresources; d) Foodresources; e) Energyresources;f)Landresources: Role of anindividualinconservationof natural resources	100%
Module II		**Ecosystems** Concept of an ecosystem.Structure and function of anecosystem.Introduction,types, characteristicfeatures, structure andfunction of the ecosystems:Forestecosystem;Grassland ecosystem;Desert ecosystem; Aquaticecosystems(ponds,streams,lakes, rivers, oceans,estuaries)	100%
Module III		**Environmental Pollution:**Air pollution; Waterpollution;Soilpollution	100%
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			100%

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HUMAN ANATOMY ANDPHYSIOLOGYII–PRACTICAL**	**100%**
COURSE CODE		**PHM22020**	**100%**
		1. To study theintegumentary and specialsenses using specimen,models,etc., 2. To study the nervoussystem using specimen,models,etc., 3. To study the endocrinesystem using specimen,models,etc 4. Todemonstratethegeneral neurologicalexamination 5. To demonstrate thefunctionofolfactorynerve 6. To examine the differenttypesoftaste. 7. To demonstrate thevisualacuity 8. To demonstrate thereflexactivity 9. Recording of bodytemperature 10. Todemonstratepositiveandnegativefeedback mechanism.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ORGANICCHEMISTRYI–PRACTICAL**	**100%**
COURSE CODE		**PHM22021**	**100%**
		1. Systematic qualitativeanalysis of unknownorganiccompoundslike 1. Preliminary test: Color,odour, aliphatic/aromaticcompounds, saturation andunsaturation,etc. 2. Detection of elementslike Nitrogen, Sulphur andHalogenbyLassaigne'stest 3. Solubilitytest 4. FunctionalgrouptestlikePhenols,Amides/ Urea,Carbohydrates, Amines,Carboxylic acids, Aldehydesand Ketones, Alcohols,Esters, Aromatic andHalogenated Hydrocarbons,Nitro compounds andAnilides. 5. Melting point/Boilingpointoforganiccompounds 6. Identification of theunknown compound fromthe literature using meltingpoint/ boilingpoint. 7. Preparation of thederivatives andconfirmation of theunknown compound bymeltingpoint/boilingpoint. 8. Minimum 5 unknownorganic compounds to beanalysedsystematically. 2. Preparationofsuitablesolid derivatives fromorganiccompounds 3. Construction ofmolecularmodels	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**BIOCHEMISTRY –PRACTICAL**	**100%**
COURSE CODE		**PHM22022**	**100%**
		1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein) 3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) 4. Qualitative analysis of urine for abnormal constituents 5. Determination of blood creatinine 6. Determination of blood sugar 7. Determination of serum total cholesterol 8. Preparation of buffer solution and measurement of pH 9. Study of enzymatic hydrolysis of starch 10. Determination of Salivary amylase activity 11. Study the effect of Temperature on Salivary amylase activity. 12. Study the effect of substrate concentration on salivary amylase activity	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COMPUTER APPLICATION INPHARMACY – PRACTICAL**	**100%**
COURSE CODE		**PHM22023**	**100%**
		1. Design a questionnaire using a word processing package to gather information about a particular disease. 2. Create a HTML web page to show personal information. 3 Retrieve the information of a drug and its adverse effects using online tools 4 Creating mailing labels Using Label Wizard , generating label in MS WORD 5 Create a database in MS Access to store the patient information with the required fields Using access 6. Design a form in MS Access to view, add, delete and modify the patient record in the database 7. Generating report and printing the report from patient database 8. Creating invoice table using – MS Access 9. Drug information storage and retrieval using MS Access 10. Creating and working with queries in MS Access 11. Exporting Tables, Queries, Forms and Reports to web pages 12. Exporting Tables, Queries, Forms and Reports to XML pages	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 3

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ORGANIC CHEMISTRY II –THEORY**	**100%**
COURSE CODE		**PHM23024**	**100%**
Module I		**Benzene and its derivatives** A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, Aromatic characters, Huckel's rule. B. Reactions of benzene nitration,sulphonation, Halogenations-reactivity, Friedelcrafts alkylation-reactivity, limitations, Friedelcrafts acylation. C. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene Compounds towards electrophilic substitution reaction D. Structure and uses of DDT, Saccharin, BHC and Chloramine	**100%**

Module II		**Phenols***-Acidityof phenols, effect ofsubstituentsonacidity,qualitative tests, Structure and uses ofphenol, cresols, resorcinol,naphthols **Aromatic Amines*** - Basicityof amines, effect ofsubstituentsonbasicity,and synthetic uses of aryldiazoniumsalts **AromaticAcids***–Acidity,effect of substituents onacidityand importantreactionsof benzoicacid.	**100%**
Module III		**FatsandOils** a. Fattyacids–reactions. b. Hydrolysis,Hydrogenation,Saponificatio nandRancidityofoils,Drying oils. c. Analytical constants – Acidvalue,Saponificationvalue,Estervalu e, Iodinevalue,Acetylvalue,ReichertMeissl(RM)value –significanceand principleinvolved in theirdetermination.	**100%**
Module IV		**Polynuclearhydrocarbons:** a. Synthesis,reactions Structureandmedicinaluses of Naphthalene,Phenanthrene,Anthracene,Diph enylmethane,Triphenylmethaneand theirderivatives	**100%**
Module V		**Cycloalkanes*** Stabilities –Baeyer's straintheory, limitation ofBaeyer's strain theory,Coulson and Moffitt'smodification, Sachse Mohr'stheory(Theoryof strainlessrings),reactions ofcyclopropane andcyclobutaneonly	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHYSICALPHARMACEUTICS I -THEORY**	**100%**
COURSE CODE		**PHM23025**	**100%**
Module I		**Solubilityofdrugs:** Solubility expressions,mechanisms of solutesolventinteractions, idealsolubilityparameters,solvation & association,quantitativeapproachtothe factors influencingsolubilityofdrugs,diffusionprinciples in biologicalsystems. Solubility of gas inliquids,solubilityofliquidsinliquids,(Binarysolutions,idealsolutions) Raoult's law,realsolutions.Partiallymiscible liquids,Critical solutiontemperature andapplications. Distributionlaw,itslimitationsand applications	**100%**
Module II		**Statesof Matterand propertiesofmatter:** Stateof matter, changes in thestateofmatter, latent heats, vapourpressure, sublimationcritical point, eutecticmixtures,gases,aerosols –inhalers, relativehumidity,liquidcomplexes,liquidcrystals,glassystates,solid crystalline, amorphous &polymorphism. **Physicochemicalpropertiesof drug molecules:**Refractive index, opticalrotation, dielectricconstant,dipolemoment, dissociationconstant,determinations andapplications	**100%**

Module III		**Surfaceandinterfacialphenomenon:** Liquidinterface, surface &interfacial tensions,surfacefreeenergy, measurementofsurface&interfacial tensions,spreading coefficient,adsorption at liquidinterfaces, surface activeagents, HLB Scale,solubilisation,detergency,adsorption at solidinterface.	**100%**
Module IV		**Complexationandprotein binding:** Introduction,Classification ofComplexation,Applications, methods ofanalysis,proteinbinding,Complexation and drugaction, crystalline structures ofcomplexes andthermodynamictreatment ofstabilityconstants.	**100%**
Module V		**pH,buffersandIsotonic solutions:** Sorensen's pHscale, pH determination(electrometric andcalorimetric), applicationsofbuffers,bufferequation,buffer capacity, buffersinpharmaceutical and biological systems,bufferedisotonic solutions.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICALMICROBIOLOGY-THEORY**	**100%**
COURSE CODE		**PHM23026**	**100%**
Module I		Introduction,historyof microbiology,itsbranches,scopeandits importance. IntroductiontoProkaryotesandEukaryotes Study of ultra-structure andmorphological classificationofbacteria, nutritional requirements,raw materials used forculture media and physicalparameters for growth,growthcurve,isolationandpreservation methods for pure cultures,cultivation of anaerobes,quantitativemeasurementofbacterial growth(total&viablecount). Study of different types ofphaseconstrastmicroscopy,darkfield microscopyandelectron microscopy.	**100%**

Module II		Identificationofbacteria using staining techniques(simple,Gram's& Acidfast staining) andbiochemicaltests(IMViC). Study of principle,procedure, merits, demeritsandapplicationsofphysical,chemical gaseous, radiationand mechanical method ofsterilization. Evaluationoftheefficiencyofsterilizationmethods. Equipmentsemployedinlargescalesterilization. Sterilityindicators.	**100%**
Module III		Studyofmorphology, classification,reproduction/replicationandcultivationofFungiandViruses. Classificationandmodeofactionofdisinfectants Factors influencingdisinfection,antisepticsandtheir evaluation. Forbacteriostatic andbactericidalactions Evaluationofbactericidal&Bacteriostatic. Sterility testing of products(solids, liquids, ophthalmicandothersterile products)accordingtoIP, BPandUSP.	**100%**

Module IV		Designingofasepticarea, laminarflowequipments;studyofdifferent sources ofcontamination inan aseptic area andmethods of prevention,cleanareaclassification. Principlesandmethodsofdifferent microbiologicalassay. Methods forstandardization ofantibiotics, vitamins andaminoacids. Assessmentofanew antibiotic.	**100%**
Module V		Typesofspoilage,factors affecting the microbialspoilage ofpharmaceuticalproducts,sources and types ofmicrobialcontaminants,assessmentofmicrobial contaminationandspoilage. Preservation ofpharmaceutical productsusingantimicrobialagents,evaluation of microbialstabilityofformulations. Growth of animal cells inculture,generalprocedureforcellculture, Primary established andtransformedcellcultures. Applicationofcellcultures inPharmaceuticalindustryandresearch.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ENGINEERING-THEORY**	**100%**
COURSE CODE		**PHM23027**	**100%**
Module I		**Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.	**100%**

Module II		**Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers. **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator. **Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation	**100%**
Module III		**Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer, spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer. **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier.	**100%**

Module IV		**Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter. **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.	**100%**
Module V		**Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plantconstruction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic ofmaterial handling systems.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL ORGANIC CHEMISTRY-IIPRACTICAL**	**100%**
COURSE CODE		**PHM23028**	**100%**
		IExperimentsinvolvinglaboratorytechniquesRecrystallization Steamdistillation **II Determination offollowingoilvalues(includingstandardization ofreagents)** Acid valueSaponificationvalueIodinevalue **III Preparation ofcompounds** Benzanilide/Phenylbenzoate/AcetanilidefromAniline/Phenol/Anilinebyacylationreaction. 2,4,6-Tribromoaniline/Para bromoacetanilidefromAniline/Acetanilide byhalogenation(Bromination)reaction. 5-Nitro salicylicacid/Meta di nitrobenzenefrom Salicylicacid/Nitro benzene bynitrationreaction. BenzoicacidfromBenzylchloride by oxidationreaction. Benzoicacid/Salicylicacidfromalkylbenzoate/alkyl salicylate byhydrolysisreaction. 1-Phenylazo-2-naptholfrom Aniline bydiazotization andcoupling reactions. BenzilfromBenzoinby oxidationreaction. Dibenzal acetone fromBenzaldehydebyClaison Schmidt reaction Cinnammic acid from Benzaldehyde by Perkin reaction P-Iodo benzoic acid from P-amino benzoic acid	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		PHYSICALPHARMACEUTICS-IPRACTICAL	100%
COURSE CODE		PHM23029	100%
		1. Determination the solubility of drug at room temperature 2. Determination of pKa value by Half Neutralization/Henderson Hassel balch equation. 3. Determination of Partition co - efficient of benzoic acid in benzene andwater 4. Determination of Partition co - efficient of Iodine in CCl_4 and water 5. Determination of % composition of NaCl in a solution using phenol-water system by CST method 6. Determination of surface tension of given liquids by drop count and drop weight method 7. Determination of HLB number of a surfactant by saponification method 8. Determination of Freundlich and Langmuir constants using activated charcoal 9. Determination of critical micellar concentration of surfactants 10. Determination of stability constant and donor accept or ratio of PABA-Caffeine complex by solubility method 11. Determination of stability constant and donor accept or ratio of Cupric-Glycine complex by pH titration method	100%
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			100%

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICALMICROBIOLOGY -PRACTICAL**	**100%**
COURSE CODE		**PHM23030**	**100%**
		1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator,laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator,microscopes used in experimental microbiology. 2. Sterilization of glassware, preparation and sterilization of media. 3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations. 4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical). 5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques. 6. Microbiological assay of antibiotics by cup plate method and other methods. 7. Motility determination by Hanging drop method. 8. Sterility testing of pharmaceuticals. 9. Bacteriological analysis of water 10. Biochemical test	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		PHARMACEUTICALENGINEERING - PRACTICAL	100%
COURSE CODE		PHM23031	100%

		I. Determination of radiation constant of brass, iron, unpainted and painted glass. II.Steam distillation – To calculate the efficiency of steam distillation. III.To determine the overall heat transfer coefficient by heat exchanger. IV.Construction of drying curves (for calcium carbonate and starch). V.Determination of moisture content and loss on drying. VI.Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method. VII.Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier. VIII.Size analysis by sieving-To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots. IX.Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill. X.Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such othermajor equipment. XI.Factors affecting Rate of Filtration and Evaporation (Surface area,To study the effect of time on the the Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity XII. To study the effect of time on the Rate of Crystallization. XIII. To calculate the uniformity Index for given sample by using Double Cone Blender	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 4

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICALORGANIC CHEMISTRY III–THEORY**	**100%**
COURSE CODE		**PHM24032**	**100%**
Module I		Stereo isomerism Optical isomerism – Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers Reactions of chiral molecules Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute	**100%**
Module II		Geometrical isomerismNomenclature ofgeometricalisomers(CisTrans, EZ, Syn Antisystems) Methods of determinationof configuration ofgeometricalisomers. Conformationalisomerism in Ethane, n-Butane and Cyclohexane.Stereo isomerism inbiphenyl compounds(Atropisomerism) andconditions for opticalactivity. Stereospecific andstereoselectivereactions	**100%**

Module III		**Heterocycliccompounds:** Nomenclature and classification Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene Relative aromaticity and reactivity of Pyrrole,Furanand Thiophene	**100%**
Module IV		Synthesis, reactions and medicinal uses of following compounds / derivatives Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridineand Indole. Basicity ofpyridine Synthesis and medicinaluses of Pyrimidine,Purine,azepinesandtheir derivatives	**100%**
Module V		**Reactions of syntheticimportance** Metal hydride reduction($NaBH_4$and $LiAlH_4$),Clemmensen reduction, Birch reduction, WolffKishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmannsre arrangement and Schmidtre arrangement. Claisen-Schmidt condensation	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**MEDICINAL CHEMISTRY I –THEORY**	**100%**
COURSE CODE		**PHM24033**	**100%**
Module I		**Introduction to MedicinalChemistry History and developmentof medicinal chemistryPhysicochemicalpropertiesin relation to biologicalaction** Ionization, Solubility,Partition Coefficient,Hydrogen bonding, Proteinbinding, Chelation,Bioisosterism, Optical andGeometricalisomerism. **Drugmetabolism** Drug metabolism principles- PhaseIandPhaseII.Factors affecting drugmetabolismincludingstereo chemicalaspects.	**100%**

Module II		**Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters:** Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. **Sympathomimetic agents:SAR of Sympathomimetic agents** Direct acting: Nor- epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. **Agents with mixed mechanism:** Ephedrine, Metaraminol. **Adrenergic Antagonists: Alpha adrenergic blockers:** Tolazoline*, Phentolamine, Phenoxy benzamine, Prazosin, Dihydroergotamine, Methysergide. **Beta adrenergic blockers:** SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.	**100%**

Module III		**Cholinergic neurotransmitters:** Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. **Parasympathomimetic agents: SAR of Parasympathomimetic agents** **Direct acting agents:** Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine. **Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible):** Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate Iodide, Parathione, Malathion. **Cholinesterase reactivator:** Pralidoxime chloride. **Cholinergic Blocking agents:SAR of cholinolytic agents** **Solanaceous alkaloids and analogues:** Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. **Synthetic cholinergic blocking agents:** Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.	**100%**

Module IV		**Drugs acting on Central Nervous System** **A. Sedatives and Hypnotics:** **Benzodiazepines:** SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem **Barbiturtes:** SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital **Miscelleneous:** Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. **B. Antipsychotics** **Phenothiazeines:** SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Trifluprom azine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride. **Ring Analogues of Phenothiazeines:** Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine. **Fluro buterophenones:** Haloperidol, Droperidol, Risperidone. **Beta amino ketones:** Molindone hydrochloride. **Benzamides:** Sulpieride. **C. Anticonvulsants:** SAR of Anticonvulsants, mechanism of anticonvulsant action **Barbiturates:** Phenobarbitone, Methabarbital. **Hydantoins:** Phenytoin*, Mephenytoin, Ethotoin **Oxazolidine diones:** Trimethadione, Paramethadione **Succinimides:** Phensuximide, Methsuximide, Ethosuximide* **Urea and monoacylureas:** Phenacemide, Carbamazepine* **Benzodiazepines:** Clonazepam **Miscellaneous:** Primidone, Valproic acid , Gabapentin, Felbamate	**100%**

Module V		**Drugs acting on CentralNervous SystemGeneral anesthetics:Inhalation anesthetics:**Halothane*, Methoxyflurane, Enflurane,Sevoflurane, Isoflurane,Desflurane. **Ultra short actingbarbitutrates:** Methohexitalsodium*,Thiamylal sodium, Thiopental sodium.**Dissociative anesthetics:**Ketamine hydrochloride.***Narcotic and non-narcoticanalgesics** **Morphine and relateddrugs:** SAR of Morphineanalogues, Morphinesulphate, Codeine,Meperidine hydrochloride,Anilerdine hydrochloride,Diphenoxylatehydrochloride, Loperamidehydrochloride, Fentanylcitrate*, Methadone hydrochloride*,Propoxyphenehydrochloride, Pentazocine,Levorphanoltartarate. **Narcotic antagonists:**Nalorphine hydrochloride,Levallorphan tartarate,Naloxone hydrochloride.**Anti-inflammatory agents:**Sodium salicylate, Aspirin,Mefenamic acid*,Meclofenamate,Indomethacin, Sulindac,Tolmetin, Zomepriac,Diclofenac, Ketorolac, Ibuprofen*,Naproxen, Piroxicam,Phenacetin,Acetaminophen, Antipyrine, Phenylbutazone.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHYSICAL PHARMACEUTICS II -THEORY**	**100%**
COURSE CODE		**PHM24034**	**100%**
Module I		**Colloidal dispersions:**Classification of dispersedsystems & their generalcharacteristics, size &shapes of colloidal particles,classification of colloids &comparative account oftheir generalproperties. Optical, kinetic & electricalproperties. Effect of electrolytes,coacervation, peptization&protective action.	**100%**
Module II		**Rheology:** Newtoniansystems, law of flow,kinematic viscosity, effect oftemperature, non-Newtonian systems,pseudoplastic, dilatant,plastic, thixotropy,thixotropyin formulation, determinationof viscosity, capillary, fallingSphere, rotationalviscometers **Deformation of solids:**Plastic and elasticdeformation, Heckelequation,Stress,Strain, ElasticModulus	**100%**

Module III		**Coarse dispersion:**Suspension, interfacial properties of suspended particles, settling insuspensions, formulation offlocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multipleemulsions; Stability of emulsions,preservation of emulsions,rheological properties of emulsions and emulsion formulationby HLB method.	**100%**
Module IV		**Micromeretics:** Particle sizeand distribution, meanparticle size, number andweight distribution, particlenumber, methods fordeterminingparticlesizebydifferent methods, counting andseparation method, particleshape, specific surface,methods for determining surface area,permeability, adsorption,derived properties ofpowders, porosity,packing arrangement, densities,bulkiness&flowproperties.	**100%**
Module V		**Drug stability:** Reactionkinetics: zero, pseudo-zero,first& secondorder,unitsof basic rate constants,determination of reactionorder.Physicalandchemical factors influencingthe chemical degradation ofpharmaceutical product:temperature, solvent, ionicstrength, dielectricconstant, specific & generalacid base catalysis, Simplenumericalproblems. Stabilization of medicinalagents against commonreactions like hydrolysis &oxidation. Accelerated stability testingin expiration dating ofpharmaceutical dosageforms. Photolytic degradation anditsprevention.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOLOGY I -THEORY**	**100%**
COURSE CODE		**PHM24035**	**100%**
Module I		**1. GeneralPharmacology** **a.** Introduction toPharmacology-Definition,historical landmarks andscopeof pharmacology, nature andsource of drugs, essentialdrugs concept and routes ofdrug administration,Agonists, antagonists(competitive and noncompetitive), sparereceptors, addiction,tolerance, dependence,tachyphylaxis, idiosyncrasy,allergy. **b.** Pharmacokinetics-Membrane transport,absorption, distribution,metabolism and excretion of drugs .Enzymeinduction, enzymeinhibition,kineticsof elimination.	**100%**

Module II		**GeneralPharmacology** **a.** Pharmacodynamics-Principles and mechanismsof drug action. Receptortheories and classification ofreceptors, regulation ofreceptors. drug receptorsinteractions signal transductionmechanisms, G – protein –coupled receptors, ionchannel receptor,transmembrane enzymelinked receptors,transmembrane JAK-STATbinding receptor and receptors thatregulate transcriptionfactors, dose responserelationship, therapeuticindex, combined effects ofdrugs and factors modifyingdrugaction. **b.** Adversedrugreactions. **c.** Drug interactions(pharmacokinetic andpharmacodynamic) **d.** Drug discovery andclinical evaluation of newdrugs - Drug discoveryphase, preclinical evaluationphase, clinical trial phase,phasesofclinicaltrialsand pharmacovigilance.	**100%**
Module III		**2. Pharmacologyofdrugsacting on peripheralnervoussystem** **a.** Organization andfunction of ANS.**b**.Neurohumoraltransmission, co-transmission andclassification ofneurotransmitters. **c.** Parasympathomimetics,Parasympatholytics,Sympathomimetics,sympatholytics. **d.** Neuromuscular blockingagents and skeletal musclerelaxants(peripheral). **e.** Localanestheticagents. Drugsusedinmyastheniagravis andglaucoma	**100%**

Module IV		**3. Pharmacology of drugsacting on central nervoussystem** **a.** Neurohumoraltransmission in theC.N.S. special emphasis onimportance of variousneurotransmitters like withGABA, Glutamate, Glycine,serotonin,dopamine. **b.** General anesthetics andpre-anesthetics. **c.** Sedatives, hypnotics andcentrally acting musclerelaxants. **d.** Anti-epileptics **e.** Alcoholsanddisulfiram	**100%**
Module V		**3. Pharmacology of drugs acting on central nervous system** a. sychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer'sdisease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOGNOSY ANDPHYTOCHEMISTRYI-THEORY**	**100%**
COURSE CODE		**PHM24036**	**100%**
Module I		**Introduction toPharmacognosy:** **(a)** Definition, history, scopeand development ofPharmacognosy **(b)** Sources of Drugs –Plants, Animals, Marine &Tissueculture **(c)** Organized drugs,unorganized drugs (driedlatex, dried juices, driedextracts, gums andmucilages, oleoresins andoleo-gum -resins).**Classification of drugs:**Alphabetical,morphological,taxonomical, chemical,pharmacological, chemoandsero taxonomicalclassificationofdrugs **Quality control of Drugs ofNaturalOrigin:**Adulteration of drugs ofnatural origin. Evaluation byorganoleptic, microscopic,physical, chemical and biologicalmethods and properties.Quantitative microscopy ofcrude drugs includinglycopodium spore method,leafconstants, cameralucidaanddiagrams of microscopic objects toscalewithcameralucida.	**100%**

Module II		**Cultivation, Collection,Processing and storage ofdrugs of natural origin:**Cultivation and Collection ofdrugs of natural originFactors influencingcultivation of medicinalplants. Plant hormones and theirapplications. Polyploidy, mutation andhybridization with referenceto medicinal plants**Conservationofmedicinal plants**	**100%**
Module III		**Plant tissue culture:**Historical development ofplant tissue culture, typesofcultures,Nutritionalrequirements, growth and theirmaintenance. Applications of plant tissueculture inpharmacognosy. Ediblevaccines	**100%**
Module IV		**Pharmacognosy in varioussystemsofmedicine:** Role of Pharmacognosy inallopathy and traditionalsystems of medicinenamely,Ayurveda, Unani, Siddha, Homeopathyand Chinese systems ofmedicine. **Introduction to secondarymetabolites:** Definition, classification,properties and test foridentification of Alkaloids,Glycosides, **f.** Flavonoids, Tannins,VolatileoilandResins	**100%**

Module V		Study of biological source, chemical nature and uses of drugs of natural origin containing Following drugs **Plant Products:** Fibers - Cotton, Jute, HempHallucinogens, Teratogens,Natural allergens **Primary metabolites:**General introduction, detailed study with respectto chemistry, sources, preparation, evaluation, preservation, storage, therapeutic usedand commercial utility as Pharmaceutical Aids and/or Medicines forthe followingPrimary metabolites: **Carbohydrates:** Acacia,Agar, Tragacanth, Honey **Proteins and Enzymes :**Gelatin, casein, proteolyticenzymes (Papain,bromelain,serratiopeptidase,urokinase, streptokinase,pepsin). **Lipids(Waxes, fats, fixedoils)** : Castor oil,Chaulmoogra oil, Wool Fat,BeesWax **MarineDrugs:** Novel medicinal agentsfrom marine sources	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**MEDICINALCHEMISTRY–IPRACTICAL**	**100%**
COURSE CODE		**PHM24037**	**100%**
Module I		**Preparationofdrugs/intermediates** 1. 1,3-pyrazole 2. 1,3-oxazole 3. Benzimidazole 4. Benztriazole 5. 2,3-diphenylquinoxaline 6. Benzocaine 7. Phenytoin 8. Phenothiazine9.Barbi turate **Assayofdrugs** 1. Chlorpromazine 2. Phenobarbitone 3. Atropine 4. Ibuprofen 5. Aspirin 6. Furosemide **Determination of Partitioncoefficientforanytwodrugs**	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHYSICALPHARMACEUTICS-IIPRACTICAL**	**100%**
COURSE CODE		**PHM24038**	**100%**
Module I		1. Determination of particle size, particle size distribution using sievingmethod. 2. Determination of particle size, particle size distribution using Microscopicmethod. 3. Determination of bulk density, true density andporosity. 4. Determine the angle of repose and influence of lubricant on angle of repose. 5. Determination of viscosity of liquid using Ostwald's viscometer. 6. Determination sedimentation volume with effect of different suspending agent. 7. Determination sedimentation volume with effect of different concentration of Single suspending agent. 8. Determination of viscosity of semisolid by using Brookfield viscometer. 9. Determination of reaction rate constant first order. 10. Determination of reaction rate constant second order. Accelerated stability studies.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOLOGY-IPRACTICAL**	**100%**
COURSE CODE		**PHM24039**	**100%**

Module I		1. Introduction to experimental pharmacology. 2. Commonly used instruments inexperimental pharmacology. 3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines. 5. Common laboratory techniques. Blood withdrawal, serum and plasma separation,anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats. 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping Time in mice. 8. Effect of drugs on ciliary motility of frog oesophagus 9. Effectof drugsonrabbiteye. 10. Effects of skeletal musclerelaxantsusingrota-rodapparatus. 11. Effect of drugs on locomotoractivityusingactophotometer. 12. Anticonvulsanteffectofdrugsby MESandPTZmethod. 13. Study of stereotype and anti-catatonic activity of drugs onrats/mice. 14. Studyofanxiolyticactivityofdrugsusingrats/ mice. 15. Study of local anesthetics bydifferentmethods *Note: All laboratory techniques andanimal experimentsare demonstratedby simulated experimentsbysoftwaresandvideos.*	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOGNOSY AND PHYTOCHEMISTRY I - PRACTICAL**	**100%**
COURSE CODE		**PHM24040**	**100%**
Module I		1. Analysis of crude drugs by chemicaltests: (i)Tragaccanth (ii) Acacia(iii)Agar(iv) Gelatin (v) starch (vi) Honey (vii)Castoroil. 2. Determination of stomatal numberandindex. 3. Determination of vein islet number,vein islet termination and palisideratio. 4. Determination of size of starchgrains,calciumoxalatecrystalsbye yepiece Micrometer. 5. Determination of Fiber length andwidth. 6. Determination of number of starchgrainsbyLycopodiumsporemeth od. 7. DeterminationofAshvalue. 8. Determination of Extractive valuesofcrudedrugs. 9. Determination of moisture contentofcrudedrugs. Determination of swelling indexandfoaming.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 5

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		MEDICINAL CHEMISTRY II -THEORY	100%
COURSE CODE		PHM25041	100%

Module I		**Antihistaminic agents:** Histamine, receptors and their distribution in the humanbody **H1–antagonists:** Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium **H2-antagonists:** Cimetidine*, Famotidine, Ranitidin. **Gastric Proton pump inhibitors:** Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole **Anti-neoplastic agents:** **Alkylating agents:** Meclorethamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa **Antimetabolites:** Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine **Antibiotics:** Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin **Plant products:** Etoposide, Vinblastin sulphate, Vincristin sulphate **Miscellaneous:** Cisplatin, Mitotane.	**100%**

Module II		**Anti-anginal**:**Vasodilators:** Amyl nitrite,Nitroglycerin*, Pentaerythritoltetranitrate, Isosorbide dinitrite*, Dipyridamole.**Calcium channel blockers:**Verapamil, Bepridilhydrochloride, Diltiazemhydrochloride, Nifedipine,Amlodipine, Felodipine,Nicardipine, Nimodipine.**Diuretics:** Carbonic anhydraseinhibitors: Acetazolamide*,Methazolamide,Dichlorphenamide. Thiazides: Chlorthiazide*,Hydrochlorothiazide,Hydroflumethiazide,Cyclothiazide, Loop diuretics:Furosemide*, Bumetanide,Ethacrynicacid. Potassium sparing Diuretics:Spironolactone,Triamterene, Amiloride. Osmotic Diuretics: Mannitol**Anti-hypertensive Agents**:Timolol,Captopril,Lisinopril,Enalapril, Benazeprilhydrochloride, Quinaprilhydrochloride, Methyldopatehydrochloride,* Clonidinehydrochloride,Guanethidinemonosulphate, Guanabenzacetate, Sodiumnitroprusside,Diazoxide,Minoxidil,Reserpine,Hydralazine hydrochloride.	**100%**

Module III		**Anti-arrhythmic Drugs**:Quinidine sulphate,Procainamidehydrochloride,Disopyramide phosphate*,Phenytoin sodium,Lidocaine hydrochloride,Tocainide hydrochloride,Mexiletine hydrochloride,Lorcainide hydrochloride,Amiodarone,Sotalol. **Anti-hyperlipidemicagents**: Clofibrate,Lovastatin, Cholesteramineand Cholestipol**Coagulant &Anticoagulants**:Menadione,Aceto menadione,Warfarin*, Anisindione, clopidogrel**Drugs used in CongestiveHeartFailure:**Digoxin, Digitoxin, Nesiritide,Bosentan,Tezosentan.	**100%**
Module IV	**g. h.**	**Drugs acting on Endocrinesystem** Nomenclature,Stereochemistry andmetabolismofsteroids.**Sex hormones**:Testosterone, Nandralone,Progestrones, Oestriol,Oestradiol, Oestrione, Diethylstilbestrol. **Drugs for erectiledysfunction:** Sildenafil,Tadalafil. **Oral contraceptives:**Mifepristone, Norgestril,Levonorgestrol**Corticosteroids:** Cortisone,Hydrocortisone,Prednisolone,Beta methasone,Dexamethasone **Thyroid and antithyroiddrugs**:L-Thyroxine,L-Thyronine, Propylthiouracil,Methimazole.	**100%**

Module V		Antidiabetic agents: Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose, Voglibose. Local Anesthetics: SAR of Local anesthetics Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Diperodon, Dibucaine.*	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**INDUSTRIAL PHARMACY I - THEORY**	**100%**
COURSE CODE		**PHM25042**	**100%**
Module I		**Preformulation Studies:**Introduction topreformulation, goals andobjectives, study ofphysicochemicalcharacteristics of drugsubstances. ***a. Physical properties:***Physical form (crystal &amorphous), particle size,shape, flow properties, solubility profile(pKa, pH, partitioncoefficient),polymorphism ***b. Chemical Properties:***Hydrolysis, oxidation,reduction, racemisation,polymerization BCS classification of drugs &its significant Application ofpreformulationconsiderations in thedevelopment of solid, liquidoraland parenteral dosageformsanditsimpactonstability of dosageforms.	**100%**

Module II		a. Introduction, idealcharacteristics of tablets,classification of tablets.Excipients, Formulation of tablets,granulation methods,compression and processingproblems. Equipments and tablettooling. b. Tablet coating: Types ofcoating, coating materials,formulation of coatingcomposition, methods ofcoating, equipmentemployed and defects incoating. c. Quality control tests: Inprocess and finishedproduct tests **Liquid orals:** Formulationand manufacturingconsideration of syrups andelixirs suspensions and emulsions;Filling and packaging;evaluationof liquid orals officialinpharmacopoeia	**100%**

Module III		**Capsules:** a. ***Hard gelatin capsules:***Introduction, Production ofhard gelatin capsule shells.size of capsules, Filling, finishingand special techniques offormulation of hard gelatincapsules, manufacturingdefects. In process and finalproduct quality control testsforcapsules. b. ***Soft gelatin capsules:***Nature of shell and capsulecontent,sizeof capsules, importance ofbase adsorption andminim/gram factors,production,in process and final productquality controltests. Packing, storage andstabilitytesting of soft gelatin capsules andtheirapplications. **Pellets:** Introduction,formulation requirements,pelletization process,equipments formanufactureofpellets.	**100%**

Module IV		**ParenteralProducts:** a. Definition, types,advantages and limitations.Preformulation factors andessential requirements, vehicles,additives, importance ofisotonicity. b. Production procedure,production facilities andcontrols, asepticprocessing c. Formulation of injections,sterile powders, largevolume parenterals andlyophilizedproducts. d. Containers and closuresselection, filling and sealingof ampoules, vials andinfusion fluids. Quality control testsofparenteral products. **Ophthalmic Preparations:**Introduction, formulationconsiderations; formulationof eye drops, eye ointments andeye lotions; methods ofpreparation; labeling,containers; evaluation of ophthalmicpreparations.	**100%**

Module V		**Cosmetics:** Formulation andpreparation of the followingcosmetic preparations:lipsticks, shampoos, coldcream and vanishing cream,tooth pastes, hair dyes andsunscreens. **Pharmaceutical Aerosols:**Definition, propellants,containers, valves, types ofaerosol systems; formulation andmanufacture of aerosols;Evaluationof aerosols; Quality control and stability studies.**Packaging MaterialsScience:** Materials used forpackagingofpharmaceutical products,factors influencing choice ofcontainers, legal and officialrequirementsforcontainers, stability aspects ofpackaging materials, qualitycontroltests.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOLOGY II -THEORY**	**100%**
COURSE CODE		**PHM25043**	**100%**
Module I		**1. Pharmacology of drugsacting on cardio vascularsystem** a. Introduction tohemodynamic andelectrophysiologyofheart. b. Drugs used in congestiveheart failure. c. Anti-hypertensivedrugs. d. Anti-anginaldrugs. e. Anti-arrhythmicdrugs. f. Anti-hyperlipidemic drugs.	**100%**
Module II		**1. Pharmacology of drugsacting on cardio vascularsystem** **a.** Drug used in the therapyof shock. **b.** Hematinics, coagulantsandanticoagulants. **c.** Fibrinolytics and anti-plateletdrugs **d.** Plasma volumeexpanders **2. Pharmacologyofdrugsactingonuri narysystem** **a.** Diuretics **b.** Anti-diuretics.	**100%**

Module III		**3. Autocoids and relateddrugs** **a.** Introduction to autacoids and classification **b.** Histamine, 5-HT and their antagonists. **c.** Prostaglandins,Thromboxanes and Leukotrienes. **d.** Angiotensin, Bradykinin and Substance P. **e.** Non-steroidal anti-inflammatory agents **f.** Anti-gout drugs Antirheumatic drugs	**100%**
Module IV		**4. Pharmacology of drugsactingonendocrinesystem** **a.** Basic concepts inendocrine pharmacology. **b.** Anterior Pituitary hormones-analogues and their inhibitors. **c.** Thyroid hormones-analogues and theirinhibitors. **d.** Hormones regulatingplasma calcium level-Parathormone, Calcitoninand Vitamin-D. **e.** Insulin, OralHypoglycemic agents and glucagon. ACTHandcorticosteroids.	**100%**
Module V		**5. Pharmacology of drugs acting on endocrine system** a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus. 6. Bioassay a. Principles and applications of bioassay. b.Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH,d-tubocurarine,digitalis, histamine and 5-HT	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOGNOSY AND PHYTOCHEMISTRYII-THEORY**	**100%**
COURSE CODE		**PHM25044**	**100%**
Module I		**Metabolicpathwaysinhigherplantsandtheir determination** a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Aminoacid pathway. b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.	**100%**

Module II		General introduction, composition,chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:**Alkaloids:** Vinca, Rauwolfia,Belladonna,Opium, **PhenylpropanoidsandFlavonoids:** Lignans,Tea, Ruta **Steroids, Cardiac Glycosides &Triterpenoids**: Liquorice, Dioscorea,Digitalis **Volatile oils**: Mentha, Clove,Cinnamon, Fennel, Coriander,**Tannins:** Catechu, Pterocarpus**Resins:** Benzoin, Guggul, Ginger,Asafoetida, Myrrh, Colophony**Glycosides:** Senna, Aloes, BitterAlmond **Iridoids,Otherterpenoids&Naphthaquinones:**Gentian, **c.** Artemisia,taxus,carotenoids	**100%**
Module III		Isolation,IdentificationandAnalysisofPhytoconstituents **a)** Terpenoids:Menthol,Citral, Artemisin **b)** Glycosides: Glycyrhetinic acid &Rutin **c)** Alkaloids:Atropine,Quinine,Reserpine ,Caffeine Resins:Podophyllotoxin,Curcumin	**100%**
Module IV		Industrial production, estimation andutilization of the followingphytoconstituents: Forskolin, Sennoside, Artemisinin,Diosgenin, Digoxin, Atropine,Podophyllotoxin,Caffeine, Taxol,VincristineandVinblastine	**100%**

Module V		**BasicsofPhytochemistry** Modern methods of extraction,application of latest techniques likeSpectroscopy, chromatography and electrophoresisin the isolation, purification andidentificationofcrude drugs.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL JURISPRUDENCE-THEORY**	**100%**
COURSE CODE		**PHM25045**	**100%**
Module I		**Drugs and Cosmetics Act, 1940 anditsrules1945:** Objectives, Definitions, Legaldefinitions of schedules to the Act andRules. Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test,examination and analysis,manufacture of new drug, loan license and repacking license.	**100%**

Module II		**Drugs and Cosmetics Act, 1940 anditsrules1945.** Detailed study of Schedule G, H, M, N,P,T,U, V, X, Y, Part XII B, Sch F & DMR(OA) Sale of Drugs – Wholesale, Retail saleand Restricted license. Offences andpenalties Labeling & Packing of drugs-Generallabeling requirements and specimenlabels for drugs and cosmetics, List of permittedcolors.Offencesandpenalties. **d.** Administration of the Act and Rules – Drugs Technical Advisory Board,Centraldrugs Laboratory, Drugs ConsultativeCommittee, Government druganalysts,Licensing authorities, controlling authorities,Drugs Inspectors.	**100%**

Module III		**Pharmacy Act –1948**: Objectives,Definitions, Pharmacy Council ofIndia;its constitution and functions, EducationRegulations, State and Joint statepharmacy councils; constitution and functions,Registration of Pharmacists, OffencesandPenalties. **MedicinalandToiletPreparationAct –1955**: Objectives, Definitions,Licensing, Manufacture In bond and Outsidebond, Export of alcoholicpreparations, Manufacture of Ayurvedic,Homeopathic, Patent & ProprietaryPreparations. OffencesandPenalties. **Narcotic Drugs and Psychotropicsubstances Act-1985 and Rules**:Objectives, Definitions, Authorities and Officers,Constitution and Functions of narcotic& Psychotropic Consultative Committee,National Fund for Controlling the DrugAbuse, Prohibition, Control andRegulation, opium poppy cultivationandproduction of poppy straw, manufacture, saleandexportofopium,Offencesand Penalties.	**100%**

Module IV		**Study of Salient Features of Drugsand Magic Remedies Act and itsrules:** Objectives, Definitions,Prohibition of certain advertisements,Classesof Exempted advertisements, OffencesandPenalties. **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions,Institutional Animal Ethics Committee, CPCSEAguidelines for Breeding and Stockingof Animals, Performance of Experiments,Transfer and acquisition of animals forexperiment, Records, Power tosuspend or revoke registration,OffencesandPenalties. **National Pharmaceutical PricingAuthority:** Drugs Price Control Order(DPCO)- 2013. Objectives, Definitions, Saleprices of bulk drugs, Retail price offormulations, Retail price and ceiling price ofscheduled formulations, National Listof Essential Medicines(NLEM).	**100%**
Module V		**Pharmaceutical Legislations –** A briefreview, Introduction, Study of drugsenquiry committee, Health survey anddevelopment committee, Hathicommittee and Mudaliarcommittee. **Code of Pharmaceutical ethics** Definition, Pharmacist in relation to hisjob,trade, medical profession and his profession,Pharmacist'soath. **MedicalTerminationofPregnancyAct. Right to Information Act.IntroductiontoIntellectualProperty Rights(IPR).**	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**INDUSTRIAL PHARMACY I - PRACTICAL**	**100%**
COURSE CODE		**PHM25046**	**100%**
Module I		1. Preformulation studies onparacetamol/asparin/or any otherdrug 2. Preparation and evaluation ofParacetamoltablets 3. Preparation and evaluation ofAspirintablets 4. Coating of tablets- film coating oftables/granules 5. Preparation and evaluation ofTetracyclinecapsules 6. Preparation of Calcium Gluconateinjection 7. Preparation of Ascorbic Acidinjection 8. Qulaity control test of (as per IP)marketedtabletsandcapsules 9. Preparation of Eye drops/ and Eyeointments 10. Preparation of Creams (cold /vanishingcream) Evaluation of Glass containers (asper IP)	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENT AGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOLOGY-IIPRACTICAL**	**100%**
COURSE CODE		**PHM25047**	**100%**

Module I		1. Introduction to *in-vitro* pharmacology and physiological salt solutions. 2. Effect of drugs on isolated frog heart. 3. Effect of drugs on blood pressure and heart rate of dog. 4. Study of diuretic activity of drugs using rats/mice. 5. DRC of acetylcholine using frog rectus abdominis muscle. 6. Effect of physostigmine and atropineon DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively. 7. Bioassay of histamine using guinea pigileum by matching method. 8. Bioassay of oxytocin using rat uterine horn by interpolation method. 9. Bioassay of serotonin using rat fundus strip by three point bioassay. 10. Bioassay of acetylcholine using ratileum/colon by four point bioassay. 11. Determination of PA_2 value of prazosin using rat anococcy geusmuscle(by Schildsplot method). 12. Determination of PD_2 value using guinea pig ileum. 13. Effect of spasmogens and spasmolytics using rabbit jejunum. 14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model. 15. Analgesic activity of drug using central and peripheral methods *Note: All laboratory techniques and animal experiments are demonstrated by simulated* 16. *Experiments by softwares and videos*	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOGNOSY AND PHYTOCHEMISTRYII PRACTICAL**	**100%**
COURSE CODE		**PHM25048**	**100%**
Module I	1.	1. Morphology, histology and powdercharacteristics & extraction &detectionof: Cinchona, Cinnamon, Senna, Clove,Ephedra,FennelandCoriander 2. Exercise involving isolation & detection of active principles a. Caffeine-from tea dust. b. Diosgen in from Dioscorea c. Atropine from Belladonna d. Sennosides from Senna 3. Separation of sugars by Paperchromatography 4. TLC of herbal extract 5. Distillation of volatile oils and detection of phytoconstitutents by TLC 2. Analysis of crude drugs by chemicaltests: **(**i) Asafoetida (ii) Benzoin (iii)Colophony(iv)Aloes(v)Myrrh	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 6

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**MEDICINALCHEMISTRYIII – THEORY**	**100%**
COURSE CODE		**PHM26049**	**100%**
Module I		Antibiotics Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes. β-Lactam antibiotics: Penicillin, Cepholosporins, β- Lactamase inhibitors, Monobactams Aminoglycosides: Streptomycin, Neomycin, Kanamycin Tetracyclines: Tetracycline,Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline	**100%**

Module II		**- Antibiotics** Historical background,Nomenclature,Stereochemistry,Structureactivity relationship, Chemicaldegradation classificationand important products ofthefollowing classes. **Macrolide:** ErythromycinClarithromycin,Azithromycin. **Miscellaneous:**Chloramphenicol*,Clindamycin. **Prodrugs:** Basic conceptsand application of prodrugsdesign. **Antimalarials:** Etiology ofmalaria. **Quinolines:** SAR, Quininesulphate, Chloroquine*,Amodiaquine, Primaquine phosphate,Pamaquine*, Quinacrinehydrochloride, Mefloquine.**Biguanides and dihydrotriazines:** Cycloguanilpamoate,Proguanil. **Miscellaneous:**Pyrimethamine, Artesunete,Artemether,Atovoquone.	**100%**

Module III		**Anti-tubercular AgentsSyntheticantitubercularagents:** Isoniozid*,Ethionamide, Ethambutol,Pyrazinamide, Para aminosalicylicacid.* **Anti tubercular antibiotics:**Rifampicin, Rifabutin,Cycloserine Streptomycine, Capreomycinsulphate. **Urinary tract anti-infectiveagents Quinolones:** SAR ofquinolones, NalidixicAcid,Norfloxacin,Enoxacin,Ciprofloxacin*, Ofloxacin,Lomefloxacin, Sparfloxacin,Gatifloxacin, MoxifloxacinMiscellaneous: Furazolidine,Nitrofurantoin*, Methanamine.**Antiviralagents:** Amantadine hydrochloride,Rimantadinehydrochloride, Idoxuridine trifluoride, Acyclovir*,Gancyclovir,Zidovudine,Didanosine, Zalcitabine,Lamivudine, Loviride,Delavirding, Ribavirin,Saquinavir,Indinavir, Ritonavir.	**100%**

Module IV		**Antifungal agents:Antifungal antibiotics:**Amphotericin-B, Nystatin,Natamycin, Griseofulvin.**Synthetic Antifungalagents:** Clotrimazole,Econazole, Butoconazole,Oxiconazole Tioconozole,Miconazole*, Ketoconazole,Terconazole, Itraconazole, Fluconazole,Naftifine hydrochloride,Tolnaftate*. **Anti-protozoal Agents:**Metronidazole*, Tinidazole,Ornidazole, Diloxanide,Iodoquinol, PentamidineIsethionate, Atovaquone,Eflornithine. **Anthelmintics:**Diethylcarbamazine citrate*,Thiabendazole,Mebendazole*,Albendazole, Niclosamide,Oxamniquine, Praziquantal,Ivermectin. **Sulphonamides andSulfones** Historical development,chemistry,classificationandSAR of Sulfonamides:Sulphamethizole,Sulfisoxazole,Sulphamethizine,Sulfacetamide*, Sulphapyridine,Sulfamethoxaole*,Sulphadiazine, Mefenideacetate, Sulfasalazine. **Folatereductaseinhibitors:**Trimethoprim*,Cotrimoxazole. **Sulfones:**Dapsone*.	**100%**

Module V		**IntroductiontoDrugDesign** Various approaches used indrugdesign. Physicochemical parametersused in quantitative structureactivity relationship (QSAR) such aspartition coefficient,Hammet's electronicparameter, Tafts stericparameter and Hanschanalysis. Pharmacophore modelingand docking techniques.**CombinatorialChemistry:** Concept and applicationschemistry: solid phase andsolutionphasesynthesis.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOLOGY III - THEORY**	**100%**
COURSE CODE		**PHM26050**	**100%**
Module I		**1. Pharmacology of drugsacting on Respiratorysystem** a. Anti-asthmaticdrugs b. Drugs used in them anagement of COPD c. Expectorants and antitussives d. Nasal decongestants e. Respiratory stimulants **2. Pharmacology of drugsacting on the Gastrointestinal Tract** a. Antiulceragents. b. Drugs for constipation and diarrhoea. c. Appetite stimulants and suppressants. d. Digestants and carminatives. e. Emetics and anti-emetics.	**100%**
Module II		**3. Chemotherapy** a. General principles of chemotherapy. b. Sulfonamides and cotrimoxazole. **e.** Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides	**100%**

Module III		**3. Chemotherapy** a. Antitubercular agents b. Antileprotic agents c. Antifungal agents d. Antiviral drugse. Anthelmintics f.Antimalarial drugs g.Antiamoebic agents	**100%**
Module IV		**3.Chemotherapy** l. Urinary tract infections and sexually transmitted diseases. m. Chemotherapy of malignancy. **4. Immunopharmacology** a. Immunostimulants Immunosuppressant Protein drugs, monoclonalantibodies, target drugs to antigen, biosimilars	**100%**
Module V		**5. Principles oftoxicology** **a.** Definition and basic knowledge of acute, subacute and chronic toxicity. **b.** Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity. **c.** General principles of treatment of poisoning. **d.** Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning. **6. Chronopharmacology** a. Definition of rhythm andcycles. Biological clock and their significance leading to chronotherapy.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENT AGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HERBALDRUGTECHNOLOGY - THEORY**	**100%**
COURSE CODE		**PHM26051**	**100%**
Module I		**Herbs as raw materials:** Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation Source of Herbs Selection, identification and authentication of herbal materials Processing of herbal rawmaterial **Biodynamic Agriculture** Good agricultural practices incultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides. **Indian Systems of Medicine** a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, f. Ghutika, Churna, Lehya and Bhasma	**100%**

Module II		**Nutraceuticals** General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer,Irritable Bowel syndrome and various Gastrointestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory,Ginger, Fenugreek, Garlic,Honey, Amla, Ginseng, Ashwagandha, Spirulina **Herbal-Drug and Herb-Food Interactions:** General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: **f.** Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic,Pepper & Ephedra	**100%**
Module III		**Herbal Cosmetics** Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gumscolours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products. **Herbalexcipients:** Herbal Excipients –Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes. **Herbal formulations :** Conventional herbal formulations like syrups,mixtures and tablets and Novel dosage forms like phytosomes.	**100%**

Module IV		**Evaluation of Drugs** WHO & ICH guidelines for the assessment of herbal drugsStability testing of herbaldrugs. **Patenting and Regulatory requirements of natural products:** a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy. b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem. **Regulatory Issues**-Regulations in India (ASUDTAB,ASUDCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs &Cosmetics Act for ASU drugs.	**100%**
Module V		**General Introduction to Herbal Industry** Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. **Schedule T–Good Manufacturing Practice of Indian systems of medicine** Components of GMP (Schedule – T) and its objectives Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**BIOPHARMACEUTICSANDPHARMACO KINETICS - THEORY**	**100%**
COURSE CODE		**PHM26052**	**100%**
Module I		**Introduction Biopharmaceutics to Absorption**; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Nonper oralextra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. g. Kinetics of protein binding, Clinical significance of protein binding of drugs.	**100%**

Module II		**Elimination:** Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Nonrenal routes of drug excretion of drugs. **Bioavailability and Bioequivalence:** Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro*drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution ratesand bioavailability of poorly soluble drugs.	**100%**
Module III		**Pharmaco kinetics:** Definition and introduction to Pharmaco kinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmaco kinetics parameters -K_E, t1/2, Vd, AUC, Ka, Clt and CL_R – definitions methods of eliminations, understanding of their significance andapplication.	**100%**
Module IV		***Multi compartment models:*** Two compartment openmodel. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settins.	**100%**

Module V		**Nonlinear Pharmacokinetics:** a.Introduction, b.Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICALBIOTECHNOLOGY - THEORY**	**100%**
COURSE CODE		**PHM26053**	**100%**
Module I		a) Brief introduction toBiotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology-Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration -Amylase,Catalase, Peroxidase, Lipase, Protease, Penicillinase. h. Basic principles of genetic engineering.	**100%**
Module II		a) Study of cloning vectors, restriction endonucleases and DNAligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. **g.** d)Brief introduction to PCR	**100%**

Module III		Types of immunity- humor alimmunity, cellularimmunity a) Structure ofImmunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterialvaccines, toxoids, viralvaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology-Production, Purification and Applications Blood products and Plasma Substituties.	**100%**
Module IV		a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. Mutation: Types of mutation/mutants.	**100%**
Module V		a) - Fermentation methods and general requirements, studyof media, equipments, sterilization methods, aeration process, stirring. b) Large scale production fermenter design and its various controls. c) Study of the production of - penicillins, citric acid,Vitamin B12, Glutamic acid, Griseofulvin, d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL QUALITYASSURANCE–THEORY**	**100%**
COURSE CODE		**PHM26054**	**100%**
Module I		**Quality Assurance and Quality Management concepts:** Definition and concept of Qualitycontrol, Quality assurance and GMP **Total Quality Management (TQM):** Definition, elements, philosophies **ICH Guidelines**: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines **Quality by design (QbD)**: Definition, overview, elements of QbD program, tools **ISO 9000 & ISO14000**: Overview, Benefits, Elements, steps for registration i. **NABL accreditation**: Principles and procedures	**100%**

Module II		**Organization and personnel:** Personnel responsibilities, training, hygiene and personal records. **Premises:** Design, construction and plantlayout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination. **Equipments and rawmaterials:** Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.	**100%**
Module III		**Quality Control:** Quality control test for containers, rubber closures and secondary packing materials. **Good Laboratory Practices:** General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports,Disqualification of Testing Facilities	**100%**
Module IV		**Complaints:** Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal. **Document maintenance in pharmaceutical industry:** Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.	**100%**

Module V		**Calibration and Validation:** Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectro photometer, General principles of Analytical method Validation. **Warehousing:** Good warehousing practice, materials management	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**MEDICINALCHEMISTRYIII – PRACTICAL**	**100%**
COURSE CODE		**PHM26055**	**100%**
Module I		**I Preparation of drugs andintermediates** 1 Sulphanilamide 2 7-Hydroxy,4-methylcoumarin 3 Chlorobutanol 4 Triphenylimidazole 5 Tolbutamide 6 Hexamine **II Assay of drugs** 1 Isonicotinicacidhydrazide 2 Chloroquine 3 Metronidazole 4 Dapsone 5 Chlorpheniraminemaleate 6 Benzylpenicillin **III** Preparation of medicinally important compounds or intermediates by Microwave irradiation technique **IV** Drawing structures and reactions using chemdraw® **V** Determination of physicochemical propertiessuchas logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (LipinskiesRO5	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		2019	
SUBJECT / COURSE TITLE		PHARMACOLOGYIII–PRACTICAL	100%
COURSE CODE		PHM26056	100%

Module I		1. Dose calculation in pharmacological experiments 2. Antiallergic activity by mast cell stabilization assay 3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model. 4. Study of effect of drugs on gastrointestinal motility 5. Effect of agonist and antagonists on guinea pig ileum 6. Estimation of serum biochemical parameters by using semi-autoanalyser 7. Effect of saline purgative on frog intestine 8. Insulin hypoglycemic effect in rabbit 9. Test for pyrogens (rabbit method) 10. Determination of acute oral toxicity (LD50) of a drug from a given data 11. Determination of acute skin irritation / corrosion of a test substance 12. Determination of acute eye irritation / corrosion of a test substance 13. Calculation of pharmacokinetic parameters from a given data 14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA) 15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test) *Experiments are demonstrated by simulated experiments/video	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**HERBALDRUGTECHNOLOGY–PRACTICAL**	**100%**
COURSE CODE		**PHM26057**	**100%**
Module I		1. To perform preliminaryphytochemical screening ofcrude drugs. 2. Determination of thealcoholcontentofAsavaandArista 3. Evaluationofexcipientsofnatural origin 4. Incorporationofpreparedand standardized extract incosmetic formulations likecreams, lotions and shampoos andtheir evaluation. 5. Incorporationofpreparedand standardized extract informulations like syrups, mixtures and tablets and theirevaluationasperPharmacopoeialrequirements. 6. Monograph analysis ofherbal drugs from recentPharmacopoeias 7. DeterminationofAldehydecontent 8. DeterminationofPhenolcontent Determination of totalalkaloids	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 7

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**INSTRUMENTAL METHODS OFANALYSIS–THEORY**	**100%**
COURSE CODE		**PHM27058**	**100%**
Module I		**UV Visible spectroscopy** Electronic transitions,chromophores,auxochromes , spectralshifts, solvent effect onabsorption spectra, Beerand Lambert's law,Derivation and deviations.Instrumentation- Sourcesof radiation, wavelengthselectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photovoltaic cell, Silicon Photodiode. Applications - Spectrophotometrictitrations, Single component and multicomponent analysis **Fluorimetry** Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions,factors affecting fluorescence, quenching,instrumentation and a. applications	**100%**

Module II		**IR spectroscopy** Introduction, fundamental modes of vibrations in polyatomic molecules, sample handling, factors affecting vibrations Instrumentation -Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector andapplications **Flame Photometry** Principle, interferences, instrumentation and applications **Atomic absorption spectroscopy** Principle, interferences, instrumentation and applications **Nepheloturbidometry** Principle, instrumentation and applications	**100%**
Module III		**Introduction to chromatography Adsorption and partition column chromatography** Methodology, advantages, disadvantages and applications. **Thin layer chromatography** Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications. **Paper chromatography** Introduction, methodology, development techniques, advantages, disadvantages and applications **Electrophoresis** Introduction, factors affecting electrophoreticmobility, Techniques of paper, gel, capillary electrophoresis, applications	**100%**

Module IV		**Gas chromatography** Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications. **High performance liquidchromatography (HPLC)** Introduction, theory, instrumentation, advantages and application	**100%**
Module V		**Ion exchange chromatography-** Introduction, classification, ion exchange resins, properties, mechanism ofion exchange process, factors affecting ionexchange, methodology and applications. **Gel chromatography-** Introduction, theory, instrumentation and applications. **Affinity chromatography-** Introduction, theory, instrumentation and applications	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**INDUSTRIAL PHARMACY –THEORY**	**100%**
COURSE CODE		**PHM27059**	**100%**
Module I		**Pilot plant scale uptechniques:** General considerations -including significance ofpersonnel requirements,space requirements, rawmaterials, Pilot plant scaleup considerations for solids,liquid orals, semi solids andrelevant documentation,SUPAC guidelines,Introductionto platform a. technology	**100%**

Module II		**Technology developmentandtransfer:** WHO guidelines forTechnology Transfer(TT):Terminology, Technology transfer protocol, Quality risk management, Transferfrom R & D to production(Process, packaging andcleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premisesand equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization -practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL,TBSE/ SIDBI; TT related documentation – confidentiality agreement, licensing, MoUs, legal issues	**100%**
Module III		**Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals **Regulatory requirements for drug approval**: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology,General considerations of Investigational New Drug(IND) Application, Investigator's Brochure (IB) and New Drug Application(NDA), Clinical research / BEstudies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions,Management Of Clinical Studies.	**100%**

Module IV		**Quality managementsystems** Quality management &Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications(OOS),Change control, Introduction to ISO 9000series of quality systems standards, ISO 14000, NABL, GLP	**100%**
Module V		**Indian Regulatory Requirements:** Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval Procedures for New Drugs	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACYPRACTICE–THEORY**	**100%**
COURSE CODE		**PHM27060**	**100%**

Module I		**Hospital and it's organization** Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions. **Hospital pharmacy and its organization** Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staffrequirements,and Responsibilities and functions ofhospitalpharmacists. **Adverse drug reaction** Classifications – Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions,and pharmacokinetic drug interactions, Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management. **Community Pharmacy** Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store	**100%**

Module II		**Drug distribution system in a hospital** Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensingofcontrolleddrugs. **Hospitalformulary** Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary. **Therapeutic drug monitoring** Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring. **Medication adherence** Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence. **Patient medication history interview** Need for the patient medication history interview, medication interview forms. **Community pharmacy management** Financial, materials, staff, and infrastructure requirements.	**100%**

Module III		**Pharmacy and therapeuticcommittee** Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs intoformulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation. **Information services** Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information. **Counseling** Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist. **Education and training programin the hospital** Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education. **Prescribed medication order and communication skills** Prescribed medication order-interpretation and legal requirements, and Communication skills-communication with prescribers and patients.	**100%**

Module IV		**preparation and implementation** Budget preparation and implementation **Clinical Pharmacy** Introduction to Clinical Pharmacy, Concept of clinical pharmacy,functions and responsibilities ofclinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern. **Over the counter (OTC) sales** Introduction and sale of over the counter, and Rational use of common over the counter medications	**100%**
Module V		**Drug store management and inventory control** Organization of drug store, typesof materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure. **Investigational use of drugs** Description, principals involved classification, control, identification, role of hospital pharmacist, advisory committee. **Interpretation of Clinical Laboratory Tests:** Blood chemistry, hematology, andurinalysis	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**NOVEL DRUG DELIVERYSYSTEM–THEORY**	**100%**
COURSE CODE		**PHM27061**	**100%**
Module I		**Controlled drug delivery systems:** Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidate's. Approaches to design controlled release formulations based on diffusion, dissolution andion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations **Polymers:** Introduction, classification, properties, advantages and application of polymers informulation of controlled release drug delivery system	**100%**

Module II		**Micro encapsulation:** Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of micro encapsulation, applications **Mucosal Drug Delivery system:** Introduction, Principles of bio adhesion /mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems **Implantable Drug Delivery Systems:** Introduction, advantages and disadvantages, concept of implants and osmotic pump	**100%**
Module III		**Transdermal Drug Delivery Systems:** Introduction, Permeation through skin, factors affecting permeation,permeation enhancers, basic components of TDDS, formulation approaches **Gastroretentive drug delivery systems:** Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastro adhesive systems and their applications **Nasopulmonary drug delivery system:** Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers	**100%**

Module IV		**Targeted drug Delivery:** Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and Their applications	**100%**
Module V		**Ocular Drug DeliverySystems:** Introduction, intra ocular barriers and methods toovercome – Preliminarystudy, ocular formulations and ocuserts **Intrauterine Drug Delivery Systems**: Introduction, advantages and disadvantages, development of intrauterine devices(IUDs) and applications	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**INSTRUMENTAL METHODS OFANALYSIS-PRACTICAL**	**100%**
COURSE CODE		**PHM27062**	**100%**
Module I		1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds 2 Estimation of dextrose by colorimetry 3 Estimation of sulfanilamide by colorimetry 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy 5 Assay of paracetamol by UV-Spectrophotometry 6 Estimation of quininesulfate by fluorimetry 7 Study of quenching offluorescence 8 Determination of sodium by flamephotometry 9 Determination ofpotassium by flamephotometry 10 Determination of chlorides and sulphates bynephelo turbidometry 11 Separation of aminoacids by paper chromatography 12 Separation of sugars by thin layer chromatography 13 Separation of plantpigments by column chromatography 14 Demonstration experiment on HPLC 15 Demonstration experiment on Gas Chromatography	**100%**

AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES	100%

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PRACTICE SCHOOL**	**100%**
COURSE CODE		**PHM27063**	**100%**
Module I		In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time. At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

SEMESTER - 8

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**BIOSTATISTICS AND RESEARCH METHODOLOGY – THEORY**	**100%**
COURSE CODE		**PHM28064**	**100%**
Module I		**Introduction:** Statistics, Biostatistics, Frequency distribution **Measures of central tendency:** Mean, Median, Mode- Pharmaceutical examples **Measures of dispersion:** Dispersion, Range, standard deviation, Pharmaceutical Problems **Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples	**100%**

Module II		**Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression– Pharmaceutical Examples **Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples **Parametric test:** t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference	**100%**

Module III		**Non Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test **Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism **Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph **Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.	**100%**
Module IV		Blocking and confounding system for Two-level factorials **Regression modeling:** Hypothesis testing in Simple and Multiple regression models **Introduction to Practical components of Industrial and Clinical Trials Problems:** Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach	**100%**

Module V		**Factorial Design:** Definition, 2^2, 2^3design. Advantage of factorial design **Response Surface methodology:** Central composite design, Historical design, Optimization Techniques	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**SOCIAL AND PREVENTIVE PHARMACY – THEORY**	**100%**
COURSE CODE		**PHM28065**	**100%**
Module I		**Concept of health and disease:** Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick. **Social and health education:** Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention. **Sociology and health:** Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health **Hygiene and health:** personal hygiene and health care; avoidable habits	**100%**

Module II		**Preventive medicine:** General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse	**100%**
Module III		**National health programs, its objectives, functioning and outcome of the following:** HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.	**100%**
Module IV		National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program	**100%**
Module V		Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMA MARKETING MANAGEMENT – THEORY**	**100%**
COURSE CODE		**PHM28066**	**100%**
Module I		**Marketing:** Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior. **Pharmaceutical market:** Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation& targeting.Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist.Analyzing the Market;Role of market research.	**100%**
Module II		**Product decision:** Classification, product line and product mix decisions, product life cycle,product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry	**100%**

Module III		**Promotion:** Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.	**100%**
Module IV		**Pharmaceutical marketing channels:** Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management. **Professional sales representative (PSR):** Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.	**100%**
Module V		**Pricing:** Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority). **Emerging concepts in marketing:** Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACEUTICAL REGULATORY SCIENCE – THEORY**	**100%**
COURSE CODE		**PHM28067**	**100%**
Module I		**New Drug Discovery and development** Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.	**100%**
Module II		**Regulatory Approval Process** Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA. **Regulatory authorities and agencies** Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)	**100%**
Module III		**Registration of Indian drug product in overseas market:** Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD), ASEAN Common Technical Document (ACTD) research.	**100%**

Module IV		**Clinical trials** Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safetymonitoring in clinical trials	**100%**
Module V		**Regulatory Concepts** Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PHARMACOVIGILANCE – THEORY**	**100%**
COURSE CODE		**PHM28068**	**100%**
Module I		**Introduction to Pharmacovigilance** History and development of Pharmacovigilance Importance of safety monitoring of Medicine WHO international drug monitoring programme Pharmacovigilance Program of India(PvPI) **Introduction to adverse drug reactions** Definitions and classification of ADRs Detection and reporting Methods in Causality assessment Severity and seriousness assessment Predictability and preventability assessment Management of adverse drug reactions **Basic terminologies used in pharmacovigilance** Terminologies of adverse medication related events Regulatory terminologies	**100%**

Module II		**Drug and disease classification** Anatomical, therapeutic and chemical classification of drugs International classification of diseases Daily defined doses International Non proprietary Names for drugs **Drug dictionaries and coding in pharmacovigilance** WHO adverse reaction terminologies MedDRA and Standardised MedDRA queries WHO drug dictionary Eudravigilance medicinal product dictionary **Information resources in pharmacovigilance** Basic drug information resources Specialised resources for ADRs **Establishing pharmacovigilance programme** Establishing in a hospital Establishment & operation of drug safety department in industry Contract Research Organisations (CROs) Establishing a national programme	**100%**

Module III		**Vaccine safety surveillance** Vaccine Pharmacovigilance Vaccination failure Adverse events following immunization **Pharmacovigilance methods** Passive surveillance – Spontaneous reports and case series Stimulated reporting Active surveillance – Sentinel sites, drug event monitoring and registries Comparative observational studies – Cross sectional study, case control study and cohort study Targeted clinical investigations **Communication in pharmacovigilance** Effective communication in Pharmacovigilance Communication in Drug Safety Crisis management Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media	**100%**
Module IV		**Safety data generation** Pre clinical phase Clinical phase Post approval phase (PMS) **ICH Guidelines for Pharmacovigilance** Organization and objectives of ICH Expedited reporting Individual case safety reports Periodic safety update reports Post approval expedited reporting Pharmacovigilance planning Good clinical practice in pharmacovigilance studies	**100%**

Module V		**Pharmacogenomics of adverse drug reactions** Genetics related ADR with example focusing PK parameters. **Drug safety evaluation in special population** Paediatrics Pregnancy and lactation Geriatrics **CIOMS** CIOMS Working Groups CIOMS Form **CDSCO (India) and Pharmacovigilance** D&C Act and Schedule Y Differences in Indian and global pharmacovigilance requirements	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**QUALITY CONTROL AND STANDARDIZATION OF HERBALS – THEORY**	**100%**
COURSE CODE		**PHM28069**	**100%**
Module I		Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms WHO guidelines for quality control of herbal drugs. Evaluation of commercial crude drugs intended for use	**100%**
Module II		Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine. WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines WHO Guidelines on GACP for Medicinal Plants.	**100%**
Module III		EU and ICH guidelines for quality control of herbal drugs. Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines	**100%**

Module IV		Stability testing of herbal medicines.Application of various chromatographic techniques in standardization of herbal products. Preparation of documents for new drug application and export registration. GMP requirements and Drugs & Cosmetics Act provisions.	**100%**
Module V		Regulatory requirements for herbal medicines. WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems Comparison of various Herbal Pharmacopoeias. Role of chemical and biological markers in standardization of herbal products	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COMPUTER AIDED DRUG DESIGN –THEORY**	**100%**
COURSE CODE		**PHM28070**	**100%**
Module I		**Introduction to Drug Discovery and Development** Stages of drug discovery and development. **Lead discovery and Analog Based Drug Design** Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation. **Analog Based Drug Design:** Bioisosterism, Classification, Bioisosteric replacement. Any three case studies	**100%**

Module II		**Quantitative Structure Activity Relationship (QSAR)** SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammet's substituent constant and Tafts steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.	**100%**
Module III		**Molecular Modeling and virtual screening techniques** **Virtual Screening techniques:** Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening. **Molecular docking:** Rigid docking, flexible docking, manual docking, Docking based screening. De novo drug design.	**100%**
Module IV		- **Informatics & Methods in drug design** Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases	**100%**
Module V		**Molecular Modeling:** Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**CELL AND MOLECULAR BIOLOGY – THEORY**	**100%**
COURSE CODE		**PHM28071**	**100%**
Module I		**Cell and Molecular Biology:** Definitions theory and basics and Applications. b) Cell and Molecular Biology: History and Summation. c) Properties of cells and cell membrane. d) Prokaryotic versus Eukaryotic e) Cellular Reproduction f) Chemical Foundations – an Introduction and Reactions (Types)	**100%**
Module II		DNA and the Flow of Molecular Information, DNA Functioning, DNA and RNA, Types of RNA, Transcription and Translation	**100%**
Module III		**Proteins:** Defined and Amino Acids, Protein Structure, Regularities in Protein Pathways, Cellular Processes, Positive Control and significance of Protein Synthesis	**100%**
Module IV		Science of Genetics, Transgenics and Genomic Analysis, Cell Cycle analysis, Mitosis and Meiosis, Cellular Activities and Checkpoints	**100%**
Module V		Cell Signals: Introduction, Receptors for Cell Signals, Signaling Pathways: Overview, Misregulation of Signaling Pathways, Protein-Kinases: Functioning	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**COSMETIC SCIENCE – THEORY**	**100%**
COURSE CODE		**PHM28072**	**100%**
Module I		Classification of cosmetic and cosmeceutical products Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs **Cosmetic excipients:** Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application **Skin:** Basic structure and function of skin. **Hair:** Basic structure of hair. Hair growth cycle. **Oral Cavity:** Common problem associated with teeth and gums.	**100%**

Module II		**Principles of formulation and building blocks of skin care products:** Face wash, Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmecuticals. **Antiperspants & deodorants-** Actives & mechanism of action. **Principles of formulation and building blocks of Hair care products:** Conditioning shampoo, Hair conditioner, anti-dandruff shampoo. Hair oils. Chemistry and formulation of Para-phylene diamine based hair dye. **Principles of formulation and building blocks of oral care products:** Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.	**100%**
Module III		Sun protection, Classification of Sunscreens and SPF. **Role of herbs in cosmetics:** Skin Care: Aloe and turmeric Hair care: Henna and amla. Oral care: Neem and clove **Analytical cosmetics:** BIS specification and analytical methods for shampoo, skincream and toothpaste.	**100%**
Module IV		Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties Soaps, and syndet bars. Evolution and skin benfits.	**100%**

Module V		Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis. Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor. Antiperspirants and Deodorants- Actives and mechanism of action	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**EXPERIMENTAL PHARMACOLOGY – THEORY**	**100%**
COURSE CODE		**PHM28073**	**100%**
Module I		**Laboratory Animals:** Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.	**100%**
Module II		**Preclinical screening models** a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. **b. Study of screening animal models for** Diuretics, nootropics, anti-Parkinson's,antiasthmatics **Preclinical screening models:** for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	**100%**

Module III		**Preclinical screening models:** for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaethetics	**100%**
Module IV		**Preclinical screening models:** for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslepidemic, anti aggregatory, coagulants, and anticoagulants. Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.	**100%**
Module V		**Research methodology and Bio-statistics** Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students 't' test and One-way ANOVA. Graphical representation of data	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**ADVANCED INSTRUMENTATION TECHNIQUES – THEORY**	**100%**
COURSE CODE		**PHM28074**	**100%**
Module I		**Nuclear Magnetic Resonance spectroscopy** Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications. **Mass Spectrometry-** Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications	**100%**
Module II		**Thermal Methods of Analysis:** Principles, instrumentation and applications Of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) **X-Ray Diffraction Methods:** Origin of X-rays, basic aspects of crystals, Xray Crystallography, rotating crystal technique, single crystal diffraction,powder diffraction, structural elucidation and applications.	**100%**

Module III		**Calibration and validation-**as per ICH and USFDA guidelines **Calibration of following Instruments** Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC	**100%**
Module IV		**Radio immune assay:**Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay **Extraction techniques**:General principle and procedure involved in the solid phase extraction and liquid-liquid extraction	**100%**
Module V		**Hyphenated techniques-**LC-MS/MS, GC-MS/MS, HPTLC-MS.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**DIETARY SUPPLEMENTS AND NUTRACEUTICALS - THEORY**	**100%**
COURSE CODE		**PHM28075**	**100%**
Module I		Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community. c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds	**100%**

Module II		Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following a) Carotenoids- α and β-Carotene, Lycopene, Xanthophylls, leutin b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Reservetrol d) Flavonoids- Rutin , Naringin, Quercitin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum f) Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.	**100%**
Module III		Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids. b) Dietary fibres and complex carbohydrates as functional food ingredients.	**100%**

Module IV		Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing. b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, α- Lipoic acid, melatonin Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole. c) Functional foods for chronic disease prevention	**100%**
Module V		a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals. b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods. c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**

	YEAR OF PREVIOUS REVISION IN A SUBJECT / COURSE	YEAR OF LATEST REVISION OF A SUBJECT / COURSE	PERCENTAGE OF CHANGE
YEAR		**2019**	
SUBJECT / COURSE TITLE		**PROJECT WORK**	**100%**
COURSE CODE		**PHM28076**	**100%**
Module I		All the students shall undertake a projectunder the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages). The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students).	**100%**
AVERAGE PERCENTAGE ON REVISION CONSIDERING ALL MODULES			**100%**