Syllabus-2023-2024

BPharm

Title of the Course	Human Anatomy and Physiology I
Course Code	BP-101[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Foundation core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Explain the gross morphology, structure and functions of various organs of the human body**(BL1-Remember)** **CO2-** Describe the various homeostatic mechanisms and their imbalances.**(BL2-Understand)** **CO3-** Identify the various tissues and organs of different systems of human body**(BL5-Evaluate)** **CO4-** Perform the various experiments related to special senses and nervous system**(BL3-Apply)** **CO5-** To analyze the importance of blood, lymphatic system and immunity in human body.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT I	Introduction to human body Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology. Cellular level of organization Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine Tissue level of organization Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT II	Integumentary system Structure and functions of skin, Skeletal system, Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system, Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction Joints Structural and functional classification, types of joints movements and its articulation	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT III	Body fluids and blood Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticuloendothelial system. Lymphatic system Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT IV	Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. Special senses Structure and functions of eye, ear, nose and tongue and their disorders.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT V	Cardiovascular system Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	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
I	ESR determination of students	PBL	BL3-Apply	3
II	Blood Grouping	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

Books	1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi. 2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
Articles	1. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata
References Books	1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
MOOC Courses	https://oli.cmu.edu/courses/anatomy-physiology-i-ii-v2-academic/
Videos	https://www.youtube.com/watch?v=3oUvqNuWzPg

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	-	1	-	-	2	-	3	1	3	1	3
CO2	2	1	-	1	-	1	-	-	1	-	2	1	2	1	2
CO3	3	2	-	-	-	1	-	-	2	-	1	1	2	1	2
CO4	3	2	-	1	1	2	-	-	-	-	-	-	1	2	1
CO5	2	1	-	-	1	-	1	-	-	-	-	-	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Analysis I
Course Code	BP-102[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Foundation core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand the principles of volumetric and electro chemical analysis**(BL2-Understand)** **CO2-** To gain knowledge of sources of errors and minimizing techniques.**(BL1-Remember)** **CO3-** To analyze the techniques of volumetric, gravimetric and gas analysis.**(BL3-Apply)** **CO4-** To explain about accuracy, precision and significant figure error concepts.**(BL1-Remember)** **CO5-** To compute analytical results and understand the physiochemical concepts of analysis, theories of acids and bases, stoichiometry etc**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Pharmaceutical Analysis- Definition and scope, Different techniques of analysis , Methods of expressing concentration Primary and secondary standards. Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride. Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principles, methods and application of diazotisation titration.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Concepts of oxidation and reduction, Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromometry, Dichrometry, Titration with potassium iodate	Blended Learning	08
UNIT 5	Electrochemical methods of analysis Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications. Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	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	Making of differen buffers and its titration	Experiments	BL2-Understand	5

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

Books	1. 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
Articles	https://www.orientjchem.org/vol36no1/a-review-article-on-pharmaceutical-analysis-of-pharmaceutical-industry-according-to-pharmacopoeias/
References Books	1. John H. Kennedy, Analytical chemistry principles 6. Indian Pharmacopoeia
MOOC Courses	https://nptel.ac.in/courses/104108363
Videos	You tube,

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	3	-	-	1	1	-	3	1	3	2	1
CO2	2	2	-	2	2	-	-	1	2	-	3	2	2	1	2
CO3	2	2	1	-	1	-	-	2	1	-	2	1	1	1	1
CO4	2	1	3	-	1	-	-	2	1	-	2	1	1	-	1
CO5	3	3	2	-	1	1	-	-	-	-	-	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutics I
Course Code	BP-103[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Know the history of profession of pharmacy **(BL1-Remember)** **CO2-** Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations**(BL2-Understand)** **CO3-** Understand the professional way of handling the prescription**(BL2-Understand)** **CO4-** Preparation of solid and liquid dosage forms**(BL3-Apply)** **CO5-** To formulate and evaluate semi solid dosage forms**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. Dosage forms: Introduction to dosage forms, classification and definitions Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription. Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. Powders: Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in the formulation of liquid dosage forms. Solubility enhancement techniques	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions. Biphasic liquids: Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. Emulsions: Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 4	Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. Pharmaceutical incompatibilities: Definition, classification, physical, chemical and therapeutic incompatibilities with examples	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	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	Students will Create and formulate different dosage form as a part of ABL	Experiments	BL6-Create	5

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**
0	0	0	0	0	0

Part E

Books	1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi. 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
Articles	https://www.mdpi.com/journal/pharmaceutics
References Books	1. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University of Michigan. 2. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi. 4. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
MOOC Courses	https://nptel.ac.in/courses
Videos	https://www.google.com/search?q=pharmaceutics+articles&rlz=1C1ONGR_enIN1056IN1057&oq=&gs_lcrp=EgZjaHJvbWUqBggBEEUYOzIGCAAQRRg5MgYIARBFGDsyBwgCEAAYgAQyBwgDEC4YgAQyBwgEEAAYgAQyBwgFEAAYgAQyBwgGEAAYgAQyBggHEEUYPNIBCTQwOTI4ajBqNKgCALACAA&sourceid=chrome&ie=UTF-8

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	-	3	2	1	-	-	-	3	2	3	2	2
CO2	3	2	3	-	-	-	-	-	-	-	-	-	3	2	1
CO3	2	2	2	-	-	1	1	2	-	3	3	-	3	1	1
CO4	2	1	1	-	-	-	-	-	-	-	2	1	3	3	-
CO5	2	1	-	1	-	1	-	1	-	-	2	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Inorganic Chemistry
Course Code	BP-104[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the history and concept of pharmacopoeia and its editions.**(BL2-Understand)** **CO2-** To know the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.**(BL1-Remember)** **CO3-** To gain knowledge on limit tests of different pharmaceutical inorganic compounds.**(BL1-Remember)** **CO4-** To understand the method to prepare inorganic pharmaceuticals**(BL2-Understand)** **CO5-** To justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	General methods of preparation, assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes	Lecture based learning, ICT, Peer Tutorial	10
UNIT 2	Acids, Bases and Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity. Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance. • Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	Lecture based learning, ICT, Peer Tutorial	10
UNIT 3	Gastrointestinal agents Acidifiers: Ammonium chloride* and Dil. HCl Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations	Lecture based learning, ICT, Peer Tutorial	10
UNIT 4	Miscellaneous compounds Expectorants: Potassium iodide, Ammonium chloride*. Emetics: Copper sulphate*, Sodium potassium tartarate Haematinics: Ferrous sulphate*, Ferrous gluconate Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333 Astringents: Zinc Sulphate, Potash Alum	Lecture based learning, ICT, Peer Tutorial	08
UNIT 5	Radiopharmaceuticals: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances.	Lecture based learning, ICT, Peer Tutorial	07

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Limit test finding in water of ITM premises sample	Experiments	BL3-Apply	4

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**
0	0	0	0	0	0

Part E

Books	1. A.I. Vogel, Text Book of Quantitative Inorganic analysis 2. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition 3. M.L Schroff, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
Articles	NA
References Books	1. Indian Pharmacopoeia
MOOC Courses	https://nptel.ac.in/courses
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	1	2	1	3	-	3	-	3	3	-
CO2	3	2	1	2	2	1	1	1	2	-	3	-	2	3	1
CO3	2	2	1	1	2	2	1	1	2	-	3	1	1	2	-
CO4	2	2	1	1	2	1	1	1	1	-	2	-	1	1	-
CO5	3	1	2	1	3	1	2	1	1	-	2	3	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Communication Skills *
Course Code	BP-105[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Non-graded Core Requirement							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation.**(BL2-Understand)** **CO2-** Communicate effectively (Verbal and Non-Verbal)**(BL3-Apply)** **CO3-** Effectively manage the team as a team player**(BL2-Understand)** **CO4-** To develop interview skills**(BL3-Apply)** **CO5-** To develop Leadership qualities and essentials.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	Lecture based Learning, interactive classroom,	07
UNIT 2	Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style	Lecture based Learning, interactive classroom, Discussion	07
UNIT 3	Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message	Lecture based Learning, interactive classroom, Discussion	07
UNIT 4	Interview Skills: Purpose of an interview, Do's and Dont's of an interview Giving Presentations: Dealing with Fears, planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery	Lecture based Learning, interactive classroom, Discussion	05
UNIT 5	• Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion	Lecture based Learning, interactive classroom, Discussion, ABL (Mooc HR Round)	05

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	How to pitch yourself for HR Round	Seminar	BL5-Evaluate	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013 4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011 5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
Articles	https://www.helpguide.org/articles/relationships-communication/effective-communication.htm
References Books	1. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green Hall, 1st Edition Universe of Learning LTD, 2010 2. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011 3. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011 4. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning India Pvt. Ltd, 2011 5. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
MOOC Courses	https://nptel.ac.in/courses/102104061
Videos	https://www.youtube.com/watch?v=yRwglZSsR_Y

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	1	-	-	3	3	-	1	3
CO2	-	-	-	-	-	2	1	1	-	-	2	2	-	1	3
CO3	-	1	-	-	-	1	-	1	-	-	2	2	-	1	3
CO4	-	-	-	1	-	2	1	1	-	-	2	3	-	1	3
CO5	-	-	-	-	-	-	1	1	-	-	1	2	-	1	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Remedial Mathematics *
Course Code	BP-106RM[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Non-graded Core Requirement							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the role of mathematics in pharmacy**(BL1-Remember)** **CO2-** Solve the different types of problems by applying theory**(BL2-Understand)** **CO3-** Appreciate the important application of mathematics in Pharmacy**(BL4-Analyze)** **CO4-** To adopt both conventional and creative techniques to the solutions of mathematical problems.**(BL4-Analyze)** **CO5-** Apply a range of techniques effectively to solve problems including theory deduction, approximation and simulation**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Partial fraction Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics Logarithms Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. Function: Real Valued function, Classification of real valued functions, Limits and continuity : Introduction , Limit of a function, Definition of limit of a function (definition)	Lecture based learning, Peer Tutorial	06
UNIT 2	Matrices and Determinant: Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants , Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations	lecture based l, numericals, based problem, learning	06
UNIT 3	Calculus Differentiation : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function , Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of xn w.r.tx, where n is any rational number, Derivative of ex,, Derivative of loge x , Derivative of ax, Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application	lecture based learning	06
UNIT 4	Analytical Geometry Introduction: Signs of the Coordinates, Distance formula, Straight Line: Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application	lecture based learning	06
UNIT 5	Differential Equations: Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations Laplace Transform: Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations	lecture based learning	06

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Laplace Transform	Experiments	BL3-Apply	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Differential Calculus by Shanthinarayan 2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
Articles	NA
References Books	1. Integral Calculus by Shanthinarayan 2. Higher Engineering Mathematics by Dr. B.S.Grewal
MOOC Courses	https://nptel.ac.in/courses/102101067 https://www.udemy.com/course/math-fundamentals-complete-course-on-fundamentals-
Videos	https://www.youtube.com/watch?v=d77qWQA4llw&list=PL7qxHC_-XSZmafOUewEGxTKsc7brHKti_

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	1	1	1	-	-	-	-	-	2	-	-	1	1
CO2	-	3	1	-	1	-	-	-	-	-	1	-	-	1	-
CO3	-	2	1	-	1	-	-	-	-	-	1	-	-	1	1
CO4	1	2	1	1	1	-	-	-	-	-	1	-	-	-	1
CO5	-	2	-	-	2	-	-	-	-	-	2	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Human anatomy and Physiology
Course Code	BP-107[P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Foundation core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall handling of compound microscope and to memorize various animal tissues.**(BL1-Remember)** **CO2-** To summarize the characteristics of different bones (skeletal system)**(BL2-Understand)** **CO3-** To identify the bleeding/clotting time and blood group**(BL2-Understand)** **CO4-** To analyze the blood cells using heamocytometry**(BL4-Analyze)** **CO5-** To estimate the ESR, HR, PR, hemoglobin concentration of human blood and blood pressure**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Study of compound microscope. 2. Microscopic study of epithelial and connective tissue	Experiments	BL2-Understand	4
2	3. Microscopic study of muscular and nervous tissue 4. Identification of axial bones	Experiments	BL3-Apply	4
3	5. Identification of appendicular bones 6. Introduction to hemocytometry	Experiments	BL4-Analyze	4
4	7. Enumeration of white blood cell (WBC) count 8. Enumeration of total red blood corpuscles (RBC) count	Experiments	BL5-Evaluate	4
5	9. Determination of bleeding time 10. Determination of clotting time	Experiments	BL4-Analyze	4
6	11. Estimation of hemoglobin content 12. Determination of blood group.	Experiments	BL3-Apply	4
7	13. Determination of erythrocyte sedimentation rate (ESR). 14. Determination of heart rate and pulse rate. 15. Recording of blood pressure.	Experiments	BL3-Apply	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi. 2. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.
Articles	NA
References Books	1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH, U.S.A. 3. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
MOOC Courses	https://www.udemy.com/course/anatomy-and-physiology-c/?couponCode=NVDPRODIN35 https://www.oxfordcollege.ac/product/anatomy-and-physiology-short-course/#:~:text=The%20course%20will%20take%20a,systems%20in%20a%20logical%20manner.
Videos	https://www.khanacademy.org/search?referer=%2F&page_search_query=HUMAN+ANATOMY+AND+PHYSIOLOGY

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	1	2	-	-	-	-	-	3	-	3	-	2
CO2	3	-	-	-	1	-	-	1	-	-	3	-	2	1	3
CO3	3	1	-	1	1	-	-	-	-	-	3	-	3	-	2
CO4	1	-	-	-	2	-	-	1	-	-	3	-	1	-	1
CO5	1	1	-	-	1	1	-	-	-	-	3	-	2	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Analysis I
Course Code	BP-108[P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the importance of calibration, calibration of weights, pipette and burette.**(BL2-Understand)** **CO2-** To demonstrate standardization of solutions with different strengths**(BL3-Apply)** **CO3-** To experiment with volumetric analysis such as acidimetry and alkalimetry, oxidation and reduction reactions, iodometry, complexometry, precipitation and non-aqueous titration**(BL4-Analyze)** **CO4-** To analyze gravimetric analytical techniques**(BL4-Analyze)** **CO5-** To evaluate pharmaceuticals by colorimetry and electrochemical methods**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Limit Test of the following (1) Chloride (2) Sulphate (3) Iron (4) Arsenic	Experiments	BL4-Analyze	12
2	Preparation and standardization of (1) Sodium hydroxide (2) Sulphuric acid (3) Sodium thiosulfate (4) Potassium permanganate (5) Ceric ammonium sulphate	Experiments	BL6-Create	10
3	Assay of the following compounds along with Standardization of Titrant (1) Ammonium chloride by acid base titration (2) Ferrous sulphate by Cerimetry (3) Copper sulphate by Iodometry (4) Calcium gluconate by complexometry (5) Hydrogen peroxide by Permanganometry (6) Sodium benzoate by non-aqueous titration (7) Sodium Chloride by precipitation titration	Experiments	BL5-Evaluate	12
4	Determination of Normality by electro-analytical methods (1) Conductometric titration of strong acid against strong base (2) Conductometric titration of strong acid and weak acid against strong base (3) Potentiometric titration of strong acid against strong base	Experiments	BL5-Evaluate	12

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

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
Articles	
References Books	4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. John H. Kennedy, Analytical chemistry principles 6. Indian Pharmacopoeia
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	1	1	-	-	-	-	-	3	-	3	-	2
CO2	3	2	1	-	1	-	-	-	-	-	3	-	3	-	1
CO3	2	3	3	2	-	-	-	-	-	-	2	-	2	-	1
CO4	2	2	2	-	1	-	-	-	-	-	2	-	1	1	1
CO5	2	3	1	1	-	-	-	-	-	-	3	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutics I
Course Code	BP-109[P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the principles used in the preparation of solid, liquid and semi solid dosage forms**(BL1-Remember)** **CO2-** Understand the professional way of handling the prescription**(BL2-Understand)** **CO3-** To experiment with solid and monophasic liquid dosage forms for internal and external administration.**(BL3-Apply)** **CO4-** To formulate Biphasic liquid dosage form and their evaluation**(BL5-Evaluate)** **CO5-** To formulate semisolid dosage form and their evaluation**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

<4d style="border: 1px solid black;">Experiments

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Syrups a) Syrup IP'66 b) Compound syrup of Ferrous Phosphate BPC'68	Experiments	BL3-Apply	4
2	Elixirs a) Piperazine citrate elixir b) Paracetamol pediatric elixir	Experiments	BL6-Create	4
3	Linctus a) Terpin Hydrate Linctus IP'66 b) Iodine Throat Paint (Mandles Paint)	Experiments	BL3-Apply	4
4	Solutions a) Strong solution of ammonium acetate b) Cresol with soap solution c) Lugol's solution	Experiments	BL5-Evaluate	4
5	Suspensions a) Calamine lotion b) Magnesium Hydroxide mixture c) Aluminimum Hydroxide gel	Experiments	BL3-Apply	4
6	Emulsions a) Turpentine Liniment b) Liquid paraffin emulsion	Experiments	BL6-Create	4
7	Suppositories a) Glycero gelatin suppository b) Coca butter suppository c) Zinc Oxide suppository	Experiments	BL6-Create	4
8	Semisolids a) Sulphur ointment b) Non staining-iodine ointment with methyl salicylate c) Carbopal gel	BL6-Create	4	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi. 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
Articles	NA
References Books	4. Indian pharmacopoeia. 5. British pharmacopoeia. 6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University of Michigan. 7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
MOOC Courses	https://www.coursera.org/courses?query=pharmaceutical
Videos	https://www.youtube.com/watch?v=aO75iAg4NWg&list=PLyfe0MKpikdUh1rh0yS5tpGEVCtMLvS1S

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	2	-	-	-	1	2	3	1	3	-	3
CO2	3	2	3	2	-	-	-	-	-	1	3	3	2	-	2
CO3	2	2	3	-	1	-	-	-	1	1	3	2	3	-	2
CO4	3	1	3	3	1	-	-	-	-	-	2	-	3	-	2
CO5	2	1	3	2	1	1	-	-	2	2	1	1	-	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Inorganic Chemistry
Course Code	BP-110[P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the sources of limit tests, preparation and identification of compounds**(BL1-Remember)** **CO2-** Understand the medicinal and pharmaceutical importance of inorganic compounds**(BL2-Understand)** **CO3-** To demonstrate the preparation of inorganic pharmaceuticals.**(BL3-Apply)** **CO4-** To analyze various inorganic pharmaceutical compounds and perform limit test**(BL4-Analyze)** **CO5-** To select suitable method for the preparation of inorganic pharmaceuticals**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Limit tests for following ions Limit test for Chlorides and Sulphates, Modified limit test for Chlorides and Sulphates, Limit test for Iron, Limit test for Heavy metals, Limit test for Lead, Limit test for Arsenic	Experiments	BL4-Analyze	10
2	Identification test Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate	Experiments	BL4-Analyze	10
3	Test for purity Swelling power of Bentonite, Neutralizing capacity of aluminum hydroxide gel, Determination of potassium iodate and iodine in potassium Iodide	Experiments	BL3-Apply	10
4	Preparation of inorganic pharmaceuticals, Boric acid, Potash alum, Ferrous sulphate	Experiments	BL6-Create	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition. 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
Articles	https://asianjpr.com/HTMLPaper.aspx?Journal=Asian%20Journal%20of%20Pharmaceutical%20Research;PID=2017-7-1-6
References Books	6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 7. Indian Pharmacopoeia
MOOC Courses	NA
Videos	https://www.youtube.com/watch?v=3ut36CX-YN0&list=PLQnNyE1lxfVL4np_23Y2f18QVelWUHvQM

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	2	2	2	-	2	-	3
CO2	2	1	1	3	2	-	-	-	1	1	3	-	2	-	1
CO3	3	2	1	1	2	-	-	-	-	-	3	-	3	1	2
CO4	3	2	1	3	2	-	-	-	1	-	2	-	1	1	1
CO5	3	3	-	1	1	-	-	-	-	1	2	-	3	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Communication Skills
Course Code	BP-111[P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Soft skill							
Course Category	Non-graded Core Requirement							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operation**(BL2-Understand)** **CO2-** To apply the practical skills to Communicate effectively (Verbal and Non-Verbal)**(BL3-Apply)** **CO3-** To take part in advanced learning on comprehension/direct and indirect speech.**(BL4-Analyze)** **CO4-** To develop the interview handling skills.**(BL5-Evaluate)** **CO5-** To improve in email etiquette.**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Basic communication covering the following topics Meeting People Asking Questions Making Friends What did you do? Do's and Dont's	Role Play	BL3-Apply	2/ WEEK
2	Advanced Learning Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills	Experiments	BL3-Apply	2/ WEEK
3	Pronunciations covering the following topics Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Experiments	BL3-Apply	2/ WEEK

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	13	15	8	10	5

Part E

Books	1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
Articles	9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning India Pvt. Ltd, 2011
References Books	4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011 5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013 6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green Hall, 1st Edition Universe of Learning LTD, 2010
MOOC Courses	https://www.coursera.org/specializations/improve-english
Videos	https://www.youtube.com/watch?v=srn5jgr9TZo

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	-	1	3	3	1	3	1	1
CO2	-	-	-	-	-	2	-	1	-	3	2	1	2	1	1
CO3	-	-	-	-	-	2	-	1	1	2	2	3	2	2	1
CO4	-	-	-	-	-	1	-	-	1	2	2	2	2	2	1
CO5	-	-	-	-	-	1	-	-	1	1	2	1	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Fine art and Music-I *
Course Code	BP-113[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Generic Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Drawing exercises are to learn accurate observation and skills of graphic presentation in free hand drawing exercises from objects and nature to study proportion, volume and visual perspective, suggestion of solidity by line, mass, value and texture; emphasis on variety of visual experiences**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
1	)Study of proportion, line, colour, form, tone, texture and graphic representation	Lecture based learning	10
2	Nature Drawing: study of various natural forms.	class out of classroom	08
3	Drawing from various man-made objects.	class out of classroom	07
4	d)Drawing from memory- to develop the sense of observation and the capacity to retain and recall images and their co-ordination.	active learning	05

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Nature drawings:1 Drawing from man-made object:1 Drawing from Memory-1 Free-hand sketching: 5	No. of assignments: 2	PBL	BL3-Apply	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	Color and Light: A Guide for the Realist Painter (Volume 2) (James Gurney Art)
Articles	https://shepherd.com/best-books/art-references-for-drawing-the-human-figure
References Books	Let's Draw! Illustrating With Copic Book by Ran; KAOPPE; Kirishima Mutsuki (shelved 1 time as drawing-reference)
MOOC Courses	https://www.nifafinearts.com/course.php?id=29
Videos	https://www.youtube.com/results?search_query=drawing

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Instrumental Methods of Analysis
Course Code	BP-701T

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis.**(BL2-Understand)** **CO2-** Gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy.**(BL1-Remember)** **CO3-** Characterization and estimation of ions by spectroscopical techniques**(BL4-Analyze)** **CO4-** Simplify affinity of matter with stationary phase and mobile phase, physical and chemical properties of matter.**(BL2-Understand)** **CO5-** Categorize different organic and inorganic compounds using suitable spectroscopic and chromatographic techniques.**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	UV Visible spectroscopy Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations. Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis Fluorimetry Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations, Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications Flame Photometry-Principle, interferences, instrumentation and applications Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications Nephelo-turbidometry- Principle, instrumentation and applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Introduction to chromatography Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications. Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications. Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications Gel chromatography- Introduction, theory, instrumentation and applications Affinity chromatography- Introduction, theory, instrumentation and applications	white board	07

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Modal making of Gel electrophoresis	Experiments	BL2-Understand	5

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

Books	1.Instrumental Methods of Chemical Analysis by B.K Sharma 2.Organic spectroscopy by Y.R Sharma 3.Textbook of Pharmaceutical Analysis by Kenneth A. Connors 4.Vogel's Textbook of Quantitative Chemical Analysis by A.I. Vogel
Articles	NA
References Books	1. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake 2. Organic Chemistry by I. L. Finar 3. Organic spectroscopy by William Kemp 4. Quantitative Analysis of Drugs by D. C. Garrett
MOOC Courses	https://nptel.ac.in/
Videos	you tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	1	2	-	-	-	-	3	-	1	2	1
CO2	2	3	-	2	-	-	-	-	-	-	3	-	1	1	1
CO3	2	2	-	1	-	-	-	-	-	-	3	-	1	1	2
CO4	2	2	-	-	-	-	-	-	-	-	2	-	1	2	1
CO5	2	2	-	-	-	-	-	-	-	-	2	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Human Anatomy and Physiology II
Course Code	BP201T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Explain the gross morphology, structure and functions of various organs of the human body.**(BL1-Remember)** **CO2-** Describe the various homeostatic mechanisms and their imbalances**(BL2-Understand)** **CO3-** Identify the various tissues and organs of different systems of human body**(BL3-Apply)** **CO4-** Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.**(BL3-Apply)** **CO5-** Appreciate coordinated working pattern of different organs of each system**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Nervous system Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Digestive system Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. • Energetics Formation and role of ATP, Creatinine Phosphate and BMR.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06
UNIT 3	Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods. Urinary system Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Endocrine system Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders	Peer tutorial	10
UNIT 5	Reproductive system Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition Introduction to genetics Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	09

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Create respiratory model using baloon and bottle	Experiments	BL3-Apply	3

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

Books	1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers' medical publishers, New Delhi. 2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
Articles	https://www.medicalnewstoday.com/articles/248743
References Books	1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A. 3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata
MOOC Courses	https://www.edx.org/learn/human-anatomy
Videos	https://www.youtube.com/watch?v=uBGI2BujkPQ

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1	-	-	3	-	3	-	2
CO2	1	-	-	1	-	1	-	1	-	-	3	-	3	-	2
CO3	3	-	-	1	1	1	-	-	-	-	3	-	2	-	2
CO4	1	-	-	1	1	1	-	2	-	-	2	-	2	-	2
CO5	1	-	-	2	1	1	1	1	-	-	2	-	2	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Organic Chemistry I
Course Code	BP202T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand and applications of nomenclature, properties, reactions and uses of organic compounds.**(BL3-Apply)** **CO2-** To remember the orientation of reactions and influence products.**(BL1-Remember)** **CO3-** To apply the knowledge for the identification of organic compounds.**(BL3-Apply)** **CO4-** To discuss chemistry and reactions of various organic compounds.**(BL2-Understand)** **CO5-** To elaborate the concepts of hybridization, electronic and steric effects of organic compounds.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Classification, nomenclature and isomerism Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07
UNIT 2	Alkanes*, Alkenes* and Conjugated dienes* SP3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP2 hybridization in alkenes E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E1 verses E2 reactions, Factors affecting E1 and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Alkyl halides* SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Carbonyl compounds* (Aldehydes and ketones) Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 5	Carboxylic acids* Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid Aliphatic amines* - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	study of lab chemical isomerism	PBL	BL2-Understand	3

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

Books	1. Organic Chemistry by Morrison and Boyd 2. Organic Chemistry by I.L. Finar, Volume-I 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl
Articles	NA
References Books	1. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz. 2. Reaction and reaction mechanism by Ahluwaliah/Chatwal
MOOC Courses	https://extendedstudies.ucsd.edu/courses-and-programs/organic-chemistry-i
Videos	https://www.youtube.com/watch?v=XQhomr7j44M&list=PLNiSYvRcckSyPEJ_PFIK-kfE66UUB_zmM

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	3	-	2	-	-	-	3	-	3	-	2
CO2	2	-	-	-	3	-	1	-	-	-	3	-	1	-	2
CO3	2	2	-	-	2	-	-	-	-	-	3	-	2	-	2
CO4	2	1	-	-	1	-	1	-	-	-	3	-	1	-	2
CO5	2	1	1	-	1	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Biochemistry
Course Code	BP203T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the properties, significance and metabolic reactions of carbohydrates, lipids, nucleic acids, proteins and amino acids**(BL1-Remember)** **CO2-** To understand the metabolism of carbohydrates and process of electron transport and ATP formation**(BL2-Understand)** **CO3-** To apply the concept of catalytic activity and enzyme inhibition in design of new drugs, diagnostic and therapeutic applications of enzyme**(BL3-Apply)** **CO4-** To distinguish the process of DNA replication, transcription and translation**(BL2-Understand)** **CO5-** To evaluate the causes, manifestations and diagnosis of metabolic disorders**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins. Bioenergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 2	Carbohydrate metabolism Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus Biological oxidation Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate level phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Lipid metabolism β-Oxidation of saturated fatty acid (Palmitic acid) Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid) Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity. Amino acid metabolism General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Nucleic acid metabolism and genetic information transfer Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 5	Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions	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	DNA MODEL MAKING	Simulation	BL2-Understand	5

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

Books	1. Textbook of Biochemistry by Rama Rao. 2. Textbook of Biochemistry by Deb.
Articles	https://www.mcgill.ca/biochemistry/about-us/information/biochemistry
References Books	1. Principles of Biochemistry by Lehninger. 2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell. 3. Biochemistry by Stryer.
MOOC Courses	https://www.edx.org/learn/biochemistry/harvard-university-principles-of-biochemistry?index=product&queryID=6f52c57d14373630030886d85bfd4dfc&position=1&linked_from=autocomplete&c=autocomplete
Videos	https://www.youtube.com/watch?v=GJAf85ckhyk&list=PLTUO2J9MZQt1bmOFMAaWB8Nxa2qslnWPe

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	1	-	-	-	-	3	-	2	1	3
CO2	2	1	-	-	1	-	-	-	-	-	3	-	2	1	2
CO3	2	2	-	-	-	-	-	-	-	-	3	-	2	1	1
CO4	3	2	-	1	1	-	1	-	-	-	2	-	1	-	1
CO5	3	1	-	1	1	-	-	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pathophysiology
Course Code	BP204T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the process of cell injury, morphology of cell injury and cellular adaptations.**(BL2-Understand)** **CO2-** To understand the etiopathogenesis of cardiovascular, respiratory and renal diseases mentioned.**(BL2-Understand)** **CO3-** To apply the principles of pathogenesis in understanding symptoms, signs and complications of disease states mentioned.**(BL3-Apply)** **CO4-** To explain the etiopathogenesis of hematologic, endocrine, nervous, gastrointestinal, muscular skeletal diseases and Immunopathogenesis of infectious diseases.**(BL1-Remember)** **CO5-** To evaluate the principles of physical, chemical and biologic carcinogenesis.**(BL5-Evaluate)**						
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis, Electrolyte imbalance Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis) Respiratory system: Asthma, Chronic obstructive airways diseases. Renal system: Acute and chronic renal failure	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Haematological Diseases: Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease. Gastrointestinal system: Peptic Ulcer	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease. Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout Principles of cancer: classification, etiology and pathogenesis of cancer Diseases of bones and joints: Rheumatoid Arthritis, Osteoporosis,Gout Principles of Cancer: Classification, etiology and pathogenesis of Cancer	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	Infectious diseases: Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections Sexually transmitted diseases: AIDS, Syphilis, Gonorrhea	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	Different desease model making	Seminar	BL2-Understand	5

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**
	0				

Part E

Books	1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010. 3. Laurence B, Bruce C, Bjorn K.; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
Articles	1. The Journal of Pathology. ISSN: 1096-9896 (Online) 2. The American Journal of Pathology. ISSN: 0002-9440 3. Pathology. 1465-3931 (Online) 4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
References Books	1. William and Wilkins, Baltimore;1991 [1990 printing]. 2. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010. 3. Guyton A, John.E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010. 4. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014
MOOC Courses	https://www.coursera.org/courses?query=pathophysiology
Videos	https://www.youtube.com/@RhesusMedicine

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	1	-	1	-	-	3	-	3	-	3
CO2	3	2	-	-	-	1	-	1	-	-	3	-	2	-	2
CO3	2	-	-	-	-	1	-	1	-	-	3	-	2	-	2
CO4	2	2	-	1	1	-	-	-	-	-	3	-	2	-	2
CO5	3	1	-	1	-	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Computer Applications in Pharmacy *
Course Code	BP205T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	0	0	3
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand different types of databases, applications of computers and databases in pharmacy.**(BL2-Understand)** **CO2-** To illustrate the concept of number system in computers.**(BL2-Understand)** **CO3-** Applications of web technologies such as HTML, XML, CSS, programming languages, Web servers and pharmacy drug database. **(BL3-Apply)** **CO4-** To evaluate the applications of computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy etc.,**(BL5-Evaluate)** **CO5-** To explain about bioinformatics and its impact in vaccine discovery.**(BL1-Remember)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG5(Gender equality)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division Concept of Information Systems and Software: Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06
UNIT 2	Web technologies: Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06
UNIT 3	Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring. Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06
UNIT 4	Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06
UNIT 5	Computers as data analysis in Preclinical development: Chromatographic dada analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS)	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	06

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	CADD	Simulation	BL2-Understand	3

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
75	38	50	25	25	13
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330. 2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
Articles	https://copbela.org/downloads/2020/SELF%20LEARNING%20MATERIAL%20BPHARMA/semester%202/BP205T/MODULE%2003.PDF
References Books	1. Bioinformatics (Concept, Skills and Applications) – S.C. Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA) 2. Microsoft office Access - 2003, Application Development Using VBA, SQLServer, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002
MOOC Courses	https://www.edx.org/certificates/professional-certificate/harvardx-data-science?index=product&results_level=first-level-results&term=COMPUTER+PHARMACY%22&objectID=program-3c32e3e0-b6fe-4ee4-bd4f-210c6339e074&campaign=Data++Science&source=edx&product_category=professional-certificate&placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch
Videos	https://www.youtube.com/watch?v=vRDswGc2wyM

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	1	1	-	1	-	-	3	2	1	1	1
CO2	-	1	-	-	1	1	-	1	-	-	2	2	1	1	1
CO3	-	1	-	-	1	1	-	1	-	-	2	1	1	1	1
CO4	-	1	-	1	1	-	-	-	-	-	3	1	-	-	-
CO5	-	-	-	1	-	1	-	-	-	-	1	1	-	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Human Anatomy and Physiology II
Course Code	BP207P

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the physiology of special senses with the help of models, charts and specimens.**(BL1-Remember)** **CO2-** To develop the knowledge on coordinating working of organs of various systems with the help of models, charts and specimens.**(BL3-Apply)** **CO3-** To analyze the functions of cranial nerves by various sensory and motor functions.**(BL4-Analyze)** **CO4-** To evaluate body temperature and body mass index.**(BL5-Evaluate)** **CO5-** To determine tidal volume and vital capacity.**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Nervous system Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	Peer tutorial	10

M

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. To study the integumentary and special senses using specimen, models, etc., 2. To study the nervous system using specimen, models, etc., 3. To study the endocrine system using specimen, models, etc 4. To demonstrate the general neurological examination	Experiments	BL2-Understand	16
2	5. To demonstrate the function of olfactory nerve 6. To examine the different types of taste. 7. To demonstrate the visual acuity 8. To demonstrate the reflex activity	Experiments	BL3-Apply	16
3	9. Recording of body temperature 10. To demonstrate positive and negative feedback mechanism. 11. Determination of tidal volume and vital capacity. 12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens	Experiments	BL3-Apply	16
4	13. Recording of basal mass index . 14. Study of family planning devices and pregnancy diagnosis test. 15. Demonstration of total blood count by cell analyser 16. Permanent slides of vital organs and gonads.	Experiments	BL3-Apply	16

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi. 2. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi
Articles	NA
References Books	1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	1	-	-	-	-	3	-	3	-	1
CO2	2	1	-	-	1	1	-	-	-	-	2	-	3	-	1
CO3	2	1	-	-	1	1	-	-	-	-	2	-	2	-	1
CO4	3	-	-	-	-	1	-	-	-	-	3	-	2	-	2
CO5	2	-	1	1	1	-	-	-	-	-	3	-	2	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Organic Chemistry I
Course Code	BP208P

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**	Minimum 5 unknown organic compounds to be analysed systematically.			
Course Outcomes & Bloom's Level	**CO1-** To explain the qualitative analysis and preparation of pharmaceutical organic compounds.**(BL1-Remember)** **CO2-** To identify the extra elements, present in the pharmaceutical organic compounds.**(BL2-Understand)** **CO3-** To analyze the presence of several functional groups in pharmaceutical compounds.**(BL4-Analyze)** **CO4-** To appraise the rules concerned with reactivity and orientation of organic compounds.**(BL5-Evaluate)** **CO5-** To analyze unknown pharmaceutical organic compounds by determining their melting point/boiling point.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.	Experiments	BL3-Apply	4
2	2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test	Experiments	BL4-Analyze	4
3	3. Solubility test	Experiments	BL3-Apply	4
4	4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides	Experiments	BL3-Apply	4
5	5. Melting point/Boiling point of organic compounds	Experiments	BL4-Analyze	4
6	6. Identification of the unknown compound from the literature using melting point/ boiling point.	Experiments	BL4-Analyze	4
7	7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point	Experiments	BL6-Create	4
8	8. Minimum 5 unknown organic compounds to be analysed systematically. 1. Preparation of suitable solid derivatives from organic compounds 2. Construction of molecular models	Experiments	BL4-Analyze	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Practical Organic Chemistry by Mann and Saunders. 2. Vogel's text book of Practical Organic Chemistry
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	3	-	2	3	1
CO2	3	2	-	-	2	-	-	1	-	-	3	-	3	2	1
CO3	2	1	-	-	1	-	-	-	-	-	3	-	2	2	2
CO4	2	2	-	-	1	-	1	-	-	-	2	-	2	1	1
CO5	3	1	-	-	1	1	-	-	-	-	2	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Biochemistry
Course Code	BP209P

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the qualitative analysis of carbohydrates and proteins**(BL1-Remember)** **CO2-** To understand the principle and clinical significance of blood glucose**(BL2-Understand)** **CO3-** To identify the amount of reducing sugars by DNSA method**(BL3-Apply)** **CO4-** To examine and evaluate the constituents present in Urine and their clinical significance**(BL5-Evaluate)** **CO5-** To determine the effect of temperature and substrate concentration on salivary amylase activity**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein) 3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) 4. Qualitative analysis of urine for abnormal constituents	Experiments	BL2-Understand	16
2	5. Determination of blood creatinine 6. Determination of blood sugar 7. Determination of serum total cholesterol 8. Preparation of buffer solution and measurement of pH	Experiments	BL3-Apply	16
3	9. Study of enzymatic hydrolysis of starch 10. Determination of Salivary amylase activity 11. Study the effect of Temperature on Salivary amylase activity. 12. Study the effect of substrate concentration on salivary amylase activity.	Experiments	BL3-Apply	16

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Outlines of Biochemistry by Conn and Stumpf 2. Practical Biochemistry by R.C. Gupta and S. Bhargavan
Articles	NA
References Books	1. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition) 2. Practical Biochemistry for Medical Students by Rajagopal and Ramakrishna. 3. Practical Biochemistry by Harold Varley
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	3	-	2	-	-	-	-	3	-	3	1	2
CO2	2	1	-	2	1	-	-	-	-	-	3	-	1	1	2
CO3	3	3	-	2	-	1	-	-	-	-	3	-	3	1	2
CO4	2	2	-	2	-	-	-	-	-	-	3	-	1	-	3
CO5	2	2	-	1	-	-	-	-	-	-	2	-	2	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Computer Applications in Pharmacy *
Course Code	BP210P

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To demonstrate and make use of MS Office, MS Word, MS Excel, MS Access and MS Power point.**(BL1-Remember)** **CO2-** To understand the paradigms of program languages and be exposed to at least one language from each model, C and SQL.**(BL2-Understand)** **CO3-** To summarize the report and printing the report from patient database**(BL2-Understand)** **CO4-** To design a questionnaire using a word processing package to gather information about a particular disease.**(BL3-Apply)** **CO5-** To create HTML web page to show personal information**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Design a questionnaire using a word processing package to gather information about a particular disease	Experiments	BL2-Understand	4
2	Create a HTML web page to show personal information.	Experiments	BL2-Understand	4
3	Retrieve the information of a drug and its adverse effects using online tools	Experiments	BL2-Understand	4
4	Creating mailing labels Using Label Wizard, generating label in MS WORD	Experiments	BL2-Understand	4
5	Create a database in MS Access to store the patient information with the required fields Using access	Experiments	BL6-Create	4
6	Design a form in MS Access to view, add, delete and modify the patient record in the database	Experiments	BL2-Understand	4
7	Generating report and printing the report from patient database	Experiments	BL3-Apply	4
8	Creating invoice table using – MS Access	Experiments	BL3-Apply	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	13	15	8	10	5

Part E

Books	1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
Articles	NA
References Books	1. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	1	-	-	-	-	1	2	-	1	1	1
CO2	-	1	-	-	1	-	-	-	-	-	1	-	1	1	1
CO3	-	1	-	-	2	-	-	-	-	-	1	-	1	1	1
CO4	-	1	-	-	1	1	-	-	-	-	2	-	1	2	-
CO5	-	1	-	-	2	-	-	-	-	-	2	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Fine art and Music II *
Course Code	BP211T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Generic Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Study of two-dimensional space and its organizational possibilities**(BL2-Understand)** **CO2-** Study of three-dimensional space and its organizational possibilities**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	2-D Design: 2 3-D Design: 2	Experiments	BL3-Apply	5

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	13	15	8	10	5
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	Ie Design Basics 2d and 3d 3e Pentak Roth Published by Cengage Learning, 2012 ISBN 10: 1111833923ISBN 13: 9781111833923
Articles	NA
References Books	Design Basics: 2D and 3D (with CourseMate Printed Access Card) Pentak, Stephen,Roth, Richard,Lauer, David A. ISBN 10: 0495909971 / ISBN 13: 9780495909972
MOOC Courses	https://www.coursera.org/specializations/graphic-design
Videos	https://www.youtube.com/watch?v=cYzbStq5lWs

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	2	2	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	1	3	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Organic Chemistry II
Course Code	BP301T

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand about aromaticity, chemistry and reactions of benzene.**(BL1-Remember)** **CO2-** To understand the concept of hydrolysis, hydrogenation, saponification and rancidity of oils**(BL2-Understand)** **CO3-** To Account for reactivity/stability of compounds**(BL3-Apply)** **CO4-** To gain knowledge on chemistry of phenols, aromatic amines and aromatic acids.**(BL4-Analyze)** **CO5-** To gain knowledge on structure and medicinal uses of pharmaceutical organic compounds.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Benzene and its derivatives A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule B. Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation. C. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction D. Structure and uses of DDT, Saccharin, BHC and Chloramine	Lecure based leraning, Peer tutorial	10
UNIT-II	Phenols* - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols Aromatic Amines* - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts Aromatic Acids* –Acidity, effect of substituents on acidity and important reactions of benzoic acid	Lecure based leraning, Peer tutorial	10
UNIT-III	Fats and Oils a. Fatty acids – reactions. b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination	Lecure based leraning, Peer tutorial	10
UNIT-IV	Polynuclear hydrocarbons: a. Synthesis, reactions b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives	Lecure based leraning, Peer tutorial	8
UNIT-V	Cyclo alkanes* Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only	Lecure based leraning, Peer tutorial	7

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	synthesis and medicinal uses of Napthelene,Phenanthrene	Experiments	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**

Part E

Books	1. Organic Chemistry by Morrison and Boyd 2. Organic Chemistry by I.L. Finar, Volume-I 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl
Articles	NA
References Books	1 Organic Chemistry by P.L.Soni 2 Practical Organic Chemistry by Mann and Saunders. 3 Vogel's text book of Practical Organic Chemistry 4 Advanced Practical organic chemistry by N.K.Vishnoi. 5 Introduction to Organic Laboratory techniques by Pavia, Lampman
MOOC Courses	https://nptel.ac.in/
Videos	youtube and other free resource

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	2	-	1	-	1	-	3	-	3	-	2
CO2	3	1	-	-	1	-	-	-	-	-	3	-	2	-	2
CO3	2	-	-	-	1	-	1	-	1	-	2	-	3	-	3
CO4	2	1	-	-	1	-	-	-	-	-	2	-	2	1	1
CO5	2	-	-	-	2	-	-	-	-	-	2	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Physical Pharmaceutics I
Course Code	BP302T

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					03	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recollect the states of matter and understand the applications of various physiochemical properties to design dosage forms**(BL2-Understand)** **CO2-** To gain knowledge of pH and buffers and their use in the stabilization of pharmaceutical formulations.**(BL3-Apply)** **CO3-** To understand the principle of interfacial tension and the applications of surface active agents in drug solubilization.**(BL2-Understand)** **CO4-** To elaborate the significance of physical properties of drug molecules in design and stability of dosage forms.**(BL1-Remember)** **CO5-** To describe the principles of diffusion in biological systems and the the concepts of complexation and protein binding in pharmacy.**(BL1-Remember)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-II	States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism. Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-III	Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-IV	Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-V	pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.	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
UNIT-V	Guest lecture by industry expert	Seminar	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**

Part E

Books	1. Physical Pharmacy by Alfred Martin 2. Experimental Pharmaceutics by Eugene, Parott. 3. Tutorial Pharmacy by Cooper and Gunn
Articles	
References Books	1. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia. 2. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc. 3. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc. 4. Physical Pharmaceutics by Ramasamy C and ManavalanR.
MOOC Courses	https://nptel.ac.in/
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	2	-	-	-	-	-	3	-	3	-	1
CO2	2	3	2	-	1	-	-	-	-	-	3	-	2	-	2
CO3	2	2	3	-	2	-	-	-	-	-	3	-	1	2	3
CO4	2	1	3	-	2	1	-	-	-	-	3	-	1	1	3
CO5	1	2	3	-	1	-	-	-	-	-	3	-	3	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Microbiology
Course Code	BP303T

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	basic understanding of cell and biology			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand methods of identification, cultivation and preservation of various microorganisms**(BL2-Understand)** **CO2-** To understand the importance and implementation of sterlization in pharmaceutical processing and industry**(BL2-Understand)** **CO3-** To Learn sterility testing of pharmaceutical products**(BL3-Apply)** **CO4-** Carried out microbiological standardization of Pharmaceuticals**(BL4-Analyze)** **CO5-** Understand the cell culture technology and its applications in pharmaceutical industries**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Introduction, history of microbiology, its branches, scope and its importance. Introduction to Prokaryotes and Eukaryotes Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-II	Identification of bacteria using staining techniques (simple, Gram's & Acid -fast staining) and biochemical tests (IMViC). Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization. Evaluation of the efficiency of sterilization methods.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board/PPT	10
UNIT-III	Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions Evaluation of bactericidal & Bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-V	Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research	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	Microbiological visit of Pharma industry	Virtual Labs	BL3-Apply	5

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

Books	1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London. 2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi. 3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn. 4. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
Articles	https://byjus.com/biology/microbiology/
References Books	1. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology. 2. Rose: Industrial Microbiology. 3. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan 4. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution. 5. Peppler: Microbial Technology. 6. I.P., B.P., U.S.P.- latest editions.
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=liqpUJ4j_bs&list=PLQnNyE1lxfVlVXt55hag4kapfWhPNjjfT

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	1	2	-	-	-	-	-	3	-	3	-	3
CO2	3	2	-	1	2	-	-	-	-	-	3	-	2	-	2
CO3	2	1	-	-	1	1	-	-	-	-	3	-	2	-	2
CO4	2	2	-	-	2	-	-	-	-	-	3	-	2	-	2
CO5	2	1	-	-	1	-	-	-	-	-	3	-	1	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Engineering
Course Code	BP304T

Part A

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

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.	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

Books	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
Articles	NA
References Books	1.Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition. 2. Unit operation of chemical engineering – Mcabe Smith, Latest edition 3. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=Ey9M1neDgx0&list=PLNiSYvRcckSxtpOvMxwzQlnhwmXt8tzpU

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	2	-	-	-	-	-	3	-	2	-	1
CO2	2	2	1	-	-	2	-	-	-	-	3	-	2	-	2
CO3	2	3	-	-	1	2	-	-	-	-	2	-	2	-	1
CO4	3	2	2	-	-	2	-	-	-	-	2	-	1	1	1
CO5	2	1	-	1	1	2	-	-	-	-	1	-	1	-	1
CO6	-	-	-	--	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Organic Chemistry II
Course Code	BP305P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To gain the knowledge on different recrystalization and steam distillation techniques.**(BL2-Understand)** **CO2-** To remember and recall the different laboratory techniques used in pharmaceutical chemistry.**(BL1-Remember)** **CO3-** To identify the purity of fats and oils by acid value, saponification value and iodine value and perform various reaction like diazotization, oxidation reactions.**(BL3-Apply)** **CO4-** To analyze named reactions like perkin and claisen schmidt reactions by using carbonyl compounds**(BL4-Analyze)** **CO5-** To test the knowledge on different electrophilic aromatic substitutions reactions like bromination, nitration in monosubstituted aromatic compounds**(BL5-Evaluate)**						
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I Experiments involving laboratory techniques • Recrystallization • Steam distillation	Experiments	BL3-Apply	8
2	II Determination of following oil values (including standardization of reagents) • Acid value • Saponification value • Iodine value	Experiments	BL5-Evaluate	8
3	III Preparation of compounds • Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.	Experiments	BL3-Apply	8
4	2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ • Acetanilide by halogenation (Bromination) reaction. • 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction	Experiments	BL3-Apply	8
5	Benzoic acid from Benzyl chloride by oxidation reaction. • Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction. • 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.	Experiments	BL3-Apply	8
6	Benzil from Benzoin by oxidation reaction. • Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction • Cinnammic acid from Benzaldehyde by Perkin reaction • P-Iodo benzoic acid from P-amino benzoic acid	Experiments	BL4-Analyze	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Practical Organic Chemistry by Mann and Saunders. 2. Vogel's text book of Practical Organic Chemistry
Articles	NA
References Books	1. Advanced Practical organic chemistry by N.K.Vishnoi. 2. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz
MOOC Courses	NA
Videos	You tube, simulation

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	-	-	3	-	1	-	3
CO2	2	3	-	2	1	-	-	-	-	-	2	-	2	-	3
CO3	3	1	-	-	2	-	-	2	-	-	2	-	1	1	1
CO4	2	2	-	1	-	-	-	-	-	-	3	-	1	1	1
CO5	3	1	-	1	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Physical Pharmaceutics I
Course Code	BP306P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					03	1	0	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms**(BL2-Understand)** **CO2-** To explain adsorption isotherms and determine Freundlich-Langmuir constant using activated charcoal.**(BL2-Understand)** **CO3-** To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs**(BL3-Apply)** **CO4-** To determine the surface tension of sample liquids by drop count and drop weight methods and deduce the HLB value and critical micellar concentration of a surfactant**(BL4-Analyze)** **CO5-** To estimate the stability constants of complexes by solubility and pH titration methods and **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Determination the solubility of drug at room temperature 4 Hrs/week 2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	Experiments	BL3-Apply	8
2	3. Determination of Partition co- efficient of benzoic acid in benzene and water 4. Determination of Partition co- efficient of Iodine in CCl4 and water	Experiments	BL4-Analyze	8
3	5. Determination of % composition of NaCl in a solution using phenol-water system by CST method 6. Determination of surface tension of given liquids by drop count and drop weight method	Experiments	BL4-Analyze	8
4	7. Determination of HLB number of a surfactant by saponification method 8. Determination of Freundlich and Langmuir constants using activated char coal	Experiments	BL4-Analyze	8
5	9. Determination of critical micellar concentration of surfactants 10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method	Experiments	BL4-Analyze	4
6	11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method	Experiments	BL4-Analyze	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
Articles	NA
References Books	1. Physical Pharmaceutics by Ramasamy C and ManavalanR.
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	1	-	-	-	-	-	3	-	2	2	3
CO2	3	2	1	-	1	-	-	-	-	-	3	-	2	1	1
CO3	2	1	1	1	2	-	-	-	1	-	1	-	-	1	2
CO4	2	2	2	-	1	-	-	-	1	-	2	-	1	1	1
CO5	1	1	3	1	-	-	1	-	-	-	2	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Microbiology
Course Code	BP307P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand methods of identification, cultivation and preservation of various microorganisms**(BL2-Understand)** **CO2-** To Learn sterility testing of pharmaceutical products**(BL3-Apply)** **CO3-** Carried out microbiological standardization of Pharmaceuticals**(BL4-Analyze)** **CO4-** To demonstrate various staining methods – simple, gram staining and acid fast staining**(BL3-Apply)** **CO5-** To choose the correct method to evaluate the microbes to be tested**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology	Experiments	BL2-Understand	4
2	Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations	Experiments	BL3-Apply	4
3	Staining methods- Simple, Grams staining and acid-fast staining (Demonstration with practical).	Experiments	BL3-Apply	4
4	Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.	Experiments	BL4-Analyze	4
5	Microbiological assay of antibiotics by cup plate method and other methods	Experiments	BL5-Evaluate	4
6	Motility determination by Hanging drop method	Experiments	BL5-Evaluate	4
7	Sterility testing of pharmaceuticals	Experiments	BL5-Evaluate	4
8	Bacteriological analysis of water	Experiments	BL5-Evaluate	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	50	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London. 2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
Articles	NA
References Books	1. Lab manual
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	-	1	-	-	-	-	-	3	-	2	-	3
CO2	2	2	-	-	2	-	-	1	-	-	2	-	2	-	2
CO3	3	2	1	-	1	-	1	-	-	-	3	-	1	-	2
CO4	3	2	1	1	1	1	-	1	-	-	3	-	1	2	1
CO5	2	3	1	-	1	-	1	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Engineering
Course Code	BP308P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To know various unit operations used in pharmaceutical industries**(BL2-Understand)** **CO2-** To demonstrate and explain about the construction, working and applications of pharmaceutical equipments such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.**(BL3-Apply)** **CO3-** To experiment with the process variables of filtration, evaporation and infer the same**(BL3-Apply)** **CO4-** To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation**(BL4-Analyze)** **CO5-** To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I. Determination of radiation constant of brass, iron, unpainted and painted glass	Experiments	BL2-Understand	6
2	II. Steam distillation – To calculate the efficiency of steam distillation	Experiments	BL3-Apply	6
3	III. To determine the overall heat transfer coefficient by heat exchanger. IV. Construction of drying curves (for calcium carbonate and starch).	Experiments	BL2-Understand	6
4	V. Determination of moisture content and loss on drying. VI. Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method	Experiments	BL3-Apply	6
5	VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier. VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots	Experiments	BL3-Apply	6
6	IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill. X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment	Experiments	BL3-Apply	6
7	XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity XII. To study the effect of time on the Rate of Crystallization	Experiments	BL3-Apply	6
8	XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.	Experiments	BL3-Apply	6

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition. 2. Remington practice of pharmacy- Martin, Latest edition.
Articles	NA
References Books	1. Theory and practice of industrial pharmacy by Lachmann., Latest edition. 2. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	1	1	-	-	-	-	-	3	-	2	-	2
CO2	2	3	2	2	2	-	-	-	-	-	3	-	2	-	2
CO3	3	2	1	1	1	-	-	-	-	-	2	-	1	-	3
CO4	2	2	1	1	2	-	-	-	-	-	2	-	3	1	2
CO5	3	1	1	-	1	-	-	-	-	-	1	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Fine art and Music III/online certification course *
Course Code	BP309T

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Theory only							
Course Category	Generic Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Study of two-dimensional space and its organizational possibilities Study of three-dimensional space and its organizational possibilities**(BL2-Understand)** **CO2-** Study of three-dimensional space and its organizational possibilities**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✓ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	2-D Design: 2 3-D Design: 2	PBL	BL2-Understand	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25		20	10	5	2
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Organic Chemistry III
Course Code	BP401T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand the nomenclature, properties and methods of preparation of heterocyclic compounds.**(BL2-Understand)** **CO2-** To understand the fundamentals of stereo chemical aspects**(BL2-Understand)** **CO3-** To identify medicinal uses and other applications of organic compounds.**(BL3-Apply)** **CO4-** To explain stereo isomerism in biphenyl compounds and conditions for optical activity.**(BL1-Remember)** **CO5-** To elaborate the reactions and synthetic importance of metal hydride reduction (NaBH4 & LiAlH4), Clemmensen reduction, Oppenauer oxidation and Beckmann rearrangement.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Stereo isomerism Optical isomerism – Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers Reactions of chiral molecules Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute	WHITEBOARD	10
UNIT-II	Geometrical isomerism Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers. Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions	WHITEBOARD/PPT	10
UNIT-III	Heterocyclic compounds: Nomenclature and classification Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene	WHITEBOARD/PPT	10
UNIT-IV	Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives	WHITEBOARD/PPT	8
UNIT-V	Reactions of synthetic importance Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation	WHITEBOARD/PPT	7

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-IV	synthesis and medicinal uses pyrimidine	PBL		5

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

Books	1. Organic chemistry by I.L. Finar, Volume-I & II. 2. A text book of organic chemistry – Arun Bahl, B.S. Bahl. 3. Heterocyclic Chemistry by Raj K. Bansal
Articles	NA
References Books	1. Organic Chemistry by Morrison and Boyd 2. Heterocyclic Chemistry by T.L. Gilchrist
MOOC Courses	https://nptel.ac.in/
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	1	-	-	-	2	-	2	-	3	1	3
CO2	2	1	2	-	2	-	-	-	1	-	2	-	2	-	2
CO3	2	2	2	-	3	-	-	-	-	-	2	-	3	1	2
CO4	2	-	-	-	2	-	-	-	-	-	3	-	2	-	1
CO5	3	-	-	-	1	-	-	-	-	-	2	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Medicinal Chemistry I
Course Code	BP402T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the various classes of medicinal compounds**(BL1-Remember)** **CO2-** To explain the physicochemical properties, steric aspects of drugs and their metabolic pathways**(BL2-Understand)** **CO3-** To identify the structural requirements of drugs to elicit biological response**(BL4-Analyze)** **CO4-** To categorize the drugs based on their mechanism of action and clinical uses**(BL2-Understand)** **CO5-** To design and create the synthetic routes for medicinal compounds.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG12(Responsible consuption 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, Bioisosterism, 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, Phenoxybenzamine, 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*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine 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 Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital Miscelleneous: Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride. Ring Analogues of Phenothiazeines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine. Fluro buterophenones: Haloperidol, Droperidol, Risperidone. Beta amino ketones: Molindone hydrochloride. Benzamides: Sulpieride. C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*, Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione Succinimides: Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas: Phenacemide, Carbamazepine* Benzodiazepines: Clonazepam Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate	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 barbitutrates: Methohexital sodium*, Thiamylal 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**

Part E

Books	
Articles	NA
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia 4. Indian Pharmacopoeia
MOOC Courses	https://nptel.ac.in/
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	-	1	-	-	-	2	-	3	-	2	-	3
CO2	2	2	2	-	2	-	-	-	1	-	2	-	2	-	2
CO3	3	1	1	-	1	-	-	-	1	-	2	-	3	-	3
CO4	3	-	-	-	1	-	-	-	1	-	2	-	2	-	2
CO5	3	-	-	-	2	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Physical Pharmaceutics II
Course Code	BP403T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To introduce and categorize the dispersed systems and understand the properties and applications of colloidal dispersions.**(BL2-Understand)** **CO2-** To make the use of principles of kinetics in the stabilization of dosage forms.**(BL3-Apply)** **CO3-** To interpret the rheological behavior of fluids and illustrate the physics of tablet compression.**(BL2-Understand)** **CO4-** To determine the properties of powders and apply them in formulation development.**(BL4-Analyze)** **CO5-** To formulate and evaluate coarse dispersions making use of rheological and electrical properties.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization& protective action	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
UNIT-II	Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-III	Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	Micromeretics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-V	Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-III	PREPARATION OF EMULSIONS, SUSPENSIONS	Experiments	BL3-Apply	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		
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0	0			

Part E

Books	
Articles	1.Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc. 2. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc. 3. Physical Pharmaceutics by Ramasamy C, and Manavalan R.
References Books	
MOOC Courses	
Videos	https://nptel.ac.in/

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	1	-	-	-	2	-	3	-	1	2	1
CO2	2	2	2	-	-	-	-	-	1	-	2	-	2	2	2
CO3	3	3	3	-	2	-	-	-	1	-	2	-	3	1	3
CO4	3	1	1	1	1	-	-	-	1	-	2	-	2	1	2
CO5	2	1	2	1	1	-	-	-	1	-	3	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology I
Course Code	BP404T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To define the fundamental concepts of pharmacology and pharmacokinetics**(BL1-Remember)** **CO2-** To understand the basics of pharmacodynamics, adverse reactions, drug interactions and drug discovery**(BL2-Understand)** **CO3-** To identify the role of neurohumoral transmission and drugs acting on peripheral nervous system.**(BL4-Analyze)** **CO4-** To analyze the functions of neurotransmitters and drugs acting on central nervous system.**(BL4-Analyze)** **CO5-** To evaluate the pharmacology of Psychopharmacological agents.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	1.General Pharmacology a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists (competitive and non-competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs. Enzyme induction, enzyme inhibition, kinetics of elimination	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-II	General Pharmacology a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance. e. Introduction to Pharmacovigilance: History and development of Pharmacovigilance, Importance of safety monitoring of Medicine, Pharmacovigilance Program of India (PvPI), Adverse drug reactions: detection and Reporting	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-III	2.Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS. b. Neurohumoral transmission, co-transmission and classification of neurotransmitters. c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	3. Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board/PPT	8
UNIT-V	3.Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.	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	EVALUATION OF ANTIDEPRESSANT ACTIVITY	Simulation	BL5-Evaluate	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

Books	1.K.D. Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi. 2. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher 3. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan,
Articles	JOURNAL related to pharmacology
References Books	1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
MOOC Courses	https://www.mooc-list.com/tags/pharmacology
Videos	you tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3	-	1	3	-	-	2	-	2	-	1	1	1
CO2	2	2	2	-	-	2	-	-	1	-	3	-	1	1	2
CO3	3	3	3	-	2	3	-	-	2	-	2	-	-	1	1
CO4	2	3	2	-	3	1	-	-	1	-	2	-	1	1	1
CO5	1	2	1	-	2	1	-	-	1	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacognosy and Phytochemistry I
Course Code	BP405T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Basic understanding of plant taxonomy and physiology			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the history, scope and development of pharmacognosy**(BL1-Remember)** **CO2-** To remember different sources of crude drugs and also classify them accordingly.**(BL1-Remember)** **CO3-** To illustrate students about cultivation, collection, processing and storage of crude drugs.**(BL2-Understand)** **CO4-** To plan systematic pharmacognostic study of primary metabolites, ayurvedic drugs, marine drugs and teratogens.**(BL6-Create)** **CO5-** To analyze quality of crude drugs.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Introduction to Pharmacognosy: (a) Definition, history, scope and development of Pharmacognosy (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins). Classification of drugs: Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs Quality control of Drugs of Natural Origin: Adulteration of drugs of natural origin, Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties. Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-II	Cultivation, Collection, Processing and storage of drugs of natural origin: Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-III	Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
UNIT-IV	Pharmacognosy in various systems of medicine: Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine. Introduction to secondary metabolites: Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-V	Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs Plant Products: Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens, Natural allergens Primary metabolites: General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites: Carbohydrates: Acacia, Agar, Tragacanth, Honey Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin). Lipids (Waxes, fats, fixed oils): Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax Marine Drugs: Novel medicinal agents from marine sources	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	VISIT OF MEDICINAL GARDEN	Field work	BL4-Analyze	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**

Part E

Books	1.W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009. 2.Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988. 3. Text Book of Pharmacognosy by T.E. Wallis 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers& Distribution, New Delhi. 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi
Articles	https://phcogj.com/
References Books	1. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi. 2. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007 3. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae 4. Anatomy of Crude Drugs by M.A. Iyengar
MOOC Courses	https://nptel.ac.in/
Videos	YOUTUBE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	1	2	-	-	2	-	2	-	1	-	2
CO2	3	2	1	-	1	1	-	-	2	-	1	-	2	-	1
CO3	2	1	2	-	1	2	-	-	2	-	2	-	2	-	1
CO4	2	-	-	-	-	-	-	-	2	-	2	-	1	-	2
CO5	3	-	-	-	-	-	-	-	1	-	1	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Medicinal Chemistry I
Course Code	BP406P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the basic requirements for synthesis and assay of drugs**(BL1-Remember)** **CO2-** To explain the techniques involved in isolation and purification of drugs and intermediates**(BL2-Understand)** **CO3-** To synthesize, characterize and purify medicinal compounds and intermediates**(BL6-Create)** **CO4-** To analyze the selected drugs present in dosage forms and to determine the percentage purity**(BL4-Analyze)** **CO5-** To determine the physicochemical property of drugs and draw its importance**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preparation of drugs/ intermediates 1,3-pyrazole	Experiments	BL3-Apply	4
2	II Assay of drugs 1 Chlorpromazine 2 Phenobarbitone 3 Atropine 4 Ibuprofen 5 Aspirin 6 Furosemide	Experiments	BL3-Apply	4
3	2,3- diphenyl quinoxaline	Experiments	BL6-Create	4
4	Benzocaine and Barbiturate	Experiments	BL6-Create	4
5	Phenytoin	Experiments	BL6-Create	4
6	Phenothiazine	Experiments	BL6-Create	4
7	IIDetermination of Partition coefficient for any two drugs	Experiments	BL4-Analyze	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	i. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. ii. Foye's Principles of Medicinal Chemistry. iii. Burger's Medicinal Chemistry, Vol I to IV. iv. Introduction to principles of drug design- Smith and Williams. v. Remington's Pharmaceutical Sciences. vi. Martindale's extra pharmacopoeia.
Articles	https://benthamscience.com/public/journals/medicinal-chemistry
References Books	1 Organic Chemistry by I.L. Finar, Vol. II. 2. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5. 3. Indian Pharmacopoeia. 4. Text book of practical organic chemistry- A.I.Vogel.
MOOC Courses	https://swayam.gov.in/nc_details/NPTEL https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/results?search_query=kcl+channel

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	1	-	-	-	2	-	2	-	1	1	1
CO2	2	-	2	-	2	-	-	-	1	-	2	-	2	1	2
CO3	2	2	3	-	2	-	-	-	1	-	2	-	2	1	2
CO4	3	-	-	-	2	-	-	-	2	-	2	-	1	1	2
CO5	2	-	-	-	1	-	-	-	-	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Physical Pharmaceutics II
Course Code	BP407P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Lab safety manual			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To choose a good suspending agent to formulate a stable suspension.**(BL5-Evaluate)** **CO2-** To interpret the shelf life of a given formulation by accelerated stability studies.**(BL5-Evaluate)** **CO3-** To make use of derived and flow properties of powders to ensure a stable solid formulation.**(BL3-Apply)** **CO4-** To distinguish the rate constants as per the chemical reaction.**(BL2-Understand)** **CO5-** To determine the viscosity using Ostwald's and Brookfield's viscometer.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Determination of particle size, particle size distribution using sieving method 2. Determination of particle size, particle size distribution using Microscopic method	Experiments	BL2-Understand	8
2	3. Determination of bulk density, true density and porosity 4. Determine the angle of repose and influence of lubricant on angle of repose	Experiments	BL3-Apply	8
3	5. Determination of viscosity of liquid using Ostwald's viscometer 6. Determination sedimentation volume with effect of different suspending agent	Experiments	BL4-Analyze	8
4	7. Determination sedimentation volume with effect of different concentration of single suspending agent 8. Determination of viscosity of semisolid by using Brookfield viscometer	Experiments	BL4-Analyze	8
5	9. Determination of reaction rate constant first order. 10. Determination of reaction rate constant second order	Experiments	BL3-Apply	8
6	11. Accelerated stability studies	Experiments	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Physical Pharmacy by Alfred Martin, Sixth edition 2. Experimental pharmaceutics by Eugene, Parott. 3. Tutorial pharmacy by Cooper and Gunn. 4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia
Articles	https://benthamscience.com/public/journal/172
References Books	1. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc. 2. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc. 3.Physical Pharmaceutics by Ramasamy C, and Manavalan R.
MOOC Courses	https://swayam.gov.in/nc_details/NPTEL https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/results?search_query=kcl+channel

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	1	-	-	-	2	-	2	-	1	1	1
CO2	2	1	2	-	2	-	-	-	1	-	2	-	2	2	2
CO3	3	1	-	-	3	-	-	-	1	-	2	-	3	1	3
CO4	2	1	-	-	2	-	-	-	2	-	3	-	1	1	1
CO5	3	1	-	-	1	-	-	-	1	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology I
Course Code	BP408P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To learn about basic instruments, common laboratory animals used in experimental pharmacology and to organize animal house as per the CPCSEA guidelines.**(BL2-Understand)** **CO2-** To demonstrate the common laboratory techniques like routes of administration , blood withdrawal, anesthetics and euthanasia used for animal studies**(BL3-Apply)** **CO3-** To interpret the effects of various drugs on rabbit eye and ciliary motility of frog oesophagus in correlation with humans**(BL5-Evaluate)** **CO4-** To analyse the effect of drugs acting as enzyme inducers, skeletal muscle relaxants and affecting locomotor activity in laboratory animals**(BL4-Analyze)** **CO5-** To evaluate the stereotype and anticatatonic activity of drugs in rats/mice**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure) SDG17(Partnerships for the goals)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Introduction to experimental pharmacology. 2,3,4. Commonly used instruments in experimental pharmacology	Experiments	BL2-Understand	6
2	3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines	Experiments	BL2-Understand	8
3	5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats.	Experiments	BL4-Analyze	8
4	7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice. 8. Effect of drugs on ciliary motility of frog oesophagus	Experiments	BL4-Analyze	8
5	9. Effect of drugs on rabbit eye. 10. Effects of skeletal muscle relaxants using rota-rod apparatus	Experiments	BL2-Understand	8
6	11. Effect of drugs on locomotor activity using actophotometer. 12. Anticonvulsant effect of drugs by MES and PTZ method	Experiments	BL2-Understand	8
7	13. Study of stereotype and anti-catatonic activity of drugs on rats/mice	Experiments	BL4-Analyze	8
8	14. Study of anxiolytic activity of drugs using rats/mice. 15. Study of local anesthetics by different methods	Experiments	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics 4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins 5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
Articles	https://benthamscience.com/public/subject/123
References Books	1. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi. 2. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher 3. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert, 4. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata. 5. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan
MOOC Courses	https://swayam.gov.in/nc_details/NPTEL https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/results?search_query=kcl+channel

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	1	-	-	1	-	-	2	-	2	1	2
CO2	2	2	2	-	2	-	-	-	-	-	2	-	2	1	2
CO3	3	3	3	-	3	-	-	-	-	-	3	-	3	2	3
CO4	2	-	-	-	-	-	-	-	-	-	2	-	1	1	1
CO5	3	1	-	-	1	-	-	-	-	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacognosy and Phytochemistry I
Course Code	BP409P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Analysis of crude drugs by chemical tests: (i)Tragaccanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil	Experiments	BL2-Understand	4
2	2. Determination of stomatal number and index	Experiments	BL5-Evaluate	4
3	3. Determination of vein islet number, vein islet termination and paliside ratio	Experiments	BL2-Understand	4
4	4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer	Experiments	BL4-Analyze	4
5	5. Determination of Fiber length and width	Experiments	BL3-Apply	4
6	6. Determination of number of starch grains by Lycopodium spore method	Experiments	BL3-Apply	4
7	7. Determination of Ash value	Experiments	BL2-Understand	4
8	8. Determination of Extractive values of crude drugs	Experiments	BL4-Analyze	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009. 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988. 3. Text Book of Pharmacognosy by T.E. Wallis 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers& Distribution, New Delhi. 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
Articles	https://www.sciencedirect.com/journal/phytomedicine https://www.ajol.info/index.php/jopat https://www.phcogres.com/
References Books	1. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi. 2. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007 3. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae 4. Anatomy of Crude Drugs by M.A. Iyengar
MOOC Courses	
Videos	https://www.youtube.com/results?search_query=kcl+channel

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	-	1	-	-	-	1	-	3	-	1	-	1
CO2	3	2	2	-	2	-	-	-	2	-	2	-	2	1	2
CO3	2	1	3	-	3	-	-	-	1	-	2	-	3	-	1
CO4	3	1	-	-	-	-	-	-	1	-	2	-	1	1	1
CO5	3	1	-	-	-	-	-	-	1	-	2	-	1	1	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Fine art and Music IV/ online certification course *
Course Code	BP410T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Theory only							
Course Category	Generic Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To accquire knowledge about the clinical data mangement and its skills**(BL2-Understand)** **CO2-** To understand about CRF processing, and documentation forms**(BL2-Understand)** **CO3-** To develop skills to accquire Job oppurtunities**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25		20	10	5	2
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	
Articles	
References Books	
MOOC Courses	https://www.coursera.org/learn/clinical-data-management
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	-	-	-	-	-	-	2	-	1	-	-
CO2	1	1	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	1	-	-	-	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Medicinal Chemistry II
Course Code	BP501T

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the classification of drugs obtained by natural and synthetic route**(BL1-Remember)** **CO2-** To explain the biological targets for medicinal compounds**(BL2-Understand)** **CO3-** To apply the knowledge of biochemical processes to understand the mechanism of action and therapeutic uses of drugs**(BL3-Apply)** **CO4-** To understand the relationships between structure of compound and its activity**(BL2-Understand)** **CO5-** To choose the synthetic route for selected category of drugs**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
1	Antihistaminic agents: Histamine, receptors and their distribution in the human body H1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium H2-antagonists: Cimetidine*, Famotidine, Ranitidin. Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole Anti-neoplastic agents: Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin Plant products: Eloposide, Vinblastin sulphate, Vincristin sulphate Miscellaneous: Cisplatin, Mitotane.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
2.	Anti-anginal: Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine. Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide. Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride, * Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
3.	Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol. Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
4.	Drugs acting on Endocrine system Nomenclature, Stereochemistry and metabolism of steroids Sex hormones: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrone, Diethyl stilbestrol. Drugs for erectile dysfunction: Sildenafil, Tadalafil. Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
5.	Antidiabetic agents: Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose, Voglibose. Local Anesthetics: SAR of Local anesthetics Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Diperodon, Dibucaine.* Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate. Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride. Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.	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	3D Model making of Histamine Receptor	Games	BL2-Understand	5

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

Books	1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. 2. Foye's Principles of Medicinal Chemistry. 3. Burger's Medicinal Chemistry, Vol I to IV.
Articles	https://pubs.acs.org/journal/jmcmar
References Books	1. Burger's Medicinal Chemistry, Vol I to IV. 2. Introduction to principles of drug design- Smith and Williams. 3. Remington's Pharmaceutical Sciences.
MOOC Courses	https://nptel.ac.in/
Videos	You tube and others free resource

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	1	2	-	-	-	-	-	3	-	3	-	3
CO2	2	2	-	1	2	-	-	-	-	-	2	-	2	1	2
CO3	3	3	-	1	2	-	-	-	-	-	2	-	3	-	3
CO4	3	1	-	-	1	-	-	-	-	-	2	-	1	-	2
CO5	2	1	-	-	1	-	-	-	-	-	3	-	1	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Industrial Pharmacy I
Course Code	BP502T

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To outline the objectives and applications of pre-formulation studies in the development and stability of dosage forms.**(BL3-Apply)** **CO2-** To discuss the formulation, manufacturing, coating and quality control tests of tablets.**(BL2-Understand)** **CO3-** To review the formulation and manufacturing considerations of liquid orals.**(BL4-Analyze)** **CO4-** To illustrate the pharmaceutical aspects of capsules and pellets.**(BL2-Understand)** **CO5-** To describe the preparation and quality control of parenterals and ophthalmic preparations.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances. a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization BCS classification of drugs & its significant Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07
Unit-2	Tablets: a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling. b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating. c. Quality control tests: In process and finished product tests Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
Unit-3	Capsules: a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules. b. Soft gelatin capsules: Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications. Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
Unit-4	Parenteral Products: a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity b. Production procedure, production facilities and controls, aseptic processing c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products. d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products. Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
Unit-5	Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens. Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies. Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests. Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens. Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies. Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests. Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens. Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies. Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit-1	cosmetic preparations from commnely used herbs	Experiments	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**

Part E

Books	1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J.B.Schwartz 2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman 3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman 4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
Articles	https://www.fip.org/industrial-pharmacy
References Books	1. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) 2. Theory and Practice of Industrial Pharmacy by Liberman & Lachman 3. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill Livingstone, Latest edition 4. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5thedition, 2005
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=JKr6mtSEbEU&list=PLFpCrsN3l3fAHUyhDdQ39rGDKux3MvOtg

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	3	1	-	-	-	1	-	3	-	3	1	2
CO2	3	2	2	3	-	-	-	-	1	-	3	-	2	2	2
CO3	3	1	2	3	1	-	-	-	-	-	3	-	2	2	3
CO4	3	2	3	-	-	-	-	-	1	-	3	-	-	-	-
CO5	2	1	3	1	1	-	-	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology II
Course Code	BP503T

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To relate the relative pros and cons in the use of drugs for various cardiac complications.**(BL2-Understand)** **CO2-** To illustrate the drugs acting on hematopoietic system, shock diuretics and anti-diuretics.**(BL2-Understand)** **CO3-** To identify the role of autocoids and related drugs.**(BL3-Apply)** **CO4-** To analyze and summarize the drugs acting on endocrine system.**(BL4-Analyze)** **CO5-** To appraise the physiological role of sex hormones and to assess the effects of oral contraceptives and drugs acting on the uterus.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	**Contents**	**Pedagogy**	**Hours**
1	1. Pharmacology of drugs acting on cardio vascular system a. Introduction to hemodynamic and electrophysiology of heart. b. Drugs used in congestive heart failure c. Anti-hypertensive drugs. d. Anti-anginal drugs. e. Anti-arrhythmic drugs. f. Anti-hyperlipidemic drugs.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
2	1. Pharmacology of drugs acting on cardio vascular system a. Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders 2. Pharmacology of drugs acting on urinary system a. Diuretics b. Anti-diuretics.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
3	3. Autocoids and related drugs a. Introduction to autacoids and classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
4.	5. Pharmacology of drugs acting on endocrine system a. Basic concepts in endocrine pharmacology. b. Anterior Pituitary hormones-analogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors. d. Hormones regulating plasma calcium level-Parathormone, Calcitonin and Vitamin-D. d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
5	5. Pharmacology of drugs acting on endocrine system a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus. 6. Bioassay a. Principles and applications of bioassay. b. Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT	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	Poster making comptetion between students	Games	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**

Part E

Books	1.K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi. 2. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher 3. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert. 4. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata. 5. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakasha
Articles	1.Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology. 2. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
References Books	1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill. 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=pJ37dBfj670&list=PLOsge3l7t_CQDMZu32Y2a3xLT963Bn6YM

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	3	-	-	-	-	3	1	2	3	2
CO2	2	-	-	-	1	2	-	-	-	-	3	-	2	3	1
CO3	2	1	-	-	1	3	-	-	-	-	3	1	2	3	1-
CO4	2	1	-	-	2	3	-	-	-	-	3	-	2	3	2
CO5	3	-	-	-	1	2	-	-	-	-	2	1	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacognosy and Phytochemistry II
Course Code	BP504T

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To outline the metabolic pathway in higher plants and their biogenetic studies.**(BL1-Remember)** **CO2-** To the pharmacognistic study of secondary metabolites like alkaloids, glycosides, tannins, volatile oils etc.**(BL2-Understand)** **CO3-** To demonstrate the different types and steps involved in isolation, identification and analysis of Phytoconstituents like terpenoids, glycosides, alkaloids and resins.**(BL2-Understand)** **CO4-** To plan the industrial production, estimation and utilization of Phytoconstituents.**(BL6-Create)** **CO5-** To assess the crude drug by modern methods of extraction, spectroscopy, chromatography, isolation and purification.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Metabolic pathways in higher plants and their determination a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
2	General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites: Alkaloids: Vinca, Rauwolfia, Belladonna, Opium, Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander, Tannins: Catechu, Pterocarpus Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony Glycosides: Senna, Aloes, Bitter Almond Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	14
3	Isolation, Identification and Analysis of Phytoconstituents a) Terpenoids: Menthol, Citral, Artemisin b) Glycosides: Glycyrhetinic acid & Rutin c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine d) Resins: Podophyllotoxin, Curcumin	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	6
4	Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
5	Basics of Phytochemistry Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Extraction method of Given drugs	PBL	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

Books	1. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi. 2 Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
Articles	https://www.phytojournal.com/
References Books	1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009. 2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers& Distribution, New Delhi.
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=v1vqV7YHKWg&list=PLtEqsPSBZlXtxeljdkyrwrPiMHidHO7G6

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	1	-	-	-	3	-	2	2	3
CO2	2	2	-	-	-	-	-	-	-	-	3	-	2	1	2
CO3	3	2	-	-	-	-	-	-	-	-	2	-	1	1	1
CO4	2	1	1	-	-	-	1	-	-	-	2	-	-	-	1
CO5	2	-	-	-	-	-	-	-	-	-	1	-	1	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Jurisprudence
Course Code	BP505T

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To recall the pharmaceutical legislations, ethics, right to information, medical termination of pregnancy and intellectual property rights**(BL1-Remember)** **CO2-** To relate the significance of Drugs and cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs**(BL2-Understand)** **CO3-** To apply the knowledge on schedules pertaining to Drugs and cosmetics act 1940 and its rules 1945 and also administration of the act and rules**(BL3-Apply)** **CO4-** To understand the functions of pharmacy councils and implementation of education regulations in pharmacy**(BL2-Understand)** **CO5-** To appraise the importance of medicinal and toilet preparations act and narcotic drugs and psychotropic substances act and rules**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✓ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG10(Reduced inequalities) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
1	Drugs and Cosmetics Act, 1940 and its rules 1945: Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
2.	Drugs and Cosmetics Act, 1940 and its rules 1945. Detailed study of Schedule G, H, M, N, P, T, U, V, X, Y, Part XII B, Sch F & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties Labeling & packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, licensing authorities, controlling authorities, Drugs Inspectors	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
3.	Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties. Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
4	Study of Salient Features of Drugs and Magic Remedies Act and its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties Prevention of Cruelty to animals Act-1960: Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
5	Pharmaceutical Legislations – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee Code of Pharmaceutical ethics Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath Medical Termination of Pregnancy Act Right to Information Act Introduction to Intellectual Property Rights (IPR)	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	visit of Wholesale, Retail sale and Restricted license.	Field work	BL2-Understand	6

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

Books	1. A text book of Forensic Pharmacy by N.K. Jain 2. Drugs and Cosmetics Act/Rules by Govt. of India publications. 3. Medicinal and Toilet preparations act 1955 by Govt. of India publications
Articles	https://www.iptsalipur.org/wp-content/uploads/2020/08/BP505T-PJ-UNIT_III.pdf
References Books	1 Medicinal and Toilet preparations act 1955 by Govt. of India publications. 2. Narcotic drugs and psychotropic substances act by Govt. of India publications 3. Drugs and Magic Remedies act by Govt. of India publication 4. Bare Acts of the said laws published by Government. Reference books (Theory
MOOC Courses	https://nptel.ac.in/
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	3	-	-	-	-	-	2	3
CO2	-	-	-	-	-	-	-	3	-	1	-	-	1	2	2
CO3	-	-	-	-	-	-	-	3	-	-	-	-	1	2	-
CO4	-	-	-	-	-	-	-	3	-	1	-	-	-	-	3
CO5	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Industrial Pharmacy I
Course Code	BP506P

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To interpret the pre-formulation studies on drugs.**(BL2-Understand)** **CO2-** To explain the preparation, evaluation and coating of tablets.**(BL2-Understand)** **CO3-** To design parenteral and ophthalmic products.**(BL6-Create)** **CO4-** To illustrate the formulation and evaluation of capsules.**(BL5-Evaluate)** **CO5-** To evaluate glass containers as per pharmacopeial specifications.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Preformulation studies on paracetamol/aspirin/or any other drug 2. Preparation and evaluation of Paracetamol tablets	Experiments	BL3-Apply	8
2	3. Preparation and evaluation of Aspirin tablets 4. Coating of tablets- film coating of tables/granules	Experiments	BL4-Analyze	8
3	5. Preparation and evaluation of Tetracycline capsules 6. Preparation of Calcium Gluconate injection	Experiments	BL3-Apply	8
4	7. Preparation of Ascorbic Acid injection 8. Quality control test of (as per IP) marketed tablets and capsules	Experiments	BL3-Apply	8
5	9. Preparation of Eye drops/ and Eye ointments 10. Preparation of Creams (cold / vanishing cream)	Experiments	BL3-Apply	8
6	11. Evaluation of Glass containers (as per IP)	Experiments	BL5-Evaluate	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman 4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition 5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
Articles	NA
References Books	1. Theory and Practice of Industrial Pharmacy by Liberman & Lachman 2. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill Livingstone, Latest edition
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	-	-	-	-	-	-	3	-	1	3	3
CO2	2	2	3	1	-	-	-	-	-	-	3	-	1	2	3
CO3	3	1	3	-	-	-	-	-	-	-	3	-	3	-	2
CO4	3	1	1	1	-	-	-	-	-	-	3	-	2	-	2
CO5	3	1	2	1	-	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology II
Course Code	BP507P

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To learn the importance of physiological salt solutions and to identify the effect of various drugs on isolated frog heart, blood pressure and heart rate of dog.**(BL1-Remember)** **CO2-** To illustrate the diuretic activity of drugs in mice/rats**(BL3-Apply)** **CO3-** To identify the dose response relationship, effect of drugs on DRC and to construct the drug concentrations by various bioassay methods using animal simulator software.**(BL4-Analyze)** **CO4-** To categorize the PA2 and PD2 value of drugs using rat anococcygeus muscle and guinea pig ileum.**(BL2-Understand)** **CO5-** To interpret the effect of spasmogens and spasmolytics using rabbit jejunum.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Introduction to in-vitro pharmacology and physiological salt solutions. 2. Effect of drugs on isolated frog heart	Experiments	BL3-Apply	8
2	3. Effect of drugs on blood pressure and heart rate of dog. 4. Study of diuretic activity of drugs using rats/mice	Experiments	BL5-Evaluate	8
4	5. DRC of acetylcholine using frog rectus abdominis muscle. 6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.	Experiments	BL3-Apply	8
5	7. Bioassay of histamine using guinea pig ileum by matching method. 8. Bioassay of oxytocin using rat uterine horn by interpolation method.	Experiments	BL3-Apply	8
6	9. Bioassay of serotonin using rat fundus strip by three-point bioassay. 10. Bioassay of acetylcholine using rat ileum/colon by four-point bioassay	Experiments	BL4-Analyze	8
7	11. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method). 12. Determination of PD2 value using guinea pig ileum	Experiments	BL3-Apply	8
8	13. Effect of spasmogens and spasmolytics using rabbit jejunum. 14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.	Experiments	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata. 2. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan
Articles	NA
References Books	1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	-	2	3	-	--	-	-	3	-	1	2	3
CO2	2	1	-	-	1	3	-	-	-	-	3	-	1	2	2
CO3	3	2	-	-	3	3	-	-	-	-	3	-	-	-	2
CO4	2	-	-	-	2	2	-	-	-	-	3	-	-	-	2
CO5	3	-	-	-	2	2	-	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacognosy and Phytochemistry II
Course Code	BP508P

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the wide variety of the crude drugs and their sources by morphological characteristics.**(BL1-Remember)** **CO2-** To identify the powder mixture and to report the types of adulterants and substituents present.**(BL4-Analyze)** **CO3-** To analyze and evaluate the powdered crude drug samples by morphological and microscopical characteristics.**(BL4-Analyze)** **CO4-** To isolate the drug from the given crude drug sample.**(BL6-Create)** **CO5-** To predict the crude drug by performing chromatographic techniques.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander	Experiments	BL2-Understand	8
3	3. Separation of sugars by Paper chromatography	Experiments	BL2-Understand	8
4	4. TLC of herbal extract	Experiments	BL3-Apply	8
5	5. Distillation of volatile oils and detection of phytoconstituents by TLC	Experiments	BL5-Evaluate	8
6	6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh	PBL		8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1.W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009. 2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers& Distribution, New Delhi. 3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi. 4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4204033/#:~:text=Pharmacognosy%20deals%20with%20the%20natural,model%20molecules%20in%20drug%20discovery.
References Books	5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007 6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi. 7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
MOOC Courses	NA
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	1	-	-	-	3	-	2	2	1
CO2	2	-	-	-	-	-	1	-	-	-	3	-	1	2	2
CO3	3	-	-	-	-	-	1	-	-	-	3	-	-	-	2
CO4	2	-	-	-	-	-	-	-	-	-	3	-	2	-	1
CO5	2	-	-	-	-	-	1	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Online certified courses related to Pharmacy I *
Course Code	BP509ET

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**						

Part B

Modules	**Contents**	**Pedagogy**	**Hours**

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	20	20	5	0	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	3	1	-	-	2
CO2	2	2	2	1	-	-	-	-	-	-	2	1	1	1	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	International Regulatory Requirements for Good Manufacturing Practices
Course Code	BP510ET

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG12(Responsible consuption and production) SDG16(Peace Justice and strong institutions)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	https://iris.who.int/bitstream/handle/10665/64465/WHO_VSQ_97.01-eng.pdf?sequence=1&isAllowed=y
Articles	https://www.fda.gov/drugs/pharmaceutical-quality-resources/current-good-manufacturing-practice-cgmp-regulations, CDER-OPQ-Inquiries@fda.hhs.gov
References Books	https://iris.who.int/bitstream/handle/10665/64465/WHO_VSQ_97.01-eng.pdf?sequence=1&isAllowed=y
MOOC Courses	https://www.itsligo.ie/courses/higher-certificate-in-science-in-good-manufacturing-practice-gmp/
Videos	https://www.youtube.com/watch?v=mFwA2KTiPwlhttps://www.youtube.com/watch?v=mFwA2KTiPwI

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	3	1	1	1	1
CO2	2	1	1	1	1	-	-	-	-	-	2	1	1	1	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Product Development
Course Code	BP511ET

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Evaluation of suspending and emulsifying agent	Experiments		

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

Books	1. Pharmaceutical Statistics Practical and Clinical Applications by Stanford Bolton, Charles Bon; Marcel Dekker Inc.
Articles	https://www.ema.europa.eu/en/documents/scientific-guideline/note-guidance-pharmaceutical-development_en.pdf
References Books	3. Pharmaceutical Dosage Forms – Tablets Vol 1 to 3, A. Liberman, Leon Lachman andJoseph B. Schwartz
MOOC Courses	https://www.coursera.org/courses?query=pharmaceutical
Videos	https://www.youtube.com/watch?v=sesDthMPRC0&list=PLkxD16eG21tVre8GBj-LbjfUUuq1qghVM

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	1	-	-	-	-	-	3	-	2	1	1
CO2	2	2	1	1	1	-	-	-	-	-	1	-	1	1	1
CO3	3	1	2	1	1	-	-	-	-	-	3	-	2	2	2
CO4	2	1	2	1	1	-	-	-	-	-	1	-	1	1	1
CO5	1	1	2	2	1	-	-	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Purification of Pharmaceutical Compounds
Course Code	BP512ET

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	https://crescent.education/wp-content/uploads/2021/06/Pharmaceutical-Organic-Chemistry.pdf
Articles	https://www.mdpi.com/books/reprint/8083-extraction-and-purification-of-bioactive-compounds
References Books	https://crescent.education/wp-content/uploads/2021/06/Pharmaceutical-Organic-Chemistry.pdf
MOOC Courses	NA
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	3	-	1	1	1
CO2	2	2	2	1	-	-	-	-	-	-	3	2	-	1	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Introduction to intellectual property rights
Course Code	BP513ET

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	patent drafting and filing	Case Study	BL3-Apply	5

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

Books	Cockburn IM. Intellectual property rights and pharmaceuticals: challenges and opportunities for economic research. The economics of intellectual property. 2009 Jan:150.
Articles	Savale SK, Savale VK. Intellectual property rights (IPR). World J Pharm Pharm Sci. 2016 Apr 22;5:2559-92.
References Books	Prabu SL, Tnk S, editors. Intellectual property rights. BoD–Books on Demand; 2017 Jun 21.
MOOC Courses	NEPTEL
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	1	-	-	-	3	-	2	3	-	1	1	1
CO2	-	1	-	-	-	-	-	3	-	-	2	-	1	-	1
CO3	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Medicinal Chemistry III
Course Code	BP601T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Pharmacophore modeling and docking	Experiments	BL2-Understand	6

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

Books	1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. 2. Foye's Principles of Medicinal Chemistry. 3. Burger's Medicinal Chemistry, Vol I to IV.
Articles	https://pubs.acs.org/journal/jmcmar
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia
MOOC Courses	https://nptel.ac.in/
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	-	-	-	-	-	3	-	1	2	3-
CO2	2	3	-	-	1	-	-	-	-	-	2	-	1	2	3
CO3	3	2	-	-	2	-	-	-	-	-	2	-	1	2	3
CO4	3	2	-	1	2	-	-	-	-	1	3	1	1	1	1
CO5	2	2	-	1	1	-	-	-	-	1	1	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology III
Course Code	BP602T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit-1	SWISS ADME TOOL HANDLING	Simulation	BL3-Apply	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	75	37	25	13
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
Articles	https://www.frontiersin.org/journals/pharmacology/article
References Books	1. Goodman and Gilman's, The Pharmacological Basis of Therapeutics 2. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins 3. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology 4. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
MOOC Courses	https://nptel.ac.in/
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	2	-	-	-	-	3	-	1	2	2
CO2	2	2	-	-	-	1	-	-	-	-	3	-	1	2	3
CO3	1	2	-	-	1	1	-	-	-	-	2	-	1	2	2
CO4	3	1	-	-	-	1	-	-	-	-	2	-	-	-	3
CO5	3	1	-	-	1	1	-	-	-	-	2	-	2	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Herbal Drug Technology
Course Code	BP603T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	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 consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

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

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

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	2	-	-	-	3	-	1	2	2
CO2	3	2	-	-	-	-	2	-	-	-	3	-	1	2	2
CO3	1	2	-	-	-	-	2	-	-	-	3	-	1	2	2
CO4	2	2	-	-	-	-	1	-	-	-	2	-	2	-	1
CO5	3	2	-	-	-	-	1	-	-	-	2	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Biopharmaceutics and Pharmacokinetics
Course Code	BP604T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	in-vitro drug dissolution models,	PBL	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

Books	1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi. 2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
Articles	https://onlinelibrary.wiley.com/journal/1099081x
References Books	3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall International edition. USA 4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Delhi 5. Pharmacokinetics: By Milo Gibaldi Donald, R. Mercel Dekker Inc.
MOOC Courses	https://nptel.ac.in/
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	3	-	3	2	3
CO2	3	2	2	1	2	-	-	-	-	-	3	-	1	-	3
CO3	2	2	1	-	2	-	-	-	-	-	3	-	1	2	-
CO4	2	3	1	1	2	-	-	-	-	-	3	-	1	1	1
CO5	3	1	2	1	2	-	-	-	-	-	2	1	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmaceutical Biotechnology
Course Code	BP605T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	DNA ISOLATION FROM ONION	Experiments	BL2-Understand	4

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

Books	1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: ASM Press Washington D.C. 2. RA Goldshy et. al., Kuby Immunology.
Articles	https://pdf.sciencedirectassets.com/272281/1-s2.0-S1369702101X80012/1
References Books	3. J.W. Goding: Monoclonal Antibodies. 4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal Society of Chemistry.
MOOC Courses	https://nptel.ac.in/
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	3	-	1	2	2
CO2	2	2	-	1	-	-	-	-	-	-	3	-	1	2	2
CO3	2	2	-	-	-	-	-	-	-	-	2	-	1	2	2
CO4	3	1	-	-	-	-	-	-	-	-	3	-	1	1	2
CO5	3	2	-	1	-	1	-	-	-	-	2	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Quality Assurance
Course Code	BP606T

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Calibration of pH meter	Experiments	BL2-Understand	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	75	38	15	13
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1. Quality Assurance Guide by organization of Pharmaceutical Products of India. 2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69. 3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3088954/
References Books	4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh 5. How to Practice GMP's – P P Sharma. 6. ISO 9000 and Total Quality Management – Sadhank G Ghosh 7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
MOOC Courses	https://nptel.ac.in/
Videos	kcl tutorial

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	1	2	-	-	-	-	-	3	-	1	2	1
CO2	1	2	-	1	2	-	-	-	-	-	3	-	1	2	1
CO3	2	2	-	1	2	-	-	-	-	-	3	-	1	-1	3
CO4	3	1	-	1	2	-	-	-	-	-	3	-	1	-	2
CO5	2	1	-	1	1	-	-	-	-	-	2	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Medicinal Chemistry III
Course Code	BP607P

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I Preparation of drugs and intermediates 1 Sulphanilamide 2 7-Hydroxy, 4-methyl coumarin 3 Chlorobutanol 4 Triphenyl imidazole 5 Tolbutamide 6 Hexamine	Experiments	BL3-Apply	9
2	II Assay of drugs 1 Isonicotinic acid hydrazide 2 Chloroquine 3 Metronidazole 4 Dapsone 5 Chlorpheniramine maleate 6 Benzyl penicillin	Experiments	BL6-Create	8
3	III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique	Experiments	BL3-Apply	8
4	IV Drawing structures and reactions using chem draw®	Experiments	BL4-Analyze	8
5	V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies ROS)	Experiments	BL5-Evaluate	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. 2. Foye's Principles of Medicinal Chemistry. 3. Burger's Medicinal Chemistry, Vol I to IV.
Articles	https://pubs.acs.org/journal/jmcmar
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia.
MOOC Courses	https://nptel.ac.in/
Videos	Pharmacy India

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	-	-	3	-	1	2	1
CO2	3	2	-	3	1	-	-	-	-	-	2	-	1	2	2
CO3	2	1	-	2	2	-	-	-	-	-	3	-	1	2	2
CO4	2	2	-	1	1	-	-	-	-	-	2	-	-	-	2
CO5	3	1	-	1	1	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacology III
Course Code	BP608P

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Dose calculation in pharmacological experiments 2. Antiallergic activity by mast cell stabilization assay	Experiments	BL2-Understand	8
2	3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model. 4. Study of effect of drugs on gastrointestinal motility	Experiments	BL4-Analyze	8
3	5. Effect of agonist and antagonists on guinea pig ileum 6. Estimation of serum biochemical parameters by using semi- autoanalyzer	Experiments	BL2-Understand	8
4	7. Effect of saline purgative on frog intestine 8. Insulin hypoglycemic effect in rabbit	Experiments	BL3-Apply	8
5	9. Test for pyrogens (rabbit method) 10. Determination of acute oral toxicity (LD50) of a drug from a given data	Experiments	BL3-Apply	8
6	11. Determination of acute skin irritation / corrosion of a test substance 12. Determination of acute eye irritation / corrosion of a test substance	Experiments	BL2-Understand	8
7	13. Calculation of pharmacokinetic parameters from a given data 14. Biostatistics methods in experimental pharmacology (student's t test, ANOVA)	Experiments	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
Articles	https://www.sciencedirect.com/science/article/abs/pii/S0163725804001718
References Books	1.Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins 2. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology
MOOC Courses	https://nptel.ac.in/
Videos	Pharmacy india

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	3	-	-	-	-	2	-	1	2	2
CO2	3	1	-	-	-	3	-	-	-	-	3	-	1	2	1
CO3	3	2	-	-	-	2	-	-	-	-	3	-	1	2	1
CO4	2	1	-	-	-	2	-	-	-	-	2	-	-	-	1
CO5	3	2	-	-	-	2	-	-	-	-	1	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Herbal Drug Technology
Course Code	BP609P

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. To perform preliminary phytochemical screening of crude drugs. 2. Determination of the alcohol content of Asava and Arista	Experiments	BL3-Apply	12
2	3. Evaluation of excipients of natural origin 4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.	Experiments	BL5-Evaluate	12
3	5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements. 6. Monograph analysis of herbal drugs from recent Pharmacopoeias	Experiments	BL5-Evaluate	12
4	7. Determination of Aldehyde content 8. Determination of Phenol content 9. Determination of total alkaloids	Experiments	BL4-Analyze	12

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8

Part E

Books	1. Textbook of Pharmacognosy by Trease &Evans. 2. Textbook of Pharmacognosy byTyler, Brady & Robber. 3. Pharmacognosy by Kokate, Purohit and Gokhale
Articles	https://www.researchgate.net/publication/8914668_Herbal_medicine_Current_status_and_the_future
References Books	5. Pharmacognosy & Phytochemistry by V.D.Rangari 6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy) 7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
MOOC Courses	https://nptel.ac.in/
Videos	Pharmacy India

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	-	-	-	-	-	-	-	1	2	-
CO2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	1
CO3	1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	2	1	1	-	-	-	-	-	-	-	-	1	2	1
CO5	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Artificial intelligence in Pharmaceutical
Course Code	BP611ET

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

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

Books	Harrer S, Menard J, Rivers M, Green DV, Karpiak J, Jeliazkov JR, Shapovalov MV, del Alamo D, Sternke MC. Artificial intelligence drives the digital transformation of pharma. InArtificial Intelligence in Clinical Practice 2024 Jan 1 (pp. 345-372). Academic Press.
Articles	Patel J, Patel D, Meshram D. Artificial Intelligence in Pharma Industry-A Rising Concept. Journal of Advancement in Pharmacognosy. 2021;1(2).
References Books	Bhupathyraaj M, Rani KR, Essa MM, editors. Artificial Intelligence in Pharmaceutical Sciences. CRC Press; 2023 Nov 23.
MOOC Courses	Udemy, coursera, NEPTEL
Videos	YOU TUBE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	2	3	-	-	-	-	-	3	-	1	1	2
CO2	2	2	1	-	1	-	-	-	-	-	2	2	1	1	1
CO3	2	3	1	1	1	-	-	-	-	-	1	1	1	1	1
CO4	1	2	1	1	1	-	-	-	-	-	1	1	1	1	1
CO5	1	1	1	1	-	-	-	-	-	-	-	1	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Good Manufacturing in Pharma
Course Code	BP612ET

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

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

Books	Karmacharya JB. Good manufacturing practices (GMP) for medicinal products. Promising Pharmaceuticals. 2014;101.
Articles	Patel KT, Chotai NP. Pharmaceutical GMP: past, present, and future–a review. Die Pharmazie-An International Journal of Pharmaceutical Sciences. 2008 Apr 1;63(4):251-5.
References Books	Durivage MA, editor. The Certified Pharmaceutical GMP Professional Handbook. Quality Press; 2016 May 23.
MOOC Courses	UDEMY, COURSERA, PHARMASTATE ACADEMY
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	1	2	-	2	2	1	-	3	-	1	1	1
CO2	2	2	-	1	3	-	2	1	1	-	2	-	1	1	1
CO3	1	1	-	1	1	-	1	1	1	-	1	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Industrial Pharmacy II
Course Code	BP702T

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	1	-1	3
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Regulatory requirements and approval	Case Study	BL3-Apply	5

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

Books	1. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php 2. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
Articles	5. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http,//en.wikipedia.org/wiki/Regulatory_ Affairs. 6. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php
References Books	3. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php 4.Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
MOOC Courses	https://nptel.ac.in/ https://www.udemy.com/course/certificate-course-in-drug-regulatory-affairs-dra/?--=&utm_source=adwords&utm_medium=udemyads&utm_campaign=LongTail_la.EN_cc.INDIA&utm_content=deal4584&utm_term=_._ag_118445032537_._ad_618853564450_._kw_._de_c_._dm_._pl_._ti_dsa-1212271230479_._li_1007795_._pd_._._&matchtype=&gad_source=1&gclid=CjwKCAjwt-OwBhBnEiwAgwzrUvsaJ5SOVDqVcWySo7cw5sJ-Zb7x2IEpdRy076MNp3jNtdJKIlZ7ORoCu2YQAvD_BwE&couponCode=IND21PM
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	-	-	-	-	-	3	-	3	2	1
CO2	3	3	1	-	-	-	-	-	-	-	3	-	3	2	1
CO3	2	2	1	1	-	-	2	-	-	-	3	-	3	2	1
CO4	3	1	1	-	-	-	-	-	-	-	2	-	3	2	1
CO5	2	3	3	-	-	-	-	-	-	-	2	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Novel Drug Delivery System
Course Code	BP704T

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To make model of disintegration	Simulation	BL3-Apply	5

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

Books	1. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001). 2. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.
Articles	1.Indian Journal of Pharmaceutical Sciences (IPA) 2.Indian Drugs (IDMA) 3. Journal of Controlled Release (Elsevier Sciences) 4. Drug Development and Industrial Pharmacy (Marcel & Decker) 5. International Journal of Pharmaceutics (Elsevier Sciences
References Books	1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
MOOC Courses	https://nptel.ac.in/
Videos	you tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	-	3	-	-	-	-	-	3	-	2	1	1
CO2	2	1	2	-	2	-	-	-	-	-	3	-	2	2	2
CO3	3	2	2	1	2	-	-	-	-	-	3	-	2	1	1
CO4	2	1	3	-	2	-	-	-	-	-	3	-	1	1	1
CO5	2	1	1	1	1	-	-	-	-	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Instrumental Methods of Analysis
Course Code	BP705P

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Theory of Respective Experiments			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds 2 Estimation of dextrose by colorimetry	Experiments	BL2-Understand	8
2	3 Estimation of sulfanilamide by colorimetry 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy	Experiments	BL4-Analyze	8
3	5 Assay of paracetamol by UV- Spectrophotometry 6 Estimation of quinine sulfate by fluorimetry	Experiments	BL4-Analyze	8
4	7 Study of quenching of fluorescence 8 Determination of sodium by flame photometry	Experiments	BL4-Analyze	8
5	9 Determination of potassium by flame photometry 10 Determination of chlorides and sulphates by nephelo-turbidometry	Experiments	BL4-Analyze	8
6	11 Separation of amino acids by paper chromatography 12 Separation of sugars by thin layer chromatography	Experiments	BL3-Apply	8
7	13 Separation of plant pigments by column chromatography 14 Demonstration experiment on HPLC	Experiments	BL3-Apply	8
8	15 Demonstration experiment on Gas Chromatography	PBL	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1.Vogel's Textbook of Quantitative Chemical Analysis by A.I. Vogel 2. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
Articles	NA
References Books	1. Organic Chemistry by I. L. Finar 2. Organic spectroscopy by William Kemp 3. Quantitative Analysis of Drugs by D. C. Garrett
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	1	-	1	-	-	-	3	-	1	1	1
CO2	3	1	2	1	1	-	1	-	-	-	3	-	1	1	1
CO3	2	2	2	1	1	-	1	-	-	-	3	-	1	1	1
CO4	2	1	3	1	1	-	1	-	-	-	2	-	1	2	1
CO5	2	1	1	2	1	-	-	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Practice School *
Course Code	BP706PS

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	6	6
Course Type	Project							
Course Category	Discipline Core							
Pre-Requisite/s	In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt for any one of the domains for practice school declared by the program committee from time to time.			**Co-Requisite/s**	every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at the college level and grade points shall be awarded.			
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professonal Ethics ✕ Gender ✓ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	**Contents**	**Pedagogy**	**Hours**

Part C

Modules	**Title**	**Indicative-ABCA/PBL/ Experiments/Field work/ Internships**	**Bloom's Level**	**Hours**
1	Practice School	Field work		5

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0	0			
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
150	75	100	50	50	25

Part E

Books	Please refer Library and Internet
Articles	Refer to the Library and Internet
References Books	Please refer Library and Internet
MOOC Courses	NA
Videos	Refer Library and Internet, NPTEL, YOU TUBE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	1	1	1	2	2	-	-	3	-	2	1	1
CO2	2	-	1	1	-	-	-	-	-	-	2	-	1	1	1
CO3	1	-	1	-	1	-	-	-	-	-	2	-	-	1	1
CO4	1	1	1	1	1	-	-	-	-	-	3	-	-	1	1
CO5	3	-	1	1	-	-	-	-	1	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Biostatistics and Research Methodology
Course Code	BP801T

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs **(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	hands on practical of MS Excel and SPSS	Simulation	BL2-Understand	3

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-4	High Performance Liquid chromatography	PBL	BL4-Analyze	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**

Part E

Books	1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork. 2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
Articles	datatab.net https://www.ijdrt.com/articles/biostatistics--research-methodology-with-an-overview-on-clinical-research.pdf
References Books	1. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam, 2. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery
MOOC Courses	https://nptel.ac.in/ datatab.net
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	3	1	-	-	-	-	2	-	2	1	1
CO2	2	1	1	2	3	1	-	-	-	-	2	-	1	1	1
CO3	3	1	1	1	3	1	-	-	-	-	2	-	1	1	1
CO4	2	1	1	1	3	1	-	-	-	-	1	-	-	1	2
CO5	2	1	1	2	3	1	-	-	-	-	1	-	1	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharma Marketing Management
Course Code	BP803ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Market survey about drugs, OTC, Antibiotic etc	PBL	BL5-Evaluate	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**

Part E

Books	1.Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi 2.Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC Graw Hill, New Delhi.
Articles	NA
References Books	1. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India 2. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition) 3. Ramaswamy, U.S & Nanakamari, S: Marketing Management: Global Perspective, Indian Context, Macmilan India, New Delhi.
MOOC Courses	https://nptel.ac.in/ https://www.udemy.com/course/pharmaceutical-sales-and-marketing/
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	2	1	1	-	2	1	-	2	1	1
CO2	2	2	1	-	1	2	1	1	-	1	1	-	1	1	1
CO3	3	1	1	-	1	2	1	1	-	2	1	-	1	1	1
CO4	3	1	2	-	1	1	1	1	-	1	2	-	1	1	1
CO5	2	2	1	-	1	2	1	1	-	2	1	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Pharmacovigilance
Course Code	BP805ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG4(Quality education) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	ADR Reporting procedure in ITM hospital	PBL	BL3-Apply	5

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

Books	1.Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers. 2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers. 3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers. 4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
Articles	12.http://www.whoumc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn 3=7297 13. http://www.ich.org/ 14. http://www.cioms.ch/ 15. http://cdsco.nic.in/ 16. http://www.who.int/vaccine_safety/en/ 17. http://www.ipc.gov.in/PvPI/pv_home.html
References Books	8.A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen,Milap C. Nahata 9. National Formulary of India 10. Text Book of Medicine by Yashpal Munjal 11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna
MOOC Courses	https://nptel.ac.in/
Videos	Refer You tube and other lectures

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	1	-	2	3	2	2	-	-	-	-	1	2	1
CO2	-	2	1	-	1	2	2	1	-	-	-	-	1	1	1
CO3	-	1	1	-	2	2	2	1	-	-	-	-	1	1	2
CO4	-	1	1	-	1	2	2	1	-	-	-	-	1	1	1
CO5	-	1	1	-	2	2	1	2	-	-	-	-	1	-	-1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Quality Control and Standardization of Herbals
Course Code	BP806ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	TLC preparation and determination of various crude drug	Experiments	BL4-Analyze	5

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

Books	1. Pharmacognosy by Trease and Evans 2. Pharmacognosy by Kokate, Purohit and Gokhale 3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006. 4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002. 5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
Articles	9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981. 10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999. 11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005. 12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.
References Books	6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002. 7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8. 8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
MOOC Courses	https://nptel.ac.in/
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	1	1	-	-	-	-	-	2	-	1	1	1
CO2	2	2	3	1	1	-	-	-	-	-	2	-	1	1	1
CO3	1	1	2	1	1	-	-	-	-	-	1	-	1	1	1
CO4	1	1	1	1	1	-	--	-	-	-	2	-	1	2	-
CO5	1	1	1	1	-	-	-	-	-	-	1	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Computer Aided Drug Design
Course Code	BP807ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	CADD Workshop and drug design	Experiments	BL3-Apply	4

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

Books	1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore. 2. Martin YC. "Quantitative Drug Design" Dekker, New York. 3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York. 4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger. 5. Koro Ikovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5248982/
References Books	6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York. 7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press. 8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston. 9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York
MOOC Courses	https://nptel.ac.in/
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	1	1	-	-	1	1	2	-	1	1	2
CO2	1	2	1	-	2	1	-	-	1	2	2	-	1	1	-
CO3	1	2	1	-	1	1	-	-	-	-	1	-	1	2	2
CO4	1	2	1	-	2	-	-	-	1	1	2	-	1	2	1
CO5	1	2	1	-	1	1	-	-	-	1	1	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Cosmetic Science
Course Code	BP809ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Preapartion of some cosmetics	Experiments	BL3-Apply	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**

Part E

Books	1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin. 2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi. 3) Text book of cosmelicology by Sanju Nanda & Roop K. Khar, Tata Publishers.
Articles	International Journal of Cosmetic Science
References Books	1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin. 2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi. 3) Text book of cosmelicology by Sanju Nanda & Roop K. Khar, Tata Publishers.
MOOC Courses	https://nptel.ac.in/
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	3	-	-	-	-	1	-	1	-	2	1	1
CO2	1	1	1	2	-	-	-	-	1	-	2	-	1	1	1
CO3	1	1	-	1	-	-	-	-	-	-	2	-	-	1	-
CO4	1	1	1	-	1	-	-	-	-	-	1	-	-	1	1
CO5	1	1	1	-	1	-	-	-	1	-	1	-	-	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Experimental Pharmacology
Course Code	BP810ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	ANOVA Using SPSS/Graph Pad	Simulation	BL3-Apply	3

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

Books	1. Fundamentals of experimental Pharmacology-by M.N.Ghosh 2. Hand book of Experimental Pharmacology-S.K.Kulakarni 3. CPCSEA guidelines for laboratory animal facility.
Articles	https://www.sciencedirect.com/book/9781483232669/screening-methods-in-pharmacology
References Books	4. Drug discovery and Evaluation by Vogel H.G. 5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta 6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard
MOOC Courses	https://nptel.ac.in
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	1	-	-	-	-	2	-	3	1	2
CO2	2	1	1	-	2	1	-	-	-	-	1	-	3	1	2
CO3	2	1	1	-	2	-	-	-	-	-	1	-	3	1	2
CO4	2	1	1	-	-	1	-	-	-	-	2	-	3	1	2
CO5	2	1	1	-	2	-	-	-	-	-	1	-	3	1	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BPharm

Title of the Course	Advanced Instrumentation Techniques
Course Code	BP811ET

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG15(Life on land) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	standard curve using UV	Experiments	BL3-Apply	4

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

Books	1. Instrumental Methods of Chemical Analysis by B.K Sharma 2. Organic spectroscopy by Y.R Sharma 3. Text book of Pharmaceutical Analysis by Kenneth A. Connors 4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
Articles	https://www.researchgate.net/publication/327751681_Advanced_Instrumentation_and_Its_Uses
References Books	6. Organic Chemistry by I. L. Finar 7. Organic spectroscopy by William Kemp 8. Quantitative Analysis of Drugs by D. C. Garrett 9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
MOOC Courses	https://nptel.ac.in/courses/104106122
Videos	https://www.youtube.com/watch?v=ZMtH-xO2Fv0&list=PL-IQezHLOAj4q6tsVPE1ApKVX3np5wltK

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	1	1	-	-	-	1	-	2	-	1	2	2
CO2	2	-	2	-	-	-	-	-	2	-	1	-	1	1	1
CO3	2	-	2	1	1	-	-	-	1	-	2	-	1	-	1
CO4	2	1	2	1	1	-	-	1	1	-	1	-	2	1	2
CO5	3	-	2	2	2	-	-	-	1	1	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Regulatory Affairs
Course Code	MPH 104T

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-III	prepare regulatory guidelines for different countries	Seminar	BL3-Apply	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**
	0				

Part E

Books	1. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143 2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P.Martin, Drugs and the Pharmaceutical Sciences,Vol.185, Informa Health care Publishers. 3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD,5th edition, Drugs and the Pharmaceutical Sciences, Vol.190
Articles	https://regsci-ojs-tamu.tdl.org/regsci/
References Books	1. Guidebook fordrug regulatory submissions / Sandy Weinberg. By John Wiley & Sons.Inc. 2. FDA regulatory affairs: a guide for prescription drugs, medical devices, and biologics/edited By Douglas J. Pisano, David Mantus. 3. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A.Rozovsky and Rodney K. Adams 4. www.ich.org/ 5. www.fda.gov/ 6. europa.eu/index_en.htm 7. https://www.tga.gov.au/tga- basics
MOOC Courses	https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/watch?v=xrZI8g70Hol&list=PLpGCFhhV_JSXuh8vFq4MwInuNj9f6hfRY

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	1	-	-	2	-	-	3	-	1	-	1
CO2	2	-	-	-	2	1	-	3	-	-	3	-	2	1	2
CO3	1	2	-	-	-	-	-	2	-	-	2	-	-	-	-
CO4	3	2	-	1	-	2	-	3	-	-	2	-	-1	2	-
CO5	2	1	-	-	1	1	-	1	-	-	2	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Modern Pharmaceutical Analytical Techniques
Course Code	MPH 101T

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

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**
	0				

Part E

Books	Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004. 2.Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5thedition, Eastern press, Bangalore, 1998. 3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers. 4. Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
Articles	https://www.sciencedirect.com/journal/journal-of-pharmaceutical-analysis
References Books	1. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991. 2. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997. 3. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series
MOOC Courses	https://onlinecourses.nptel.ac.in/
Videos	https://www.udemy.com/course/modern-analytical-techniques/?utm_source=adwords-pmax&utm_medium=udemyads&utm_campaign=PMax_la.EN_cc.INDIA&utm_content=deal4584&utm_term=_._ag__._kw__._ad__._de_c_._dm__._pl__._ti__._li_1007795_._pd__._&gad_source=2&gclid=Cj0KCQjwzZmwBhD8ARIsAH4v1gVb5PzO7EviNr_12MuMwoz1rKlhE_Qov_xOdxhwjSAvvuE6kO0Ay6waAtDsEALw_wcB&c

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	-	3	-	-	-	-	-	3	-	1	-	1
CO2	3	2	3	-	2	1	-	-	-	-	3	-	2	1	2
CO3	3	1	1	-	1	2	-	-	-	-	3	-	2	-	1
CO4	3	1	1	2	2	2	-	-	-	-	3	-	1	2	2
CO5	2	1	2	-	2	2	-	-	-	-	3	-	-	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Drug Delivery System
Course Code	MPH 102T

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)					

Part B

Modules	**Contents**	**Pedagogy**	**Hours**

Part C

Modules	**Title**	**Indicative-ABCA/PBL/ Experiments/Field work/ Internships**	**Bloom's Level**	**Hours**
UNIT-1	3D PRINTING TECHNOLOGY	PBL	BL4-Analyze	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**
	0				

Part E

Books	1.N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001). 2. S. P. Vya s and R. K. Khar, Controlled Drug Delivery- conceptsand advances, Vallabh Prakashan, New Delhi, First edition 2002
Articles	2.Indian Journal of Pharmaceutical Sciences (IPA) 3. Indian drugs (IDMA) 4. Journal of controlled release (Elsevier Sciences) desirable 4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable
References Books	5. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker,Inc., New York, 1992. 3. Encyclopedia of controlled delivery, Editor-Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
MOOC Courses	https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/watch?v=1Jk08tf1Gh8

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	3	1	-	-	-	-	3	-	1	-	1
CO2	3	-	2	-	1	2	-	-	-	-	3	-	2	1	-
CO3	3	1	3	-	2	-	-	-	-	-	3	-	-	-	2
CO4	3	-	1	-	2	1	-	-	-	-	3	-	-	1	2
CO5	2	2	3	1	1	-	-	-	-	-	3	-	1	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Modern Pharmaceutics
Course Code	MPH 103T

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-V	study of diffussion and dissolution parameters	PBL	BL4-Analyze	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**

Part E

Books	1.Theory and Practice of Industrial Pharmacy By Lachmann and Libermann 2. Pharmaceutical dosage forms: Tablets Vol. 1-3 by Leon Lachmann. 3.Pharmaceutical Dosage forms: Disperse systems, Vol, 1-2; By Leon Lachmann. 4. Pharmaceutical Dosage forms: Parenteral medications Vol. 1-2; By Leon Lachmann. 5. Modern Pharmaceutics; By Gillbert and S. Banker. 6. Remington's Pharmaceutical Sciences
Articles	https://www.ijmpronline.com/
References Books	7.Advances in Pharmaceutical Sciences Vol. 1-5; By H.S. Bean & A.H. Beckett. 8. Physical Pharmacy; By Alfred martin 9. Bentley's Textbook of Pharmaceutics – by Rawlins. 10. Good manufacturing practices for Pharmaceuticals: Aplan for total quality control, Second edition; By Sidney H. Willig. 11. Quality Assurance Guide; By Organization of Pharmaceutical producers of India. 12.Drug formulation manual; By D.P.S. Kohli and D.H.Shah. Eastern publishers, New Delhi. 13.How to practice GMPs; By P. P. Sharma. Vandhana Publications, Agra. 12. Pharmaceutical Process Validation; By Fra. R. Berry and Robert A. Nash. 13.Pharmaceutical Preformulations; By J.J. Wells. 14. Applied production and operations management; By Evans, Anderson, Sweeney and Williams. 15. Encyclopedia of Pharmaceutical technology, Vol I – III
MOOC Courses	https://swayam.gov.in/nc_details/NPTEL
Videos	https://www.youtube.com/watch?v=mRJvss9bMVc&list=PL0o-kamDFTumhseOKF-6OCrHdhBySNkAA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	3	-	1	-	-	-	-	-	3	-	1	-	1
CO2	3	1	1	-	2	-	-	-	-	-	3	-	-	1	-
CO3	2	2	2	1	2	-	-	-	-	-	3	-	2	2	2
CO4	2	1	1	-	2	-	-	-	-	-	3	-	1	-	2
CO5	2	2	2	2	-	1	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Pharmaceutics Practical I
Course Code	MPH 105P

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	6	6
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s							**Co-Requisite/s**	
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer 2. Simultaneousestimation ofmulti component containing formulations by UV spectrophotometry	Experiments	BL4-Analyze	8
2	3. Experiments based on HPLC 4. Experiments based on Gas Chromatography	Experiments	BL3-Apply	8
3	5. Estimation of riboflavin/quinine sulphate by fluorimetry 6. Estimation of sodium/potassium by flame photometry	Experiments	BL4-Analyze	8
4	7. To perform In-vitro dissolution profile of CR/ SR marketed formulation 8. Formulation and evaluation of sustained release matrix tablets	Experiments	BL5-Evaluate	8
5	9. Formulation and evaluation osmotically controlledDDS 10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS	Experiments	BL6-Create	8
6	11. Formulation and evaluation of Muco adhesive tablets. 12. Formulation and evaluation of trans dermal patches	Experiments	BL6-Create	8
7	13. To carry out preformulation studies of tablets. 14. To study the effect of compressional force on tablets disintegration time.	Experiments	BL3-Apply	8
8	15. To study Micromeritic properties of powders and granulation. 16. To study the effect of particle size on dissolution of a tablet	Experiments	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
150	0	100	50	50	25

Part E

Books	PRACTICAL MANUAL
Articles	JOURNALS
References Books	LAB MANUAL
MOOC Courses	SWAYAM NPTEL
Videos	YOUTUBE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	1	1	-	-	-	-	-	3	-	1	-	1
CO2	3	1	2	2	2	-	-	-	-	-	3	-	2	1	2
CO3	3	2	3	-	1	-	-	-	-	-	3	-	3	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Online Certificate Course
Course Code	MPH 107ET

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Online course							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	ELECTIVES			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	25	12	25	13
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	1.https://www.coursera.org/courses?query=regulatory%20affairs 2. https://www.igmpi.ac.in/RAprograms.html
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	3	-	-	3	-	3	1	2
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Good Manufacturing in Pharma
Course Code	MPH 108ET

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Specific Elective							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	GMP	Seminar	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

Books	Karmacharya JB. Good manufacturing practices (GMP) for medicinal products. Promising Pharmaceuticals. 2014;101.
Articles	Patel KT, Chotai NP. Pharmaceutical GMP: past, present, and future–a review. Die Pharmazie-An International Journal of Pharmaceutical Sciences. 2008 Apr 1;63(4):251-5.
References Books	Durivage MA, editor. The Certified Pharmaceutical GMP Professional Handbook. Quality Press; 2016 May 23.
MOOC Courses	UDEMY, COURSERA, PHARMASTATE ACADEMY
Videos	You tube

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	-	1	1	2	-	3	-	1	1	1
CO2	1	-	-	1	1	-	1	1	2	-	3	-	1	1	1
CO3	1	-	-	-	1	-	2	1	2	-	3	-	2	1	1
CO4	2	-	-	1	1	-	1	2	2	-	2	-	1	-	3
CO5	1	-	-	1	1	-	2	2	2	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Molecular Pharmaceutics (Nano Tech and Targeted DDS)
Course Code	MPH 201T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Upon completion of the course student shall be able to understand The various approaches for development of novel drug delivery systems. • The criteria for selection of drugs and polymers for the development of NTDS The formulation and evaluation of novel drug delivery systems			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**		SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-2	PREPARATION OF NANOSOMES	PBL	BL4-Analyze	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**
	0				

Part E

Books	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. S. P. Vyas and R. K. Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
Articles	https://pubs.acs.org/journal/mpohbp
References Books	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. S. P. Vyas and R. K. Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
MOOC Courses	https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/watch?v=rGP7KZOTkzE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	3	3	-	-	-	-	-	3	-	3	-	3
CO2	2	2	2	3	2	-	-	-	-	-	3	-	2	1	2
CO3	2	1	3	2	1	-	-	-	-	-	3	-	2	-	1
CO4	3	2	3	2	3	-	-	-	-	-	3	-	3	2	2
CO5	1	1	3	2	2	-	-	-	-	-	2	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Advanced Biopharmaceutics & Pharmacokinetics
Course Code	MPH 202T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
EXPERIMENT	PREPARATIONS OF TARGETED DRUG DELIEVERY SYSTEM	PBL	BL3-Apply	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**
	0				

Part E

Books	1. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expande by Robert. E. Notari, Marcel Dekker Inc, New York and Basel,1987. 2. Biopharmaceutics and Relevant Pharmacokinetics by John. G Wagner and M.Pemarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971. 3. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996. 12. Basic Pharmacokinetics, 1st edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing,2009. 13. Absorption and Drug Development- Solubility, Permeability, and Charge State, Alex Avdeef, John Wiley & Sons, Inc,2003. 9. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expande by Robert. E. Notari, Marcel Dekker Inc, New York and Basel,1987. 10. Biopharmaceutics and Relevant Pharmacokinetics by John. G Wagner and M.Pemarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971. 11. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996. 12. Basic Pharmacokinetics, 1st edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing,2009. 13. Absorption and Drug Development- Solubility, Permeability, and Charge State, Alex Avdeef, John Wiley & Sons, Inc,2003.
Articles	JOURNAL OF PHARMACEUTICS JOURNAL OF MOLECULAR PHARMACEUTICS
References Books	1. Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th edition,Philadelphia, Lea and Febiger, 1991 2. Biopharmaceutics and Pharmacokinetics, A. Treatise, D .M. Brahmankar and Sunil B. Jaiswal., VallabPrakashan, Pitampura, Delhi 3. Applied Biopharmaceutics and Pharmacokinetics by Shargel. Land YuABC, 2ndedition, Connecticut Appleton Century Crofts, 1985 4. Textbook of Biopharmaceutics and Pharmacokinetics, Dr. Shobha Rani R. Hiremath, Prism Book 5. Pharmacokinetics by Milo Gibaldi and D. Perrier, 2nd edition, Marcel Dekker Inc.,New York, 1982 6. Current Concepts in Pharmaceutical Sciences: Biopharmaceutics, Swarbrick. J, Leaand Febiger, Philadelphia, 1970 7. Clinical Pharmacokinetics, Concepts and Applications 3rd edition by MalcolmRowland and Thom~ N. Tozer, Lea and Febiger, Philadelphia, 1995 8. Dissolution, Bioavailability and Bioequivalence, Abdou. H.M, Mack Publishing Company, Pennsylvania 1989
MOOC Courses	NPTEL
Videos	https://www.youtube.com/watch?v=hXrniai9ZR0

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	3	-	-	-	-	3	-	1	1	1
CO2	2	1	2	2	2	2	-	-	-	-	2	-	2	2	2
CO3	2	2	3	1	2	1	-	-	-	-	2	-	1	2	2
CO4	3	-	1	2	2	2	-	-	-	-	3	-	2	-	2
CO5	3	1	3	2	3	2	-	-	-	-	2	-	1	1	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Computer Aided Drug Delivery System
Course Code	MPH 203T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG7(Affordable and clean energy) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	ARTIFICIAL INTELLIGENCE IN HEALTH CARE	Seminar	BL4-Analyze	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

Books	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
Articles	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
References Books	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
MOOC Courses	nptel
Videos	pharmawins

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	-	3	-	1	-	-	-	3	-	1	-	1
CO2	2	2	3	-	3	-	-	-	-	-	3	-	-	1	2
CO3	1	-	2	-	2	-	-	-	-	-	3	-	2	2	2
CO4	3	1	2	-	3	-	1	-	-	-	2	-	1	-	-
CO5	3	-	1	-	3	-	1	-	-	-	2	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Cosmetics and Cosmeceuticals
Course Code	MPH 204T

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-4	COSMETIC PREPARATIONS	PBL	BL3-Apply	12

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**
	0				

Part E

Books	Harry's Cosmeticology. 8th edition. Poucher'sperfumecosmeticsandSoaps,10th edition. 3. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma,4th edition Handbook of cosmetic science and Technology A. O. Barel, M. Payeand H.I. Maibach. 3rd edition 5. Cosmetic and Toiletries recent suppliers catalogue. CTFA directory.
Articles	https://onlinelibrary.wiley.com/journal/14682494
References Books	Harry's Cosmeticology. 8th edition. Poucher'sperfumecosmeticsandSoaps,10th edition. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma,4th edition Handbook of cosmetic science and Technology A. O. Barel, M. Payeand H.I. Maibach. 3rd edition Cosmetic and Toiletries recent suppliers catalogue. CTFA directory.
MOOC Courses	https://nptel.ac.in/
Videos	https://www.youtube.com/watch?v=bcCkQ1liaKA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	-	-	-	-	-	3	-	1	1	1
CO2	3	1	-	-	2	-	-	-	-	-	3	-	2	2	2
CO3	2	2	-	-	2	-	-	-	-	-	1	-	1	-	2
CO4	1	2	-	-	1	-	-	-	-	-	2	-	1	-	3
CO5	3	-	-	-	-	-	-	-	-	-	1	-	-	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Pharmaceutics Practical II
Course Code	MPH 205P

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					7	0	0	7
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	TO GAIN EXPERIMEMTAL KNOWLEDGE			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. To study the effect of temperature change, non-solvent addition, incompatible polymer addition in microcapsules preparation	Experiments	BL4-Analyze	4
2	2. Preparation and evaluation of Alginate beads	PBL	BL6-Create	4
3	3. Formulation and evaluation of gelatin /albumin microspheres	PBL	BL6-Create	4
4	4. Formulation and evaluation of liposomes/niosomes	PBL	BL6-Create	4
5	5. Formulation and evaluation of spherules	PBL	BL6-Create	4
6	6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.	PBL	BL4-Analyze	4
7	7. Comparison of dissolution of two different marketed products /brands	PBL	BL5-Evaluate	4
8	8. Protein binding studies of a highly protein bound drug & poorly protein bound drug	PBL	BL4-Analyze	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
150	75	100	50	50	25

Part E

Books	7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill Livingstone, Latest edition
Articles	https://www.ipinnovative.com/journal-name/JPBS
References Books	1 Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition 2.Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) 3. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
MOOC Courses	https://nptel.ac.in/
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	3	-	1	-	1
CO2	3	-	1	1	-	-	-	-	-	-	3	-	-	1	2
CO3	2	-	2	2	-	-	-	-	-	-	3	-	2	-	3
CO4	3	-	-	1	-	-	-	-	-	-	3	-	-	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Seminars
Course Code	MPH 206S

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					0	0	7	7
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG7(Affordable and clean energy)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Polymers in NDDS	Seminar	BL2-Understand	12
2	Gene theray	Seminar	BL2-Understand	10
3	PKPD studies	Research Paper Presentation	BL4-Analyze	12
4	Insilico drug designing	Simulation	BL3-Apply	8

Part D(Marks Distribution)

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

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1-	-	-	-	-	-	-	3	3	1	1	-	3
CO2	-	2	2	-	-	-	-	-	-	3	3	2	-	-	1
CO3	2	-	1	-	-	-	-	-	-	3	3	1	2	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Online Certificate Course
Course Code	MPH 207ET

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Online course							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	Pharmaceutical background			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	35	18	15	8
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	NA
Articles	N A
References Books	NA
MOOC Courses	1. https://ispe.org/training/course/qbd 2. https://www.udemy.com/course/quality-by-design-qbd-in-pharmaceutical-development/?--=&utm_source=adwords&utm_medium=udemyads&utm_campaign=LongTail_la.EN_cc.INDIA&utm_content=deal4584&utm_term=_._ag_118445032537_._ad_618853564450_._kw_._de_c_._dm_._pl_._ti_dsa-1212271230479_._li_1007795_._pd_._&matchtype=&gad_source=1&gclid=Cj0KCQjwztOwBhD7ARIsAPDKnkBXWZvoPEBACFjanUEyfigFRV8AJSdYMY2AH1tTLjXCBcpyt7DSYX8aAsvOEALw_wcB&couponCode=IND21PM 3. https://www.6sigma.us/quality-by-design/
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	3	-	1	1	1
CO2	2	2	2	-	-	-	-	-	-	-	3	-	2	2	2
CO3	3	-	-	-	-	-	-	-	-	-	3	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Introduction to intellectual property rights
Course Code	MPH 208ET

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)** **CO5-** To evaluate the crude drugs by chemical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	patent drafting and filing	Case Study	BL3-Apply	5

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

Books	Cockburn IM. Intellectual property rights and pharmaceuticals: challenges and opportunities for economic research. The economics of intellectual property. 2009 Jan:150.
Articles	Savale SK, Savale VK. Intellectual property rights (IPR). World J Pharm Pharm Sci. 2016 Apr 22;5:2559-92.
References Books	Prabu SL, Tnk S, editors. Intellectual property rights. BoD–Books on Demand; 2017 Jun 21.
MOOC Courses	NEPTEL
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	1	-	-	-	3	-	2	3	-	1	1	1
CO2	-	1	-	-	-	-	-	3	-	-	2	-	1	-	1
CO3	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Research Methodology and Biostatistics
Course Code	MPH 301T

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)** **CO4-** To evaluate the crude drugs by physical methods of evaluation.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	75	37	25	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork. 2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
Articles	NA
References Books	1. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam. 2. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery
MOOC Courses	https://www.coursera.org/search?query=biostatistics%20in%20public%20health
Videos	https://www.youtube.com/watch?v=UtivXLO7c9A

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	3	-	-	-	-	-	-	3	-	1	1	1
CO2	-	2	2	1	-	-	-	-	-	-	3	-	2	2	2
CO3	-	3	1	2	-	-	-	-	-	-	2	-	1	2	1
CO4	-	3	3	3	-	-	-	-	-	-	2	-	2	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Journal Club
Course Code	MPH 302P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education) SDG17(Partnerships for the goals)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the recent literature in Pharmaceutical sciences	Research Paper Presentation	BL3-Apply	12
2	To prepare review articles	Case Study	BL5-Evaluate	5
3	To present review articles	Research Paper Presentation	BL3-Apply	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	13	25	12	0	0

Part E

Books	NA
Articles	
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	-	-	-	-	-	-	3	-	1	2	3
CO2	1	2	-	2	-	-	-	-	-	-	3	-	-	3	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Discussion Presentation (Proposal Presentation)
Course Code	MPH 303P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s	Selection and discussion of project proposal			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques	Research Paper Presentation	BL3-Apply	12

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	50	25	0	0

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	2	-	-	-	-	-	-	3	-	1	2	2
CO2	3	1	1	1	-	-	-	-	-	-	3	-	2	2	1
CO3	1	2	2	3	-	-	-	-	-	-	2	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Research Work
Course Code	MPH 304P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	14	14
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	175				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
350	175	200	100	150	75

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	-	-	-	-	3	-	1	3	3
CO2	3	2	3	2	2	1	-	-	-	-	3	-	2	1	3
CO3	3	3	3	2	2	1	-	-	-	-	3	-	3	1	3
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Research Presentation in Seminar/ Conference/Symposium
Course Code	MPH 305P

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s	know about preparation of presentation			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
50	25	50	25	0	0

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	3	3	3	1	2	3
CO2	1	1	1	-	-	-	-	-	-	3	3	3	2	2	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Journal Club
Course Code	MPH 401P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	1	1
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s	In a journal club, a group of participants who have common practice or research interests meet regularly for a defined pedagogical purpose. The club often discusses current research articles and the appropriateness of the study design, the data analysis, the conclusions drawn, and the potential applications or implications of the research to practice and patient care. In pharmacy, these clubs allow pharmacists to understand the current drug research to help make evidence-based recommendations. The goals of journal clubs in education and research.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the recent literature in Pharmaceutical sciences	Internships	BL3-Apply	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
25	12	25	13	0	0

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	-	-	3	-	1	-	3
CO2	3	-	1	-	-	-	-	-	-	-	3	-	-	-	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Discussion/Presentation (Proposal Presentation)
Course Code	MPH 402P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s	Selection and Discussion of project proposal			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
75	38	75	38	0	0

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	-	-	3	-	1	-	2
CO2	3	3	1	3	-	-	-	-	-	-	3	-	2	-	1
CO3	3	3	2	2	-	-	-	-	-	-	2	-	2	2	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Discussion/Final Presentation
Course Code	MPH 403P

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					0	0	3	3
Course Type	Lab only							
Course Category	Projects and Internship							
Pre-Requisite/s	**Co-Requisite/s**							
Course Outcomes & Bloom's Level	**CO1-** To remember different morphological and microscopical characteristic features of crude drugs.**(BL1-Remember)** **CO2-** To understand the cellular structure of crude drugs.**(BL2-Understand)** **CO3-** To evaluate the crude drugs by quantitative evaluation methods.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	200				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
400	200	200	100	200	100

Part E

Books	NA
Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	3	1	-	-	-	-	-	3	-	1	-	3
CO2	-	2	3	3	1	-	-	-	-	-	3	-	-	-	1
CO3	-	3	3	3	-	-	-	-	-	-	2	-	1	-	3
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MPharm-PharmaCeutics

Title of the Course	Research Publication /Report
Course Code	MPH 404T

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
Course Type								
Course Category								
Pre-Requisite/s	**Co-Requisite/s**							
Course Outcomes & Bloom's Level								
Coures Elements		**SDG (Goals)**						

Part B

Modules	**Contents**	**Pedagogy**	**Hours**

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books
Articles
References Books
MOOC Courses
Videos

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3