







## Syllabus-2023-2024

### BPharm

<b>Title of the Course</b>	Pharmaceutical Engineering
<b>Course Code</b>	BP304T

#### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					3	1	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To know various unit operations used in pharmaceutical industries( <b>BL1-Remember</b> ) <b>CO2-</b> To understand the material handling techniques( <b>BL2-Understand</b> ) <b>CO3-</b> To perform various processes involved in pharmaceutical manufacturing process( <b>BL3-Apply</b> ) <b>CO4-</b> To carry out various test to prevent environmental pollution( <b>BL3-Apply</b> ) <b>CO5-</b> To appreciate the various preventive methods used for corrosion control in pharmaceutical industries. ( <b>BL2-Understand</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics X Gender X Human Values X Environment X		<b>SDG (Goals)</b>		SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure) SDG12(Responsible consumption and production)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	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.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	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	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	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.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board, Peer tutorial	10
UNIT 4	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.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board, Peer tutorial	08
UNIT 5	Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non-metals, basic of material handling systems.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the basics principle of distillation	Experiments	BL3-Apply	2

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

#### Part E

<b>Books</b>	1. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition. 2. Remington practice of pharmacy- Martin, Latest edition. 3. Theory and practice of industrial pharmacy by Lachmann., Latest edition
<b>Articles</b>	NA
<b>References Books</b>	1.Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition. 2. Unit operation of chemical engineering – McCabe Smith, Latest edition 3. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.
<b>MOOC Courses</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=Ey9M1neDgx0&amp;list=PLNISYvRcckSxtpOvmxwzQlnhwmXt8tzpU">https://www.youtube.com/watch?v=Ey9M1neDgx0&amp;list=PLNISYvRcckSxtpOvmxwzQlnhwmXt8tzpU</a>







## Syllabus-2023-2024

### BPharm

<b>Title of the Course</b>	Medicinal Chemistry I
<b>Course Code</b>	BP402T

#### Part A

Year	2nd	Semester	4th	Credits	L	T	P	C
					3	1	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>				<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To recall the various classes of medicinal compounds( <b>BL1-Remember</b> ) <b>CO2-</b> To explain the physicochemical properties, steric aspects of drugs and their metabolic pathways( <b>BL2-Understand</b> ) <b>CO3-</b> To identify the structural requirements of drugs to elicit biological response( <b>BL4-Analyze</b> ) <b>CO4-</b> To categorize the drugs based on their mechanism of action and clinical uses( <b>BL2-Understand</b> ) <b>CO5-</b> To design and create the synthetic routes for medicinal compounds. ( <b>BL6-Create</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics X Gender X Human Values X Environment X		<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG12(Responsible consumption and production)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Introduction to Medicinal Chemistry History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Biososterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-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. • Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. • Agents with mixed mechanism: Ephedrine, Metaraminol Adrenergic Antagonists: Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxylbenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-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, Isoflurophate, 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*, Glycopyrrrolate, Methantheline bromide, Propantheline bromide, Benztrapine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	Drugs acting on Central Nervous System A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem Barbiturates: SAR of barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital Miscellaneous: Amides & imides: Glutethimide, Alcohol & their carbamate derivatives: Meprobamate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazines: SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride. Ring Analogues of Phenothiazines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine. Fluro buterophenones: Haloperidol, Droperidol, Risperidone. Beta amino ketones: Molindone hydrochloride. Benzamides: Sulpiride. C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methabarbitol. 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	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-V	Drugs acting on Central Nervous System General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane. Ultra short acting barbiturates: Methohexital sodium*, Thiomyal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.*	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Receptor binding of drug simulation	Simulation	BL2-Understand	10

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

















## Syllabus-2023-2024

### BPharm

<b>Title of the Course</b>	Herbal Drug Technology
<b>Course Code</b>	BP603T

#### Part A

Year	3rd	Semester	6th	Credits	L	T	P	C
					3	1	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>	Co-Requisite/s							
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To Understand raw material as source of herbal drugs from cultivation to herbal drug product( <b>BL2-Understand</b> ) <b>CO2-</b> To Know the WHO and ICH guidelines for evaluation of herbal drugs( <b>BL1-Remember</b> ) <b>CO3-</b> To know the herbal cosmetics, natural sweeteners, nutraceuticals( <b>BL2-Understand</b> ) <b>CO4-</b> To Appreciate patenting of herbal drugs, GMP( <b>BL2-Understand</b> ) <b>CO5-</b> To illustrate the scope and future prospects of the herbal drug industry( <b>BL1-Remember</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics X Gender X Human Values X Environment ✓	<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consumption and production)				

#### Part B

Modules	Contents	Pedagogy	Hours
1	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 raw material Biodynamic Agriculture Good agricultural practices in cultivation 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, Ghutika, Churna, Lohya and Bhasma.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	11
2	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 Gastro intestinal 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: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
3	Herbal Cosmetics Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products. Herbal excipients: 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	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
4	Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs Stability testing of herbal drugs. 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 (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
5	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.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation and standardization of Ayurvedic formulations	Research Paper Presentation	BL2-Understand	8

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

#### Part E

<b>Books</b>	1. Textbook of Pharmacognosy by Trease & Evans. 2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
<b>Articles</b>	<a href="https://www.researchgate.net/publication/8914668_Herbal_medicine_Current_status_and_the_future">https://www.researchgate.net/publication/8914668_Herbal_medicine_Current_status_and_the_future</a>
<b>References Books</b>	3. Pharmacognosy by Kokate, Purohit and Gokhale 4. Essential of Pharmacognosy by Dr.S.H.Ansari 5. Pharmacognosy & Phytochemistry by V.D.Rangari 6. Pharmacopoeial standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
<b>MOOC Courses</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>
<b>Videos</b>	kcl tutorial









## Syllabus-2023-2024

### BPharm

<b>Title of the Course</b>	Pharmacy Practice
<b>Course Code</b>	BP703T

#### Part A

Year	4th	Semester	7th	Credits	L	T	P	C
					3	1	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>				<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<p><b>CO1-</b> To acquire the knowledge on organization of hospitals, various methods of distribution and hospital formulary in hospitals and apply it in the practice of pharmacy. <b>(BL1-Remember)</b></p> <p><b>CO2-</b> To outline the organization and structure of community pharmacy and to build ability to design and run own community pharmacy. <b>(BL1-Remember)</b></p> <p><b>CO3-</b> To demonstrate the knowledge of therapeutic drug monitoring, patient medication history interview and to apply the knowledge on assessment of drug related problems. <b>(BL2-Understand)</b></p> <p><b>CO4-</b> categorize and evaluate the role of hospital pharmacist in pharmacy and therapeutic committee, drug information services, patient counseling, education and training programmes in hospitals. <b>(BL1-Remember)</b></p> <p><b>CO5-</b> To interpret clinical laboratory tests of specific disease states to provide better patient centered service. <b>(BL4-Analyze)</b></p>							
<b>Courses Elements</b>	Skill Development X Entrepreneurship ✓ Employability ✓ Professional Ethics ✓ Gender ✓ Human Values ✓ Environment X		<b>SDG (Goals)</b>		SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG6(Clean water and sanitation)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	a) 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. b) Hospital pharmacy and its organization Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists. c) 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. d) 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.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	a) 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 Dispensing of controlled drugs. b) Hospital formulary Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary. c) Therapeutic drug monitoring Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring. d) Medication adherence Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence. e) Patient medication history interview Need for the patient medication history interview, medication interview forms. f) Community pharmacy management Financial, materials, staff, and infrastructure requirements.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	a) Pharmacy and therapeutic committee Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation. b) Drug information services Drug and Poison information center, Sources of drug information, Computerized services, and storage and retrieval of information, Patient counseling Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist c) Education and training program in 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. d) Prescribed medication order and communication skills Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	preparation and implementation Budget preparation and implementation b) Clinical Pharmacy Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical 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. c) Over the counter (OTC) sales Introduction and sale of over the counter, and Rational use of common over the counter medications.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	a) Drug store management and inventory control Organization of drug store, types of 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 b) Investigational use of drugs Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Visit of ITM Hospital	Internships	BL2-Understand	3
2	Visit of ITM Hospital	Field work	BL2-Understand	2

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation























