Study & Evaluation Scheme of Diploma in Pharmacy

[Applicable for 2019-21]

Version 2019
(According to PCI Regulation 6, 7 &8 of the Diploma in Pharmacy (D. Pharm.) course regulation2014)

Approved in BOS	Approved in BOF	Approved in Academic Council
13/04/2019	18/06/2019	13/07/2019 Vide Agenda No. 2.4

Quantum University, Roorkee
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Quantum University, Roorkee

Study & Evaluation Scheme

Study Summary

Name of the Faculty	Faculty of Health Sciences
Name of the School	Quantum School of Health Sciences
Name of the Department	Department of Pharmacy
Program Name	Diploma in Pharmacy
Duration	2 Years
Medium	English/Hindi

Evaluation Scheme

Diploma in Pharmacy (Part-I) Examination

Subject	Max. Marks in Theory			Max. Marks in Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics-I	80	20	100	80	20	100
Pharmaceutical Chemistry-I	80	20	100	80	20	100
Pharmacognosy	80	20	100	80	20	100
Biochem. & Clinical Pathology	80	20	100	80	20	100
Human Anatomy & Physiology	80	20	100	80	20	100
Health Education & community Pharmacy	80	20	100			
			600			500

Diploma in Pharmacy (Part-II) Examination

Subject	Max. Marks in Theory			Max. Marks in Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics-II	80	20	100	80	20	100
Pharmaceutical Chemistry-II	80	20	100	80	20	100
Pharmacology & Toxicology	80	20	100	80	20	100
Pharmaceutical Jurisprudence	80	20	100			
Drug store and Business Management	80	20	100			
Hospital & Clinical Pharmacy	80	20	100	80	20	100
			600			400

FIRST YEAR

Course Code	Category	Course title	L	T	P	C	Version	Course Prerequisite
PR1101	PC	Pharmaceutics- I	3	0	0	6	1.0	--
PR1102	PC	Pharmaceutical Chemistry- I	3	0	0	6	1.0	--
PR1103	PC	Pharmacognosy	3	0	0	6	1.0	--
PR1104	PC	Biochemistry & Clinical Pathology	3	0	0	6	1.0	--
PR1105	PC	Human Anatomy & Physiology	3	0	0	6	1.0	--
PR1106	PC	Health Education & Community Pharmacy	3	0	0	6	1.0	--
PR1140	PC	Pharmaceutics Lab – I	0	0	4	4	1.0	--
PR1141	PC	Pharmaceutical Chemistry Lab – I	0	0	4	4	1.0	--
PR1142	PC	Pharmacognosy Lab	0	0	4	4	1.0	--
PR1143	PC	Biochemistry & Clinical Pathology Lab	0	0	4	4	1.0	--
PR1144	PC	Human Anatomy & Physiology Lab	0	0	4	4	1.0	--
		TOTAL	18	0	20	56		

SECOND YEAR

Course Code	Category	Course title	L	T	P	C	Version	Course Prerequisite
PR1201	PC	Pharmaceutics- II	3	0	0	6	1.0	--
PR1202	PC	Pharmaceutical Chemistry- II	3	0	0	6	1.0	--
PR1203	PC	Pharmacology & Toxicology	3	0	0	6	1.0	--
PR1204	PC	Hospital & Clinical Pharmacy	3	0	0	6	1.0	--
PR1205	PC	Drug Store & Business Management	3	0	0	6	1.0	--
PR1206	PC	Pharmaceutical Jurisprudence	3	0	0	6	1.0	--
PR1240P	PC	Pharmaceutics Lab – II	0	0	4	4	1.0	--
PR1241P	PC	Pharmaceutical Chemistry Lab – II	0	0	4	4	1.0	--
PR1242P	PC	Pharmacology & Toxicology Lab	0	0	4	4	1.0	--
PR1243P	PC	Hospital & Clinical Pharmacy Lab	0	0	4	4	1.0	--
		TOTAL	18	0	16	52		

Contact Hrs: 34

PROGRAM OUTCOMES OF D. Pharm

- PO1.

  Pharmaceutical Knowledge: Students gain a deep knowledge regarding human body, its related diseases, analytical skills, drug molecules (Active Pharmaceutical Ingredients) along with excipients, natural drug resources, chemistry involved in API including synthesis of commonly used drugs, effect of drug on human body, toxicity and impurity profile, ADME studies of drugs (behaviour of drug in human body), dosage form studies including novel approaches, designing and development of formulation stability studies, analysis etc.

- PO2 **Research Analysis:** Students could apply the knowledge in research field to make new discoveries.
- PO3. **Design & Development of dosage forms**: Various dosage forms could be prepared by a pharmacy student in the pharmaceutical companies for the ease of patients.
- PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern methods with an understanding of the limitations and its usage. The student also learns to handle many instruments related to their studies which would help them work in a Pharmaceutical Industry, pharmacovigilance, regulatory requirements, legal processes etc.
- PO6. **Pharmacy and society:** Pharmacist provides complete health care data and practices to the people of the society and guides them to be healthy. The student also learns drug distribution system, patient counselling, industrial laws etc. Student gains expertise in storage and distribution of drugs with all precautions and in-depth knowledge of dose, adverse effect and other health related issues to deal with indoor and outdoor patients admitted in hospitals and also in public.
- PO7. **Environment and sustainability**: Understand the impact of the professional pharmacist in society and environment, and make an impact of it on the people of the society.
- PO8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmacy practice. Student is also trained in ethical behavior with physician, nurses and other paramedical staff for protecting patient's health.

- PO9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams acts as a multidisciplinary person in every context.
- PO10. **Communication:** Communicate effectively on pharmaceutical activities with the community and with society.
- PO11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- PO12. **Social Interaction:** Being a public welfare job, a pharmacist would be able to interact with the people in a better way to cure them and make them feel healthy.

D. Pharm.

Program Specific Outcomes:

PSO1: Detail understanding of theoretical and practical knowledge of all core and allied subjects of pharmaceutical sciences, which consist of dosage form design, routes of administration of various drugs, their mechanism of action, chemical moiety involved, doses of drugs, patient treatment, patient counseling, drug dispensing, hospital administration, drug manufacturing and QA/QC regulation etc.

PSO2: Highlight the concepts and operative components of pharmacovigilance, clinical pharmacy, hospital pharmacy, community pharmacy, pharmaceutical care, pharmacovigilance, pharmacoeconomics, clinical research, clinical pharmacokinetics and other related areas for the benefit of academicians, hospital/community pharmacists and industry, emphasizing the consequences of the use of medications.

PSO3: Rigorous core course-work in biopharmaceutics, drug transport, pharmacokinetics & pharmacodynamics, drug delivery systems, cell and molecular biology, synthetic and macromolecular chemistry, chemical and biomedical engineering, materials science, physiology and pharmacology.

PSO4: Emphasis on Drug Discovery and Design, Drug Delivery, Drug Action, Clinical trials, Drug Analysis, Cost Effectiveness of Medicines (Pharmacoeconomics) and Drug Regulatory Affairs etc.

PR1101	Title: Pharmaceutics-I	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	To impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.	
Expected Outcome	Students will be able to: Prepare various conventional dosage forms.	
Chapter No.		No. of hours (per Chapter)
Chapter I		2
Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarization with new drug delivery systems.		
Chapter II		2
Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.		
Chapter III		6
Metrology, Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, Isotonic solutions.		
Chapter IV		5
Packing of Pharmaceuticals. Desirable features of container types of containers. Study of glass and plastics as materials for containers and rubber as material for closures-their merits and demerits. Introduction to aerosol packaging.		
Chapter V		5
Size Reduction: Objectives, and factors affecting size reduction, methods of size reduction. Study of Hammer mill, Ball mill, Fluid Energy Mill and Disintegrator.		
Chapter VI		5
Size Separation, Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.		
Chapter VII		6
Mixing and Homogenization, Liquid mixing and powder mixing, Mixing of semisolids, Study of Silverson Mixer, Homogeniser, Planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Double cone mixer.		
Chapter VIII		5
Clarification and Filtration, Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments, Filter Press, Sintered Filters, Filter Candles, Metafilter		
Chapter IX		4
Extraction and Galenicals (a) Study of percolation and maceration and their modification, continuous hot extraction. Applications in the preparation of tinctures and extracts. (b) Introduction to Ayurvedic dosage forms.		
Chapter X		3
Evaporation, Definition, Factors affecting evaporation-Study of evaporating still and Evaporating Pan.		
Chapter XI		6
Distillation, Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of vacuum still, preparation of Purified Water I.P. and water for injection I.P. Construction and working of the still used for the same.		
Chapter XII		3
Introduction to drying processes, Study of Tray Dryers, Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.		
Chapter XIII		7

Concept of sterilization and its differences from disinfection-Thermal resistance of microorganisms. Detailed study of the following sterilization process- sterilization with moist heat,Dry heat sterilization,Sterilization by radiation, Sterilization by filtration and Gaseous sterilization. Aseptic techniques. Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.		
Chapter XIV		7
Tablets,Processing of Tablets-Definition; Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets. Evaluation of Tablets; Physical Standards including Disintegration and Dissolution. Tablet coating, sugar coating; film coating, enteric coating and microencapsulation		
Chapter XV		3
Capsules,Processing of Capsules- Hard and soft gelatin capsules; different sizes capsules; filling of capsules; handling and storage of capsules, Special applications of capsules.		
Chapter XVI		2
Immunological Products, Study of immunological products like sera, vaccines, toxoids & their preparations.		
Text Book	1. Remington's Pharmaceutical Sciences: Joseph P. Remington, Easton, Pa.: Mack Pub. Co., 1990. 2. Textbook of Pharmaceutics BY R.S. Gaud and A.V. Yadav, Publisher: Nirali Prakashan	
Reference Books	1. Indian Pharmacopoeia. IPC, Publisher: IPC. 2. British Pharmacopoeia,British Pharmacopoeia Commission,Publisher: TSO	
Mode of Evaluation	Internal and External Examinations	
Recommendation by Board of Studies on	13-04-2019	
Date of approval by the Academic Council	13-07-2019	

Course Outcomes for PR1101

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to prepare various conventional dosage forms.	2	Em,S
CO2	Students should be able to calculating the Dosage for patient.	2	Em,S
CO3	Students should be able to know the Pharmacopeias and other official books	1	Em,S
CO4	Students should be able to do the extraction and Preparation of crude drugs	2	Em,S
CO5	Students should be able to know the different types of Distillation Techniques and their uses	3	Em,S

CO-PO Mapping for PR1101

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	1	1	1	1	3	1	2	2	1
CO2	2	3	2	2	1	1	1	1	1	3	1	1	1	1
CO3	2	2	2	2	1	1	1	1	2	3	2	2	2	1
CO4	1	2	2	1	2	2	2	2	1	1	3	2	1	1
CO5	2	1	1	2	2	3	2	3	3	2	1	2	2	1
Avg	1.8	2	1.8	1.6	1.4	1.6	1.4	1.6	1.6	2.4	1.6	1.8	1.6	1

PR1102	Title: Pharmaceutical Chemistry –I	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Students will be able to understand the chemistry of inorganic compounds and their pharmaceutical importance.	
Expected Outcome	Upon completion of the course the student shall be able to: 1. Identify the incompatibilities of inorganic compounds, their uses and recommended dose. 2. Importance of quality control in pharmaceuticals.	
Chapter No.		No. of hours (per Chapter)
Chapter I		28
Introduction to Inorganic Chemistry, General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and pharmaceutical uses, storage conditions and chemical incompatibility. (A) Acids, bases and buffers Boric acid, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers. (B)Antioxidants-Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium metabisulphite, Sodium thiosulphate, Nitrogen and Sodium Nitrite. (C) Gastrointestinal agents-- (i) Acidifying agents Dilute hydrochloric acid. (ii) Antacids-Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations. (iii) Protective and Adsorbents-Bismuth subcarbonate and Kaolin. (iv) Saline Cathartics-Sodium potassium tartrate and Magnesium sulphate. (D) Topical Agents- (i) Protectives-Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, Silicone polymers. (ii) Antimicrobials and Astringents- Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax. Silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury. (iii) Sulphur and its compounds-Sublimed sulphur, precipitated sulphur, selenium sulphide. (iv) Astringents: -Alum and Zinc Sulphate. (E) Dental Products-Sodium Fluoride, Stannous Fluoride, Calcium carbonate, Sodium metaphosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride. (F) Inhalants-Oxygen, Carbondioxide, Nitrousoxide. (G) Respiratory stimulants-Ammonium Carbonate. (H) Expectorants and Emetics-Ammonium chloride, Potassium iodide, Antimony potassium tartrate. (I) Antidotes-Sodium nitrate.		
Chapter II		14
Major Intra and Extracellular electrolytes. (A) Electrolytes used for replacement therapy-Sodium chloride and its preparations, Potassium chloride and its preparations. (B) Physiological acid-base balance and electrolytes used-Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection (C) Combination of oral electrolyte powders and solutions.		
Chapter III		8
Inorganic Official compounds of Iron, Iodine, and, Calcium Ferrous Sulfate and Calcium gluconate.		
Chapter IV		10
Radio pharmaceuticals and Contrast media, Radio activity-Alpha, Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G. M. Counter Radio isotopes their uses, storage and precautions with special reference to the official preparations. Radio opaque Contrast media- Barium sulfate.		
Chapter V		6

Quality control of Drugs and Pharmaceuticals, Importance of quality control, significant errors, methods used for quality control, sources of impurities in Pharmaceuticals, Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals.		
Chapter VI		6
Identification tests for cations and anions as per Indian Pharmacopoeia.		
Text Books	1. Textbook of Inorganic Chemistry by Md. Ali, CBS Publisher 2. Inorganic medicinal and pharmaceutical chemistry by J.H. Block and E.V. Roche,Publisher: Lea &Febiger.	
Reference Books	Indian Pharmacopoeia.IPC, Publisher:IPC.	
Mode of Evaluation	Internal and External Examinations	
Recommendation by Board of Studies on	13-04-2019	
Date of approval by the Academic Council	13-07-2019	

Course Outcomes for PR1102

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to prepare various conventional dosage forms.	3	Em,S
CO2	Students should be able to calculating the Dosae for patient.	2	Em,S
CO3	Students should be able to know the Pharmacopeias and other official books	1	Em,S
CO4	Students should be able to do the extraction and Preparation of crude drugs	2	Em,S

CO-PO Mapping for PR1102

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	1	1	1	1	3	1	2	2	1
CO2	2	3	1	1	1	1	1	1	1	3	3	1	1	1
CO3	2	2	1	2	1	1	1	1	3	3	3	1	2	1
CO4	1	2	2	1	2	2	2	2	1	1	1	1	1	1
Avg	1.75	2.25	1.5	1.25	1.25	1.25	1.25	1.25	1.5	2.5	2	1.25	1.5	1.00

PR1103	Title: Pharmacognosy	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	This subject is designed to provide a complete knowledge on drug classification, adulteration and evaluation & its morphological and microscopical features.	
Expected Outcome	The students will be able to classify, identify and evaluate crude drugs in a systemic manner.	
Chapter No.		No. of hours (per Chapter)
Chapter I		5
Definition, history and scope of Pharmacognosy including indigenous system of medicine.		
Chapter II		3
Various systems of classification of drugs of natural origin.		
Chapter III		3
Pharmacopoeial Standards of drugs, Adulteration and drug evaluation; significance of Pharmacopoeial standards		
Chapter IV		8
Occurrence and distribution of various drugs, Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatileoils, tannins and resins.		
Chapter V		28
Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable andtherapeutic efficacy of following categories of drugs. (a) Laxatives: Aloes, Rhuburb, Castor oil, Ispaghula, Senna. (b) Cardiotonics-Digitalis, Arjuna. (c) Carminatives & G.I. regulators-Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom Ginger,Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove. (d) Astringents- Catechu. (e) Drugs acting on nervous system-Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium,Cannabis, Nux vomica. (f) Antihypertensives-Rauwolfia. (g) Antitussives-Vasaka, Tolu balsam, Tulsi. (h) Antirheumatics-Guggul, Colchicum. (i) Antitumour-Vinca. (j) Antileprotics-Chaulmoogra Oil. (k) Antidiabetics -Pterocarpus, Gymnema, Sylvestro. (l) Diuretics- Gokhru, Punarrnava. (m) Antidysentrics-Ipecacuanha (n) Antiseptics and disinfectants Benzoin, Myrrh. Nim, curcuma. (o) Antimalarial- Cinchona. (p) Oxytocics-Ergot. (q) Vitamins-Shark liver Oil and Amla. (r) Enzymes-Papaya, Diastase, Yeast. (s) Perfumes and flavoring agents-Peppermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandalwood. (t) Pharmaceutical aids-Honey, Arachis Oil, Starch, Kaolin, Pectin, Olive oil, Lanolin, Beeswax, Acacia,Tragacanth, Sodium alginate, Agar, Guar gum, Gelatin. (u) Miscellaneous-Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhapusphi, Pyrethrum,Tobacco.		
Chapter VI		10
Collection and preparation of crude drug for the market as exemplified by Ergot, opium, Rauwolfia, Digitalis andSenna.		
Chapter VII		5

Study of source, preparation and identification of fibers used in sutures and surgical dressings-cotton, silk, wool andregenerated fiber.		
Chapter VIII		10
Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, Nuxvomica& Ipecacuanha.		
Text Books	A textbook of Pharmacognosy by Dr. C.K. Kokate, Nirali Prakashan.	
Reference Books	1. Textbook of Pharmacognosy by Trease and Evan,Publisher: Elsevier Health - UKs. 2. Textbook of Pharmacognosy T. E. Wallis,CBS Publishers & Distributors	
Mode of Evaluation	Internal and External Examinations	
Recommendation by Board of Studies on	13-04-2019	
Date of approval by the Academic Council	13-07-2019	

Course Outcomes for PR1103

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to prepare various conventional dosage forms.	2	Em
CO2	Students should be able to calculating the Dosae for patient.	2	Em
CO3	Students should be able to know the Pharmacopeias and other official books	2	Em
CO4	Students should be able to do the extraction and Preparation of crude drugs	2	Em

CO-PO Mapping for PR1103

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	2	1	1	1	2	1	2	2	1
CO2	2	1	2	1	2	2	3	1	2	3	2	1	2	1
CO3	2	2	2	1	2	2	1	1	2	2	1	2	2	1
CO4	3	2	2	2	1	2	2	2	1	3	2	2	2	1
Avg	2.25	1.75	1.75	1.25	1.75	2	1.75	1.25	1.5	2.5	1.5	1.75	2	1.00

PR1104	Title: Biochemistry & Clinical Pathology	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	To understand about chemistry and role of various protein, carbohydrates etc. and role of co-enzymes and vitamins including normal and abnormal metabolism of proteins.	
Expected Outcome	Understand the catalytic role of co-enzymes, importance of enzyme inhibitors design of new drugs, therapeutic and diagnostic applications of co- enzymes.	
Chapter No.		No. of hours (per Chapter)
Chapter I		20
Introduction to biochemistry, Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.Brief chemistry and role of Carbohydrates, Classification, qualitative tests, Diseases related to carbohydrate metabolism		
Chapter II		20
Brief chemistry and role of Lipids, Classification, qualitative tests. Diseases related to lipids metabolism. Brief chemistry and role of Vitamins and Coenzymes.		
Chapter III		10
Enzymes: Brief concept of enzymatic action. Factors affecting it. Therapeutic and pharmaceutical importance. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.		
Chapter IV		15
Introduction to pathology of blood and urine. (a) Lymphocytes and Platelets, their role in health and disease. (b) Erythrocytes Abnormal cells and their significance. (c) Abnormal constituents of urine and their significance in diseases.		
Chapter V		6
Role of minerals and water in life processes.		
Text Books	1. Biochemistry and clinical pathology (P.C Dandiya, & P.K Sharma) Vallabh Publications 2. Essential of Biochemistry (U. Satyanarayana&Chakrapani) Books & Allied (P) Ltd.	
Reference Books	Illustrated Biochemistry by Harper,McGraw Hill Education	
Mode of Evaluation	Internal and External	
Recommendation by Board of Studies on	13-04-2019	
Date of approval by the Academic Council	13-07-2019	

Course Outcomes for PR1104

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the role of various protein, carbohydrates, co-enzymes and vitamins including normal and abnormal metabolism.	2	Em,S
CO2	Students should be able to understand the catalytic role of co-enzymes	2	Em,S
CO3	Students should be able to know the importance of enzyme inhibitors in design of new drugs.	2	Em,S
CO4	therapeutic and diagnostic applications of co- enzymes	2	Em,S
CO5	Students should be able to understand the pathology of body fluids and their importance.	2	Em,S

CO-PO Mapping for PR1104

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO 3	P O 4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PSO1	PSO 2	PSO 3
CO1	2	2	2	2	2	2	2	2	1	3	1	2	2	1
CO2	2	3	1	1	1	2	2	2	1	3	2	1	1	1
CO3	2	2	1	2	1	1	2	2	2	3	3	2	2	1
CO4	1	2	2	1	2	2	2	2	2	1	2	2	1	1
CO5	2	2	3	2	1	2	1	1	1	3	1	2	2	1
Avg	1.8	2.2	1.8	1. 6	1.4	1.8	1.8	1.8	1.4	2.6	1.8	1.8	1.6	1.00

PR1105	Title: Human Anatomy & Physiology	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objective	This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body The subject provides the basic knowledge required to understand the various disciplines of pharmacy.	
Expected Outcome	Upon completion of this course the student should be able to: 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Identify the various tissues and organs of different systems of human body.	
Chapter No.		No. of hours (per Chapter)
ChapterI		2
Definition of various terms used in Anatomy		
ChapterII		4
Structure of cell, function of its components with special reference to mitochondria and microsomes.		
Chapter III		5
Elementary tissues of the body- epithelial tissue, muscular tissue, connective tissue and nervous tissue.		
Chapter IV		5
Skeleton System, Structure and function of skeleton. Classification of joints and their function, Joint disorder.		
Chapter V		6
Structure of skeletal muscle. Physiology of muscle contraction, Names, position, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.		
Chapter VI		7
Blood, Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.		
Chapter VII		8
Structure and functions of various parts of the heart. Arterial and venous systems with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders. Name and functions of lymph glands.		
Chapter VIII		5
Respiratory System, various parts of respiratory system and their functions. Physiology of respiration.		
Chapter IX		4
Urinary System, various parts of urinary system and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and edema.		
Chapter X		8
Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.		
Chapter XI		4
Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain.		
Chapter XII		5
Names of the various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.		
Chapter XIII		6
Locations of the endocrine glands, their hormones and functions. Pituitary, thyroid, Adrenal and Pancreas.		
Chapter XIV		3
Urinary System, Physiology and Anatomy of Reproductive system.		
Text Books	Anatomy and physiology in health and illness by Ross and Wilson,Publisher: Elsevier Health – UK	

Reference Books	Principles of anatomy and physiology by Gerard J. Tortora, Publisher John Wiley & Sons Inc.
Mode of Evaluation	Internal and External Examinations
Recommended by Board of Studied on	13-04-2019
Date of Approval by the Academic Council on	13-07-2019

Course Outcomes for PR1105

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the gross morphology, of various organs of the human body.	2	Em,S
CO2	Students should be able to Identify the various tissues and organs of different systems of human body	2	Em,S
CO3	Students should be able to establish the link between different subjects within the regime.	3	Em,S
CO4	Students should be able to know the structure and functions of various organs of the human body.	2	Em,S

CO-PO Mapping for PR1105

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	1	1	1	2	1	2	2	1	1	1	1	2	1	1
CO 2	2	2	1	1	2	1	2	1	2	1	2	2	2	1
CO 3	2	3	2	2	1	2	2	3	3	2	1	2	2	1
CO 4	1	1	2	3	1	1	1	1	1	1	2	1	2	1
CO 5	1.5	1.75	1.5	2	1.25	1.5	1.75	1.5	1.75	1.25	1.5	1.75	1.75	1
Avg	1	1	1	2	1	2	2	1	1	1	1	2	1	1

PR1106	Title: Health Education & Community Pharmacy	L T P C 3 0 0 6
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	This subject provides details about nutrition and health including first aid treatment and awareness about communicable and non-communicable diseases.	
Expected Outcome	The students should be able to apply the dynamics of disease transmission preferably for communicable and non-communicable diseases and they should be able to classify Demography cycle and food requirements.	
Chapter No.		No. of hours (per Chapter)
Chapter I		6
Concept of health, Definition of physical health, mental health, social health, spiritual health determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.		
Chapter II		6
Nutrition and health, Classification of foods requirements, disease induced due to deficiency of proteins, Vitamins and minerals-treatment and prevention.		
Chapter III		7
Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India.		
Chapter IV		7
First aid, Emergency treatment in shock, snake-bite, burns poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.		
Chapter V		7
Environment and health-Sources of water supply, water pollution, purification of water, health and air, noise light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control, rodents, animals and diseases.		
Chapter VI		6
Fundamental principles of microbiology Classification of microbes, isolation, staining techniques of organisms of common diseases.		
Chapter VII		18
Communicable diseases: Causative agents, modes of transmission and prevention. (a) Respiratory infections-Chicken pox, measles,Influenza, diphtheria, whooping cough and tuberculosis. (b) Intestinal infections-Poliomyelitis. Hepatitis. Cholera. Typhoid, Food poisoning, Hookworm infection. (c) Arthropod borne infections-plague, Malaria, Filariasis. (d) Surface infections-Rabies, Trachoma, Tetanus, and Leprosy. (e) Sexually transmitted diseases -Syphilis. Gonorrhoea. AIDS.		
Chapter VIII		7
Non-Communicable diseases: Causative agents, prevention, care and control; Cancer, Diabetes, Blindness, Cardiovascular diseases		
ChapterIX		8
Its scope, methods, uses, and dynamics of disease transmission, immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection, disinfection procedures, for faeces, urine, sputum, room linen, dead-bodies, instruments.		
Text Books	Health education and community pharmacy by N.S. Parmar, CBS Publishers & Distributors	
Reference Books	Health education and community pharmacy by Dr. S.B. Bhise and Dr. A.V. Yadav,	

	Nirali Prakashan
Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1106

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to apply the dynamics of disease transmission preferably for communicable and non-communicable diseases	3	Em,S
CO2	Students should be able to classify Demography cycle and food requirements.	2	Em,S
CO3	Students should be able to understand the concept of family planning and its importance in society	1	Em,S
CO4	Students should be able to understand the primary care for various emergency situations	2	Em,S

CO-PO Mapping for PR1106

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	1	1	1	1	3	1	2	2	1
CO2	2	3	1	1	1	1	1	1	1	3	3	1	1	1
CO3	2	2	1	2	1	1	1	1	3	3	3	1	2	1
CO4	1	2	2	1	2	2	2	2	1	1	1	1	1	1
Avg	2	2	2	1	1	1	1	1	1	3	1	2	2	1

PR1140	Title: Pharmaceutics Lab – I	L T P C 0 0 4 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	To impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different dosage forms.	
Expected Outcome	The students should be able to prepare various conventional dosage forms, their uses, labelling requirements and direction for use.	
Experiment No.	List of Experiments	

Preparation (minimum number stated against each) of the following categories illustrating different techniques involved.

1. Aromatic waters
2. Solutions
3. Spirits
4. Tinctures
5. Extracts
6. Creams
7. Cosmetic preparations
8. Capsules
9. Tablets
10. Preparations involving sterilization
11. Ophthalmic preparations
12. Preparations involving aseptic techniques

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	12-05-2018
Date of approval by the Academic Council	11-06-2018

Course Outcomes for PR1140

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to apply the dynamics of disease transmission preferably for communicable and non-communicable diseases	2	Em,S
CO2	Students should be able to classify Demography cycle and food requirements.	2	Em,S
CO3	Students should be able to understand the concept of family palnning and its importance in society	2	Em,S

CO-PO Mapping for PR1140

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	1	1	1	1	2	1	2	2	1
CO2	2	2	2	1	2	1	2	2	1	2	2	3	2	1
CO3	2	2	2	1	2	2	2	2	2	3	2	2	2	1
Avg	2.0	2.0	2.0	1.0	1.7	1.3	1.7	1.7	1.3	2.3	1.7	2.3	2.0	1.00

PR1141	Title: Pharmaceutical Chemistry Lab – I	L T P C 0 0 4 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Tosynthesize inorganic compounds and perform limit test for quality control in pharamceuticals.	
Expected Outcome	Students will be able to perform assay of inorganic compounds and limit tests for iron, sulphur, chlorides, arsenic, and heavy metals.	
Experiment No.	List of Experiments	

1. Identification tests for inorganic compounds particularly drugs and pharmaceuticals.
2. Limit test for chloride, sulfate, Arsenic, Iron and Heavy metals.
3. Assay of inorganic Pharmaceuticals involving each of the following methods of compounds marked with (*) under theory.
   a. Acid-Base titrations (at least 3)
   b. Redox titrations (One each of Permanganometry and iodimetry)
   c. Precipitation titrations (at least 2)
   d. Complexometric titrations (Calcium and Magnesium)

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1141

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to perform limit test for quality control in pharmaceuticals.	2	Em,S
CO2	Students should be able to perform assay of inorganic compounds	2	Em,S
CO3	Students should be able to perform the limit tests for iron, sulphur, chlorides, arsenic, and heavy metals in pharmaceutical preparations.	2	Em,S

CO-PO Mapping for PR1141

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	1	2	1	2	2	1	2	1	2	2	2	1
CO2	2	2	2	2	2	2	1	2	1	2	2	2	3	1
CO3	2	3	2	2	1	1	3	3	3	2	1	1	1	1
Avg	1.67	2.00	1.67	2.00	1.33	1.67	2.00	2.00	2.00	1.67	1.67	1.67	2.00	1.00

PR1142	Title: Pharmacognosy Lab	L T P C 0 0 4 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Toprovide a fundamental knowledge on identification of crude drug and their adulteration.	
Expected Outcome	The students should be able to identify the organoleptic properties, macroscopical, microscopical features and chemical tests of the crude drugs.	
Experiment no	List of Experiments	

1. Identification of drug by morphological characters.

2. Physical and chemical tests for evaluation of drugs wherever applicable.

3. Gross anatomical studies (T.S) of the following drugs: Senna, Datura, Cinnamon, Cinchona, Coriander, Fennel, Clove, Ginger, Nuxvomica, and Ipecacuanha.

4. Identification of fibers and surgical dressings.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1142

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the fundamental knowledge on identification of crude drug and their adulteration	2	Em,S
CO2	Students should be able to identify the organoleptic properties, macroscopical and microscopical features of the crude drugs.	2	Em,S
CO3	Students should be able to identify the crude drug by chemical tests.	2	Em,S

CO-PO Mapping for PR1142

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	1	2	1	2	2	1	2	1	2	2	2	1
CO2	2	3	2	2	2	2	2	2	1	3	2	1	3	1
CO3	3	2	2	2	1	1	3	3	3	2	1	1	1	1
Avg	2.0	2.0	1.7	2.0	1.3	1.7	2.3	2.0	2.0	2.0	1.7	1.3	2.0	1.00

PR1143	Title: Biochemistry & Clinical Pathology Lab	L T P C 0 0 4 4
Version No.	1.0	
Course Prerequisites	NIL	
Experiment No.	List of Experiments	
Objectives	Toimpart knowledge of clinical diagnosis of diseases, normal range of biochemical values in human body.	
Expected Outcome	Students will be able to perform the detection of proteins, amino acids, and lipids in given samples and clinical diagnosis of biological samples	

1. Detection and identification of Proteins, Amino acids, Carbohydrates and lipids.

2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, Urea, Creatine, creatinine, cholesterol, alkaline phosphatase, acid phosphatase, Bilirubin, SGPT, SGOT, Calcium, Diastase, Lipase).

3. Examination of sputum and faeces (microscopic and staining).

4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes. Withdrawal of blood samples.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1143

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to clinical diagnosis of diseases.	2	Em,S
CO2	Students should be able to perform the detection test of proteins, amino acids, and lipids in given samples	2	Em,S
CO3	Students should be able to normal range of biochemical values in human body.	2	Em,S

CO-PO Mapping for PR1143

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PSO 1	PSO 2	PSO 3
CO1	1	2	1	1	3	1	2	2	2	1	1	2	1	1.0
CO2	2	1	3	3	1	2	2	2	2	3	2	1	1	1.0
CO3	2	2	2	3	1	1	2	2	1	2	2	1	2	1.0
Avg	1.67	1.67	2.00	2.33	1.67	1.33	2.00	2.00	1.67	2.00	1.67	1.33	1.33	1.00

PR1144	Title: Human Anatomy & Physiology Lab	L T P C 0 0 4 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Toimpart fundamental knowledge on the structure and functions of the various systems of the human body.	
Expected Outcome	The students will be able to explain the morphology of human body, tissues and able to count RBC, WBC in blood, heart rate, pulse rate and determine the hemoglobin content of the blood.	
Experiment No	List of Experiments	

1. Study of the human skeleton.

2. Study with the help of charts and models of the following systems and organs:

(a) Digestive system.

(b) Respiratory system.

(c) Cardiovascular system.

(d) Urinary system.

(e) Reproductive system.

(f) Nervous system.

(g) Eye.

(h) Ear.

3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues.

4. Examination of blood films for TLC, DLC and malarial parasite.

5. Determination of clotting time of blood, erythrocyte sedimentation rate and Hemoglobin value.

6. Recording of body temperature, pulse, heart rate, blood pressure and ECG.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1144

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to apply the dynamics of disease transmission preferably for communicable and non-communicable diseases	2	Em,S
CO2	Students should be able to classify Demography cycle and food requirements.	2	Em,S
CO3	Students should be able to understand the concept of family planning and its importance in society	2	Em,S

CO-PO Mapping for PR1144

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	1	2	1	1	3	1	1	2	1	1	1	3	1	1
CO 2	2	2	2	3	1	2	1	1	3	3	2	1	1	1
CO 3	3	2	1	3	1	1	2	1	1	2	1	1	2	1
Avg	2.0	2.0	1.3	2.3	1.7	1.3	1.3	1.3	1.7	2.0	1.3	1.7	1.3	1.00

Year 2

PR1201	Title: Pharmaceutics-II	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosageforms.	
Expected Outcome	Students should be able to: Know the history of profession of pharmacy, Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations, Understand the professional way of handling the prescription, Preparation of various conventional dosage forms	
Chapter No.		No. of hours per chapter
Chapter No.1		10 hours
Prescriptions-Reading and understanding of prescriptions; Latin terms commonly used (Detailed studyis not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing. **Incompatibilities in prescriptions**- study of various types of incompatibilities-physical, chemicaland therapeutic. **Posology**- Dose and dosage of drugs, factors influencing dose, calculations of doses on the basis of age, sex, surface area and veterinary doses. **Dispensed Medications**: (Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures. special labeling requirements and storage conditions should be high-lighted).		
Chapter No.2		10 hours
Powders-Type of powders-Advantages and disadvantages of powders, Granules, cachets and tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of a material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.		
Chapter No.3		10 hours
Liquid oral Dosage forms: **Monophasic**-Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colorants and flavors, with examples. Review of the following monophasic liquids with details of formulation and practical methods. Liquids for internal administration Liquids for external administration or used on mucous membranes, Mixtures and concentrates, Gargles, Syrups Mouth washes, Throat-paints Elixirs, Douches , Ear Drops Nasal drops, Sprays, Liniments, Lotions.		
Chapter No.4		10 hours
Biphasic Liquid Dosage Forms: **Suspensions** (elementary study)-Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvant used like thickening agents, wetting agents, their necessity and quantity to be incorporated, suspensions of precipitate forming liquids like tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated /non-flocculated suspension system. **Emulsions**-Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agent. Instabilities in emulsions, preservation of emulsions.		
Chapter No.5		10 hours
Semi-Solid Dosage Forms: **Ointments:** Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes: Trituration, fusion, chemical reaction, Emulsification. **Pastes**: Differences between ointments and pastes, Bases of pastes. Preparation of pastes and their preservation. **Jellies**: An introduction to the different types of jellies and their preparation. An elementary study of poultice. **Suppositories and pessaries**-Their relative merits and demerits, types of suppositories, suppository bases, classification, properties. Preparation and packing of suppositories. Use of suppositories of drug absorption.		
Chapter No.6		7 hours

Dental and cosmetic preparations: Introduction to Dentifrices, facial cosmetics, Deodorants. Anti-Perspirants, shampoo, Hair dressings and Hair removers.		
Chapter No.7		10 hours
Sterile Dosage forms: **Parenteral dosage forms**-Definition, General requirements for parenteral dosage forms. Types of Parenteral formulations, vehicles, adjuvant, processing and personnel, Facilities and quality control. Preparation of Intravenous fluids and admixtures-Total parenteral nutrition, Dialysis fluids. **Sterility testing:** particulate matter monitoring- Faculty seal packaging.		
Chapter No.8		8 hours
Ophthalmic products: study of essential characteristics of different ophthalmic preparations. Formulation: Additives, special precautions in handling and storage of ophthalmic products.		
Text books	**1.** R.M. Mehta, A Text Book of Pharmaceutics. **2.** N.K Jain, A Text Book of Pharmaceutics **3.** C.V.S. Subrahamanyam, A Text Book o Pharmaceutics.	
Reference books	**1.** Indian Pharmacopoeia. **2.** British pharmacopoeia. **3.** National formularies (N.F.I., B.N.P) **4.** Remington's pharmaceutical sciences. **5.** Martindale's Extra pharmacopoeia.	
Mode of evaluation	Internal and external examination	
Recommendation by board of studies	13-04-2019	
Date of approval by the academic council	13-07-2019	

Course Outcomes for PR1201

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to Know the history of profession of pharmacy	2	Em,S
CO2	Students should be able to understand the advancement of pharmeceutical dosage forms,	2	Em,S
CO3	Students should be able to professional way of handling the prescription and preparation of various conventional dosage forms	2	Em,S
CO4	Students should be able to understand the pharmaceutical incompatibilities	2	Em,S
CO5	Students should be able to know the pharmaceutical calculations for prepration of dosage for of different age groups patients	2	Em,S

CO-PO Mapping for PR1201

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO 3	P O 4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PSO1	PSO 2	PSO 3
CO1	2	2	2	1	1	1	1	1	1	3	1	2	2	1
CO2	2	3	2	2	1	1	1	1	1	3	1	1	1	1
CO3	2	2	2	2	1	1	1	1	2	3	2	2	2	1
CO4	1	2	2	1	2	2	2	2	1	1	3	2	1	1
CO5	2	1	1	2	2	3	2	3	3	2	1	2	2	1
Avg	1.8	2	1. 8	1. 6	1.4	1.6	1.4	1.6	1.6	2.4	1.6	1.8	1.6	1

PR1202	Title: Pharmaceutical Chemistry-II	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	Students will be able to understand the chemistry of organic compounds and their pharmaceutical importance	
Expected Outcome	Students should be able to: Understand the mechanism of action and structural formula of compound.	
Chapter No.		No. of hours per chapter
Chapter No.1		10 hours
Introduction to the nomenclature of organic chemical systems with particular reference to hetero-cyclic system containing up to 3 rings. The chemistry of following pharmaceutical organic compounds covering their nomenclature, chemical structure, uses and the important physical and chemical properties(chemical structure of only those compounds marked with asterisk (*). The stability and storage conditions and the different type of pharmaceutical formulations of these drugs and their popular brand names.		
Chapter No 2		10 hours
Antiseptics and Disinfectants-Proflavine*, Benzalkonium chloride, Cetrimide, Phenol, chloroxylenol, Formaldehyde solution, Hexachlophene, Nitrofurantoin. **Sulphonamides**- Sulphadiazine, Sulphaguanidine, Phthalylsulphathaizole, Succinylsulphathiazole, Sulphadimethoxine, Sulphamethoxypyridazine, Co-trimoxazole, sulfacetamide* **Antileprotic Drugs** - Clofazimine , Thiambutosine, Dapsone*, solapsone,		
Chapter No 3		10 hours
Anti-tubercular Drugs- Isoniazid*, PAS*, Streptomycin, Rifampicin, Ethambutol*, Thiacetazone, Ethionamide, cycloserine, pyrazinamide*. **Antimoebic and Anthelmintic Drugs**- Emetine, Metronidazole, Halogenated hydroxyquinolines, Diloxanide furoate, Paromomycin , Piperazine*, Mebendazole ,D.E.C.* **Antibiotics**- Benzyl penicillin*, Phenoxy methyl penicillin*, Benzathine penicillin, Ampicillin*,Cloxacillin, Carbencicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.		
Chapter No 4		10 hours
Antifungal agents- Udecylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin. **Antimalarial Drugs**- Chloroquine*,Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim. **Tranquilizers**-Chlorpromazine*, Prochlorperazine, Trifluoperazine, Thiothixene, Haloperiodol*,Triperiodol, Oxypertine, Chlordizepoxide, Diazepam*, Lorazepam, Meprobamate.		
Chapter No 5		10 hours
Hypnotics- Phenobarbitone*, Butobarbitone, Cylobarbitone, Nitrazepam, Glutethimide*, Methyprylon, Paraldehyde, Triclofosodium. **General Anaesthetics**-Halothane*, Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopecal sodium, Trichloroethylene . **Antidepressant Drugs**- Amitriptyline, Nortryptyline, Imperamine*, Phepelzine, Tranylcypromine. **Analeptics** - Theophylline, Caffeine*, Coramine*, Dextro-amphetamine.		
Chapter No.6		10 hours
Adrenergic drugs- Adrenaline*, Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrne*, Pseudoephedrine. **Adrenergic antagonist**- Tolazoline, Propranolol*, Practolol. **Cholinergic Drugs**- Neostigmine*, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine*. **Cholinergic Antagonists**- Atropine*, Hyoscine, Homatropine, Propantheline*, Benztropine, Tropicamide, Biperiden*.		
Chapter No.7		10 hours
Diuretic Drugs- Furosemide*, Chlorothiazide, Hydrochlorothiazidc*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.		

Cardiovascular Drugs- Ethylnitrite*, Glyceryl trinitrate, Alpha methyldopa, Guanethidine, Clofibrate, Quinidine. **Hypoglycemie Agents-** Insulin, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin*, Metformin. **Coagulants and Anti coagulants-** Heparin, Thrombin, Menadione*, Bisphydroxy-coumarin, Warfarin sodium. **Local Anaesthetics** - Lignocaine*, Procaine*, Benzocaine,	
Chapter No.8	10 hours
Histamine and anti-Histaminic Agents- Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine*, Pheniramine, Chlorpheniramine*, **Analgesics and Anti-pyretics-**Morphine, Pethidine, Codeine, Mathadone, Aspirin*, Paracetamol, Analgin, Dextropropoxphene, Pentazocine. **Non-steriodal anti-inflammatory agents-** Indomethacin*, Phenylbutazone*, Oxyphenbutazone, Ibuprofen.	
Chapter No.9	10 hours
Thyroxine and Antithyroids- Thyroxine*, Methimazole, Methyl thiouracil, Propylthiouracil. **Diagnostic Agents-** Lopanoic Acid, Propyliodone, Sulfobromopthalein-sodium, IndigotindiIndigo Carmine, Evans blue, Congo Red, Fluorescein sodium. **Anticonvulsants, cardiac glycosides, Antiarrhythmic, Antihypertensives & Vitamins**.	
Chapter 10	10 hours
Steroidal Drugs- Betamethasone, Cortisone, Hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol, Nandrolone. **Anti-Neoplastic Drugs-** Actinomycin, Azathioprie, Busulphan, Chloramubucil, Cisplatin, Cyclophosphamide, Daunorubicin Hydrochoride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.	
Text books	1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone, Press of University of London 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. John H. Kennedy, Analytical chemistry principles
Reference books	Indian Pharmacopoeia of India. British Pharmaceutical codex. Martindale's Extra pharmacopoeia
Mode of evaluation	Internal and external examination
Recommendation by board of studies	13-04-2019
Date of approval by the academic council	13-07-2019

Course Outcomes for PR1202

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the chemistry of organic compounds and their pharmaceutical importance	2	Em,S
CO2	Students should be able to understand the mechanism of action organic compounds	2	Em,S
CO3	Students should be able to know the Drugs belonging to different classes of chemicals	2	Em,S
CO4	Students should be able to understand the structural formula of organic compounds with their uses.	2	Em,S

CO-PO Mapping for PR1202

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	1	1	1	1	3	1	2	2	1
CO2	2	3	1	1	1	1	1	1	1	3	3	1	1	1
CO3	2	2	1	2	1	1	1	1	3	3	3	1	2	1
CO4	1	2	2	1	2	2	2	2	1	1	1	1	1	1
Avg	1.75	2.25	1.5	1.25	1.25	1.25	1.25	1.25	1.5	2.5	2	1.25	1.5	1

PR1203	Title: **Pharmacology & Toxicology**	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	This course is designed to impart a pharmacological knowledge with pharmacokinetics and pharmacodynamics of drug.	
Expected Outcome	Students should be able to: Know the mode of action of every drug, side effect and adverse effect of drug	
Chapter no.		No. of hours per chapter
Chapter No. 1		10 hours
Introduction to pharmacology, scope of pharmacology. **Routes of administration of drugs**, their advantages and disadvantages. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs. **General mechanism of drugs action** and their factors which modify drugs action. Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspects:		
Chapter No. 2		15 hours
Drugs acting on the central Nervous system: General anaesthetics - adjunction to anaesthesia, intravenous anaesthetics. Analgesic antipyretics and non-steroidal Anti-inflammatory drugs- Narcotic analgesics. Antirheumatic and anti-gout remedies. Sedatives and Hypnotics, psychopharmacological agents, anticonvulsants, analeptics. Centrally acting muscle relaxants and anti-parkinsonism agents. Local anesthetics. Drugs acting on autonomic nervous system. Cholinergic drugs, Anticholinergic drugs, anticholinesterase drugs. Adrenergic drugs and adrenergic receptor blockers. Neurone blockers and ganglion blockers. Neuromuscular blockers, used in myasthenia gravis. Drugs acting on eye: Mydriatics, drugs used in glaucoma.		
Chapter No. 3		10hours
Drugs acting on respiratory system Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents. **Autocoids**: physiological role of histamine and serotonin, Histamine and Antihistamines, prostaglandins. **Cardio vascular drugs** Cardiotonics, Antiarrhythmic agents, Anti-anginal agents, Antihypertensive agents, peripheral Vasodilators and drugs used in atherosclerosis. Drugs acting on the blood and blood forming organs. Haematinics, coagulants and anticoagulants, Haemostatic, Blood substitutes and plasma expanders.		
Chapter No. 4	10 hours	
Drugs affecting renal function- Diuretics and anti-diuretics. **Hormones and hormone antagonists**- Hypoglycemic agents, Anti--thyroid drugs, sex hormones and oral contraceptives, corticosteroids. **Drugs acting on digestive system**-carminatives, digest ants, Bitters, Antacids and drugs used in peptic ulcer, purgatives ,and laxatives, Antidiarrohoeals, Emetics, Anti-emetics, Antispasmodics.		
Chapter No. 5		15 hours
Chemotherapy of microbial diseases: Urinary antiseptics, sulphonamides, penicillin, streptomycin, Tetracyclines and other antibiotics. Antitubercularagents, Antifungal agents, antiviral drugs, anti-leprotic drugs. Chemotherapy of protozoal diseases, Anthelmintic drugs. Chemotherapy of cancer. Disinfectants and antiseptics.		
Text books	1. K.D. Tripathi, Essential of Medical pharmacolgy 2.Goodman Gillman, A basis pharmacological of therapeutics	
Reference books	Indian pharmacopoeia	

Mode of evaluation	Internal and external examination

Recommendation by board of studies	13-04-2019
Date of approval by the academic council	13-07-2019

Course Outcomes for PR1203

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should have pharmacological knowledge of drugs.	2	Em
CO2	Students should be able to know the mode of action of every drug,	2	Em
CO3	Students should be able to know the toxicology of different drugs	2	Em
CO4	Students should have knowledgeof pharmacokinetics and pharmacodynamics of drug.	2	Em
CO5	Students should be able to know the side effect and adverse effect of drug	2	Em

CO-PO Mapping for PR1203

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	2	1	1	1	2	1	2	2	1
CO2	2	1	2	1	2	2	3	1	2	3	2	1	2	1
CO3	2	2	2	1	2	2	1	1	2	2	1	2	2	1
CO4	3	2	2	2	1	2	2	2	1	3	2	2	2	1
CO5	2.25	1.75	1.75	1.25	1.75	2	1.75	1.25	1.5	2.5	1.5	1.75	2	1
Avg	2	2	1	1	2	2	1	1	1	2	1	2	2	1

PR1204	Title: **Hospital and Clinical Pharmacy**	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	This subject deals the clinical parameters of hospitals, function and definition of various terms	
Expected Outcome	Students should be able to: Know about the IPD and OPD of the hospitals.	
Chapter No.		No. of hours per chapter
Chapter No. 1		10 hours
Hospital-Definition, Function, classifications based on various criteria, organization, Management and health delivery system in India. **Hospital Pharmacy:** Definition Functions and objectives of Hospital pharmaceutical services. Location, Layout, Flow chart of materials and men. Personnel and facilities requirements including equipments based on individual and basic needs. Requirements and abilities required for Hospital pharmacists.		
Chapter No.2		10 hours
Drug Distribution system in Hospitals. Out-patient service, In-patient services- types of services detailed discussion of unit Dose system, Floor ward stock system, satellite pharmacy services, central sterile services, Bed side pharmacy. **Manufacturing:** Economical considerations, estimation of demand.		
Chapter No.3		10 hours
Sterile manufacture-Large and small volume parenterals, facilities, requirements, layout production planning, man-power requirements. **Non-sterile manufacture**-Liquid orals, externals, Bulk concentrates. Procurement of stores and testing of raw materials. Nomenclature and uses of surgical instruments and Hospital Equipment and health accessories.		
Chapter No.4		25 hours
P.T.C.(pharmacy Therapeutic Committee) **Hospital Formulary system** and their organization, functioning, composition. **Drug Information service** and Drug Information Bulletin. **Surgical dressing** like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V.sets, B.G. sets, Ryals tubes, Catheters, Syringes etc **Application of computers** in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.		
Chapter No.5		10 hours
Introduction to Clinical pharmacy practice- Definition, scope. **Modern dispensing aspects**- Pharmacists and patient counseling and advice for the use of common drugs, medication history. **Common daily terminology used in the practice of Medicine**. **Disease, manifestation and patho-physiology** including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.		
Chapter No.6		10 hours
Physiological parameters with their significance. **Drug Interactions:** Definition and introduction. Mechanism of Drug Interaction. Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, Gastro-intestinal agents. Vitamins and Hypoglycemic agents. Drug-food interaction. **Adverse Drug Reaction:** Definition and significance. Drug-Induced diseases and Teratogenicity. **Drugs in Clinical Toxicity**- Introduction, general treatment of poisoning, systemic antidotes, Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organo-phosphorus poisons. **Drug dependences**, drug abuse, addictive drugs and their treatment, complications. **Bio-availability of drugs**, including factors affecting it.		
Text books	G. parathasarthi, A Text book of Hospital and clinical pharmacy B.S. Shah, A Text book of Hospital Pharmacy	
Reference books	Indian Pharmacopoeia.	
Mode of evaluation	Internal and external examination	

Recommendation by board of studies	13-04-2019
Date of approval by the academic council	13-07-2019

Course Outcomes for PR1204

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the clinical parameters of hospitals	2	Em
CO2	Students should be able to Know about the IPD and OPD of the hospitals.	2	Em
CO3	Students should be able to know the layout and working culture of hospitals	2	Em
CO4	Students should be able to know the function and definition of various items in hospitals	2	Em

CO-PO Mapping for PR1204

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	2	1	1	1	2	1	2	2	1
CO2	2	1	2	1	2	2	3	1	2	3	2	1	2	1
CO3	2	2	2	1	2	3	1	1	2	2	1	2	2	1
CO4	3	2	2	2	1	2	2	2	1	3	2	2	2	1
Avg	2.25	1.75	1.75	1.25	1.75	2.25	1.75	1.25	1.5	2.5	1.5	1.75	2	1

PR1205	Title: **Drug Store and Business Management**	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	This subject deals Storage condition of drugs, management of inventory control.layout of the drug store	
Expected Outcome	Students should be able to: Know the debit ,credit by accountancy, business prospect	
Chapter No.		No. of hours per chapter
Chapter No. 1		25 hours
Introduction-Trade, Industry and commerce, Functions and subdivision of commerce, Introduction to Elements for Economics and Management. Forms of Business Organizations. Channels of Distribution. **Drug House Management**-selection of site, space Lay-out and legal requirements. Importance and objectives of purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. Codification, handling of drug stores and other hospital supplies. Inventory Control-objects and importance, modern techniques like ABC,VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.		
Chapter No.2		10 hours
Sales promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display. **Recruitment, training**, evaluation and compensation of the pharmacist.		
Chapter No.3		15 hours
Banking and Finance-Service and functions of bank, Finance planning and sources of finance		
Chapter No.4		25 hours
Introduction to the accounting concepts and conventions. Double entry Book Keeping, Different kinds of accounts. Cash Book. General Ledger and Trial Balance. Profit and Loss Account and Balance Sheet. Simple techniques of analyzing financial statements. Introduction to Budgeting.		
Text books	N.K. Jain, A Text book of Drug Store and Mangement	
Reference books	Indian Pharmacopoeia.	
Mode of evaluation	Internal and external examination	
Recommendation by board of studies	13-04-2019	
Date of approval by the academic council	13-07-2019	

Course Outcomes for PR1205

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the storage condition of drugs	2	Em
CO2	Students should be able to know the debit and credit by accountancy	2	Em
CO3	Students should be able to know the management of inventory control	2	Em
CO4	Students should be able to know the layout of the drug store.	2	Em
CO5	Students should be able to know the management of business prospect in drugs	2	Em

CO-PO Mapping for PR1205

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO 8	PO 9	PO1 0	PO1 1	PSO1	PSO 2	PSO 3
CO1	1	2	1	2	2	2	3	1	2	1	2	2	1	1
CO2	2	1	2	2	2	2	1	1	2	1	2	2	1	1
CO3	2	2	2	2	2	2	1	1	2	1	2	1	1	1
CO4	2	2	2	2	2	2	2	1	1	1	2	1	1	1
CO5	1	1	1	1	1	1	1	1	2	1	1	1	1	1
Avg.	1.6	1.6	1.6	1. 8	1.8	1.8	1.6	1	1. 8	1	1.8	1.4	1	1

PR1206	Title: **Pharmaceutical Jurisprudence**	L T P C 3 0 0 6
Version	1.0	
Course Prerequisites	None	
Objectives	This subject deals the legislation of Pharmacy Council of India	
Expected Outcome	Students should be able to: Know the rules and regulation of the pharmacy	
Chapter No.		No. of hours per chapter
Chapter No. 1		10 hours
Origin and nature of pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of pharmacy" as an integral part of the Health care system. **Principles and significance of professional Ethics**. Critical study of the code of pharmaceutical Ethics drafted by pharmacy council of India. **Pharmacy Act, 1948**-The General study of the pharmacy Act with special reference to Education Regulations, Working of state and central councils, constitution of these councils and functions, Registration procedures under the Act.		
Chapter No.2		10 hours
The Drugs and Cosmetics Act, 1940-General study of the Drugs and cosmetics Act and the Rules there under. Definitions and salient features related to retail and whole sale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licenses under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C,C1,F,G,J,H,P and X and salient features of labeling and storage conditions of drugs.		
Chapter No.3		10 hours
The Drugs and Magic Remedies (objectionable Advertisement)Act, 1954-General study of the Act, objectives , special reference to be laid on Advertisements, magic remedies and objections1 and permitted advertisements - diseases which cannot be claimed to be cured.		
Chapter No.4		10 hours
Narcotic Drugs and psychotropic substances Act, 1985-A brief study of the act with special reference to its objectives, offences and punishment. Brief introduction to the study of the following acts: **Latest Drugs (price control) order in force.**		
Chapter No.5		10 hours
Poisons Act 1919(as amended to date) **Medicinal and Toilet preparations (excise Duties) Act, 1955 (**as amended to date **Medical Termination of Pregnancy Act, 1971(as amended to date).**		
Text books	N.K. Jain, A Text book of Pharmaceutical Jurisprudence	
Reference books	Indian Pharmacopoeia.	
Mode of evaluation	Internal and external examination	
Recommendation by board of studies	13-04-2019	
Date of approval by the academic council	13-07-2019	

Course Outcomes for PR1206

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the rules to run a pharmecy collage	2	Em
CO2	Students should be able to know the legislation of Pharmacy Council of India	2	Em
CO3	Students should be able to know the regulation of the pharmacy acts	2	Em
CO4	Students should be able to know the regulation for sale and purchase of the medicine	2	Em
CO5	Students should be able to know the different schedule of pharmacy acts	2	Em

CO-PO Mapping for PR1206

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	1	2	3	1	2	2	2	2	2	1	1
CO2	2	3	2	3	2	3	3	2	2	2	3	1	3	1
CO3	2	3	2	3	2	3	3	2	2	2	3	2	3	1
CO4	2	3	2	3	2	3	3	2	2	2	2	2	3	1
CO5	2	1	2	1	2	3	1	2	2	2	2	1	1	1
Avg.	2	2.2	2	2.2	2	3	2.2	2	2	2	2.4	1.6	2.2	1

PR1240P	Title: Pharmaceutics Lab II	L T PC 0 04 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	To impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different dosage form.	
Expected Outcome	The student should be able to prepare various conventional dosage forms, their uses labelling requirements and direction for use.	

List of Experiments

- Dispensing of at least 100 products covering a wide range of preparations:
- Mixtures
- Emulsion
- Solutions
- Liniments
- E.N.T. preparations.
- Ointments
- Suppositories
- Powders
- Incompatible prescriptions etc.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1240P

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different dosage form.	2	Em
CO2	Students should be able to know the prepare various conventional dosage forms, their uses. labelling requirements and direction for use	2	Em
CO3	Students should be able to know the labelling requirements and direction for use of different dosages forms.	2	Em

CO-PO Mapping for PR1240P

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	1	2	1	2	2	1	2	1	2	2	2	1
CO2	2	3	2	2	2	2	2	2	1	3	2	1	3	1
CO3	3	2	2	2	1	1	3	3	3	2	1	1	1	1
Avg.	2.0	2.0	1.7	2.0	1.3	1.7	2.3	2.0	2.0	2.0	1.7	1.3	2.0	1.0

PR1241P	Title: Pharmaceutical Chemistry Lab II	L T PC 0 04 4
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Students will be able to know the functional structure of compond.	
Expected Outcome	The subject will be able to perform synthesis of organic compound.	
List of Experiments		
1. Systematic qualitative testing of organic drugs involving solubility determination, melting pointand/or boiling point, detection of elements and functional groups (10 compounds). 2. Official identification tests for certain groups of drugs included in the I.P. like barbiturates, Sulfonamides, Phenothiazines, Antibiotics etc. (8 compounds). 3. Preparation of three simple organic preparations.		
Mode of Evaluation	Internal and External Examinations	
Recommendation by Board of Studies on	13-04-2019	
Date of approval by the Academic Council	13-07-2019	

Course Outcomes for PR1241P

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the fundamental knowledge of the functional structure of compounds.	2	Em
CO2	Students should be able to perform synthesis of organic compound.	2	Em
CO3	Students should be able to perform the chemical test of synthesized of organic compound.	2	Em

CO-PO Mapping for PR1241P

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO 1	PSO2	PSO3
CO1	1	2	1	1	3	1	2	2	2	1	1	2	1	1
CO2	2	2	3	3	2	2	2	2	2	3	2	3	1	1
CO3	2	2	2	3	1	1	2	2	2	2	2	3	2	1
Avg.	1.67	2.00	2.00	2.33	2.00	1.33	2.00	2.00	2.00	2.00	1.67	2.67	1.33	1.00

PR1242P	Title: Pharmacology and Toxicology Lab	L T P C 0 0 4 2
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Students able to know the pharmacokinetic and pharmacodynamic drug action.	
Expected Outcome	This is helpful for developing an insight on the subject.	

List of Experiments

1. The first six of the following experiments will be done by the students while
2. The remaining will be demonstrated by the teacher.
3. Effect of potassium and calcium ions, acetylcholine and adrenaline on frog's heart.
4. Effect of acetyl choline on rectus abdomens muscle of frog and guinea pig ileum.
5. Effect of spasmogens and relaxants on rabbits intestine.
6. Effect of local anaesthetics on rabbit cornea.
7. Effect of mydriatics and miotics on rabbit's eye.
8. To study the action of strychnine on frog.
9. Effect of digitalis on frog's heart.
10. Effect of hypnotics in mice.
11. Effect of convulsants and anticonvulsant in mice or rats.
12. Test for pyrogens.
13. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats.
14. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2017
Date of approval by the Academic Council	13-07-2017

Course Outcomes for PR1242P

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to know the pharmacokinetic and pharmacodynamic drug actions.	2	Em
CO2	Students should be able to know the developing an insight of pharmacology and toxicology.	2	Em
CO3	Students should be able to know ADR monitering.	2	Em

CO-PO Mapping for PR1242P

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped- 3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	2	3	3	1	1	2	2	2	1
CO2	2	2	1	2	3	3	2	3	2	2	3	2	1	1
CO3	2	1	1	2	2	3	1	2	1	2	2	1	2	1
Avg.	2.0	1.7	1.3	1.7	2.3	2.7	2.0	2.7	1.3	1.7	2.3	1.7	1.7	1.0

PR1243P	Title: Hospital & Clinical Pharmacy Lab	L T P C 0 0 4 2
Version No.	1.0	
Course Prerequisites	NIL	
Objectives	Students should be able to: Know about the IPD and OPD of the hospitals	
Expected Outcome	The subject will be able to understand the Handling and use of data processing equipments.	

List of Experiments

1. Preparation of transfusion fluids.
2. Testing of raw materials used in (1).
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glass ware and other hospital supplies.
5. Handling and use of data processing equipments.

Mode of Evaluation	Internal and External Examinations
Recommendation by Board of Studies on	13-04-2019
Date of approval by the Academic Council	13-07-2019

Course Outcomes for PR1243P

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Em)/ Skill(S)/ Entrepreneurship (En)/ None (*Use, for more than one*)
CO1	Students should be able to working in hospital and management of clinical pharmacy.	2	Em
CO2	Students should be able for the preparation and management of infusions.	2	Em
CO3	Students should be able to know the sterilization and evaluation of surgical dressings and other hospital supplies	2	Em

CO PO Mapping of PR1243P

Course Outcomes	Program Outcomes (Course Articulation Matrix (Highly Mapped-3, Moderate- 2, Low-1, Not related-0)											Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	2	3	3	1	2	2	2	2	1
CO2	1	2	3	2	2	2	1	1	3	2	2	2	2	1
CO3	2	1	1	2	2	3	1	1	3	2	2	3	2	1
Avg.	1.7	1.7	1.3	2.0	2.0	1.3	1.7	1.7	2.3	2.0	2.0	1.7	2.0	1