

SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM& B.PHARM+MBA I YEAR – SEMESTER II, 2020-21

Program: B. Pharm				Semester :II	
Course : Human Anatomy and Physiology II - Theory				Code: BP201T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 25)	Term End Examinations (TEE) (Marks- 25 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite: Knowledge of Anatomy and Physiology & Biology.					
Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.					
Objective: Course is designed to provide the detailed information about human anatomy and Physiology.					
Outcomes: After completion of the course, students would be able to : 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. 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. 5. Appreciate coordinated working pattern of different organs of each system 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.					
Detailed Syllabus: (per session plan)					
Unit	Description				Durat ion
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)				10
2	Digestive system Anatomy of GI Tract with special reference to anatomy and functions of				

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	<p>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.</p> <p>Energetics Formation and role of ATP, Creatinine Phosphate and BMR.</p>	6
3	<p>Respiratory system 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.</p> <p>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.</p>	10
4	<p>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.</p>	10
5	<p>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</p> <p>Introduction to genetics Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance</p>	9
6	Tutorials	15
	Total	60

Text Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypeebrothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,GuytonandJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers,

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New Delhi.

7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference 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

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

(Concerned Faculty/HOD)

Approved by

Dr. Bala Prabhakar
Dean, SPP-SPTM

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Program: B. Pharm.				Semester : II	
Course : Pharmaceutical Organic Chemistry I - Theory				Code:BP202T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite:					
<ul style="list-style-type: none"> • Knowledge of functional groups, Structure and Basic Properties of Organic Compounds • Knowledge of Basics in Pharmaceutical Chemistry 					
Scope: This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.					
Objectives:					
<ul style="list-style-type: none"> • To impart the detailed knowledge and understanding of the science behind organic synthesis of small molecules and to some extent, macromolecules. The course introduces the students to various types of organic transformations, reaction mechanisms and the species involved in all different mechanisms, their characteristic reactions and methods of synthesis or generation • To provide the detailed information about the basics of Organic Chemistry required to understand various aspects of Pharmaceutical Sciences. • To inculcate skills to identify, prepare, use and understand the nature of organic substances used in Pharmaceutical Sciences. 					
Outcomes:					
Upon completion of the course the student shall be able to					
<ol style="list-style-type: none"> 1. write the structure, name and the type of isomerism of the organic compound 2. write the reaction, name the reaction and orientation of reactions 3. account for reactivity/stability of compounds, 4. identify/confirm the identification of organic compound 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration
General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained					
To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences					

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1	<ul style="list-style-type: none"> • 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 	7
2	<ul style="list-style-type: none"> • 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 versus 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 	10
3	<ul style="list-style-type: none"> • 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 	10
4	<ul style="list-style-type: none"> • 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. 	10
5	<ul style="list-style-type: none"> • 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 	8

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	benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid <ul style="list-style-type: none"> • Aliphatic amines* - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine 	
6	Tutorials	15
	Total	60

Text Books:

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Practical Organic Chemistry by Mann and Saunders.
4. Vogel's text book of Practical Organic Chemistry
5. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reference Books:

- Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part A: Structure and Mechanisms, 4th ed.; Springer: NY, 2006.
- Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part B: Reactions and Synthesis, 4th ed.; Springer: NY, 2001.

Any other information :

- www.organic-chemistry.org/
- www.acdlabs.com/iupac/nomenclature/
- www.organic-chemistry.org/namedreactions/
- totallysynthetic.com/blog/
- www.chem.ucalgary.ca/courses/351/orgnom/index.html
- <http://www.cem.msu.edu/~reusch/vtxtindex.htm>

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

(Concerned Faculty/HOD)

Approved by

Dr. Bala Prabhakar
 Dean, SPP-SPTM

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Program: B. Pharm				Semester : II	
Course : Biochemistry - Theory				Code: BP203T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75

Pre-requisite:

Basic knowledge of biology, chemistry and human anatomy and physiology.

Scope :

Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA

Objectives:

This course is designed to summarize comprehensive and balanced introduction to biological and chemical background to life.

- The subject should help students understand different biomolecules and their simplicity to perform complex functions of living systems.
- This subject would form the basic knowledge required in understand drug-receptor interactions and chemistry behind such interactions.

Outcomes:

After completion of the course, students would be able to :

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1	<p>Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.</p> <p>Bioenergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.</p>	8

	Energy rich compounds; classification; biological significances of ATP and cyclic AMP	
2	<p>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</p> <p>Biological oxidation Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate phosphorylation level Inhibitors ETC and oxidative phosphorylation/Uncouplers</p>	10
3	<p>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.</p> <p>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 (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice</p>	10
4	<p>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</p>	10
5	<p>Enzymes Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation</p>	7

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	Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions	
6	Tutorials	15
	Total	60

Text Books:

1. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
2. Biochemistry by Stryer.

Reference Books:

1. Principles of Biochemistry by Lehninger.
2. Outlines of Biochemistry by Conn and Stumpf

Any other information :

- <http://www.textbooksonline.tn.nic.in/books/12/std12-biochem-em.pdf>
- <http://ibk.mf.uni-lj.si/people/phudler/Biochemistry%205th%20Edition.pdf>

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Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

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Program: B. Pharm.				Semester : II	
Course : Pathophysiology - Theory				Code: BP204T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite: Basic knowledge of Human Anatomy and Physiology					
Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.					
Objectives: To provide an understanding of pathophysiological basis of various diseases at a cellular, tissue, organ, and system levels.					
Outcomes: After completion of the course, students would be able to : <ul style="list-style-type: none"> • Understand the pathophysiological basis (etiology, pathogenesis, clinical manifestations, newer molecular drug targets, and treatment strategy) of various disorders and diseases. • Thorough understanding of any disease helps in early diagnosis that disease which ultimately helps in better treatment and management. • Complete understanding of any disease also helps in formulating treatment strategy. 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration (Hrs)
1	Basic principles of Cell injury and Adaptation: Introduction, definitions, 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				10
2	Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)				10

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	Respiratory system: Asthma, Chronic obstructive pulmonary diseases. Renal system: Acute and chronic renal failure	
3	Haematological Diseases: Iron deficiency, megaloblastic anaemia (Vit B ₁₂ and folic acid), sickle cell anaemia, thalassemia, hereditary acquired anaemia, haemophilia Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones Nervous system: Epilepsy, Parkinson's disease, psychiatric disorders: depression, schizophrenia and Alzheimer's disease. Gastrointestinal system: Peptic Ulcer	10
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	8
5	Infectious diseases: Typhoid, Leprosy, Tuberculosis, Urinary tract infections Sexually transmitted diseases: AIDS, Syphilis, Gonorrhoea	7
6	Tutorials	15
Total		60

Prescribed Texts:

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.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore;1991.
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
9. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.
10. Stephen J McPhee, William F. Ganong. Pathophysiology of Disease: An Introduction to Clinical Medicine. 7th Edn. 2014, Published by McGraw-Hill.

Reference Books:

1. Wilson JD, Braunwald E, Isselbacher K J, Peterbors RG, Martin JV, Fauci AS, Root RK. Harrison's Principles of Internal Medicine. Vol. I & Vol.II, 19th Edn., 2015, Published by McGraw Hill.

2. Walker BR, Colledge NR, Ralson SH, Penman ID. Davidson's Principles and Practice of Medicine. 22th Edn., 2014, Churchill Livingstone.

Any other information :

Internet Reference:

- Human anatomy online
- Dmoz.org/Health/Conditions_and_Diseases/

Recommended Journals

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 Pharmac 1944-8171
ISSN:
(Online)
6. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

(Concerned Faculty/HOD)

Approved by

Dr. Bala Prabhakar
Dean, SPP-SPTM

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Program: B. Pharm.				Semester : II	
Course : Computer Applications in Pharmacy - Theory				Code: BP205T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 25 in Question Paper)
2	0	1	3	Marks Scaled to 25	Marks Scaled to 50
Scope: This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases					
Objectives:					
Outcomes: Upon completion of the course the student shall be able to 1. know the various types of application of computers in pharmacy 2. know the various types of databases 3. know the various applications of databases in pharmacy					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration (Hrs)
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				6
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				6
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				6
4	Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery				6

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5	Computers as data analysis in Preclinical development: Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMs)	6
6	Tutorial	15
Total		45

Reference 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
3. Bioinformatics (Concept, Skills and Applications) - S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi - 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath - Cary N.Prague - Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
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Term Work	10
Total Marks :	25

Prepared by

(Concerned Faculty/HOD)

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Program: B. Pharm.				Semester : II	
Course : Environmental sciences - Theory				Code: BP206T	
Teaching Scheme			Evaluation Scheme		
Lecture (Hours per week)	Practica 1 (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 25 in Question Paper)
2	0	1	3	Marks Scaled to 25	Marks Scaled to 50
Scope: Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment					
Outcomes: Upon completion of the course the student shall be able to: 1. Create the awareness about environmental problems among learners. 2. Impart basic knowledge about the environment and its allied problems. 3. Develop an attitude of concern for the environment. 4. Motivate learner to participate in environment protection and environment improvement. 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems. 6. Strive to attain harmony with Nature					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration (Hrs)
1	The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources				10
2	Ecosystems □ Concept of an ecosystem. □ Structure and function of an ecosystem. □ Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)				10
3	Environmental Pollution: Air pollution; Water pollution; Soil pollution				10
4	Tutorials				15

Total	45								
Reference Books: 1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore 2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. 3. BharuchaErach, The Biodiversity of India, Mapin Pu blishingPvt. Ltd., Ahmedabad – 380 013, India, 4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p 5. Clark R.S., Marine Pollution, Clanderson Press Oxford 6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p 7. De A.K., Environmental Chemistry, Wiley Eastern Ltd. 8. Down of Earth, Centre for Science and Environment									
Any other information : Total Marks of Internal Continuous Assessment (ICA) : 25 Marks Distribution of ICA Marks :									
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 70%;">Description of ICA</th><th style="width: 30%;">Marks</th></tr></thead><tbody><tr><td>Sessional Examination</td><td style="text-align: center;">15</td></tr><tr><td>Term Work</td><td style="text-align: center;">10</td></tr><tr><td>Total Marks :</td><td style="text-align: center;">25</td></tr></tbody></table>		Description of ICA	Marks	Sessional Examination	15	Term Work	10	Total Marks :	25
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SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM& B.PHARM+MBA I YEAR – SEMESTER II, 2020-21

Program: B. Pharm				Semester :II	
Course : Human Anatomyand PhysiologyII - Practical				Code: BP207P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practica l (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Pre-requisite: Knowledge of Anatomy and Physiology & Biology.					
Scope: Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.					
Objective: Courseisdesignedtoprovidethedetailedinformationabouthumananatomyand Physiology.					
Outcomes: After completion of the course, students would be able to : <ul style="list-style-type: none"> • It deals with the understanding of the structure of the body and the relationship involved between the body systems. • It can be a gateway to gratifying career in a host of health-related professions. It can help towards a better understanding of the pathophysiology of various disorders. 					
Detailed Syllabus: (per session plan)					
Description					
<ol style="list-style-type: none"> 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 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 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. 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 					

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Text Books:

1. Tortora G.J. Principles of Anatomy and Physiology, 12th edition, 2009, John Wiley & Sons Inc.
2. Guyton A.C. and Hall J.E. Textbook of Medical Physiology, 11th edition, 2006, Elsevier's Saunders Inc.
3. Ross & Wilson. Anatomy & Physiology in Health and Illness, 10th edition, 2010, Churchill Livingstone.
4. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypeebrothers medical publishers, New Delhi.
5. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
6. Textbook of Human Histology by Inderbir Singh, Jaypeebrothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypeebrothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

1. Marieb E.N. Human Anatomy & Physiology Laboratory Manual, Pig Version, 8th edition, Pearson, 2005, Benjamin Cummings Inc.
2. Chatterjee C.C. Human Physiology, Vol I and II, 2003, Medical Allied Agency

Any other information :

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

Prepared by

(Concerned Faculty/HOD)

Approved by

Dr. Bala Prabhakar
Dean, SPP-SPTM

SVKM's Narsee Monjee Institute of Management Studies
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 B.PHARM& B.PHARM+MBA I YEAR - SEMESTER II, 2020-21

Program: B.Pharm				Semester : II	
Course : Pharmaceutical Organic Chemistry I - Practical				Code: BP208P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Prerequisite :					
<ul style="list-style-type: none"> • Knowledge of functional groups, IUPAC nomenclature, Structure and Basic Properties of Organic Compounds • Knowledge of Basics in Pharmaceutical Chemistry 					
Scope: This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.					
Objectives					
<ul style="list-style-type: none"> • To impart the detailed knowledge and understanding of the science behind organic synthesis of small molecules and to some extent, macromolecules. The course introduces the students to various types of organic transformations, reaction mechanisms and the species involved in all different mechanisms, their characteristic reactions and methods of synthesis or generation • To provide the detailed information about the basics of Organic Chemistry required to understand various aspects of Pharmaceutical Sciences. • To inculcate skills to identify, prepare, use and understand the nature of organic substances used in Pharmaceutical Sciences and research. 					
Outcomes: Upon completion of the course student shall be able to					
<ul style="list-style-type: none"> • write the structure, name and the type of isomerism of the organic compound • write the reaction, name the reaction and orientation of reactions • account for reactivity/stability of compounds, • identify/confirm the identification of organic compound 					
Detailed Syllabus: (per session plan)					
Unit	Description				
1	Systematic qualitative analysis of unknown organic compounds: Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.				
2	Solubility test				
3	Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test				
4	Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols,				
5	Functional group test like Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.				
6	Melting point/Boiling point of organic compounds				

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7	Identification of the unknown compound from the literature using melting point/boiling point.
8	Preparation of the derivatives and confirmation of the unknown compound by melting point/boiling point.
9	unknown organic compounds to be analysed systematically
10	unknown organic compounds to be analysed systematically
11	unknown organic compounds to be analysed systematically
12	unknown organic compounds to be analysed systematically
13	unknown organic compounds to be analysed systematically
14	Preparation of suitable solid derivatives from organic compounds
15	Construction of molecular models

Text Books:

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar, Volume-I
3. Practical Organic Chemistry by Mann and Saunders.
4. Vogel's text book of Practical Organic Chemistry
5. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reference Books:

- Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part A: Structure and Mechanisms, 4th ed.; Springer: NY, 2006.
- Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part B: Reactions and Synthesis, 4th ed.; Springer: NY, 2001.
- Ahluwalia, V. K.; Parashar, R. K. Organic Reactions Mechanisms, 3rd ed.; Narosa Publishing House: India, 2007.

Any other information :

- www.organic-chemistry.org/
- www.acdlabs.com/iupac/nomenclature/
- www.organic-chemistry.org/namedreactions/
- totallysynthetic.com/blog/
- www.chem.ucalgary.ca/courses/351/orgnom/index.html
- <http://www.cem.msu.edu/~reusch/vtxtindex.htm>

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

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Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

Prepared by

Approved by

(Concerned Faculty/HOD)

Dr. Bala Prabhakar
Dean, SPP-SPTM

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Program: B.Pharm				Semester : II	
Course : Biochemistry – Practical				BP209P	
Teaching Scheme			Evaluation Scheme		
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Prerequisite :					
Basic knowledge of biology, chemistry and human anatomy and physiology.					
Scope:					
<ul style="list-style-type: none"> Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA. 					
Objectives					
This course is designed to summarize comprehensive and balanced introduction to biological and chemical background to life.					
<ul style="list-style-type: none"> The subject should help students understand different biomolecules and their simplicity to perform complex functions of living systems. This subject would form the basic knowledge required in understand drug-receptor interactions and chemistry behind such interactions. 					
Outcomes:					
After completion of the course, students would be able to :					
<ol style="list-style-type: none"> Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes. Understand the metabolism of nutrient molecules in physiological and pathological conditions. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins. 					
Detailed Syllabus: (per session plan)					
Unit	Description				(Hrs - 60)
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)				
4	Quantitative analysis of Proteins (Biuretmethod)				
5	Qualitative analysis of urine for abnormalconstituents				

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6	Determination of bloodcreatinine
7	Determination of bloodsugar
8	Determination of serum totalcholesterol
9	Preparation of buffer solution and measurement ofpH
10	Study of enzymatic hydrolysis ofstarch
11	Determination of Salivary amylaseactivity
12	Study the effect of Temperature on Salivary amylaseactivity.
13	Study the effect of substrate concentration on salivary amylaseactivity.
14	Lipid estimation- Sap or Iodine or acid value
15	Polarimeter demonstration

Text Books:

1. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
2. Biochemistry by Stryer.

Reference Books:

1. Principles of Biochemistry by Lehninger.
2. Outlines of Biochemistry by Conn and Stumpf
3. Introduction to Practical Biochemistry. Plummer Mu, David T. Plummer. Publisher, Tata McGraw Hill Publishing Company, 1988.

Any other information :

- <http://www.textbooksonline.tn.nic.in/books/12/std12-biochem-em.pdf>
- <http://ibk.mf.uni-lj.si/people/phudler/Biochemistry%205th%20Edition.pdf>

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

Prepared by

(Concerned Faculty/HOD)

Approved by

Dr. Bala Prabhakar
 Dean, SPP-SPTM

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Program: B. Pharm.				Semester : II	
Course : Computer Applications in Pharmacy – Practical				Code: BP210P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 10)	Term End Examinations (TEE) (Marks- 15 in Question Paper)
0	2	0	1	Marks Scaled to 10	Marks Scaled to 15
Pre-requisite: Basic knowledge of computer					
Objectives: To make the student well appraised with Microsoft Office tools such as MS Word, MS Excel and MS Access. To design webpages using HTML.					
Outcomes: Upon completion of the course, the students shall be able to understand					
<ul style="list-style-type: none"> • Learning and practicing MS Word, MS Excel and MS Access with real time scenarios. • Designing webpage using HTML and gaining knowledge of drugs using online tools. 					
Detailed Syllabus: (per session plan)					
Unit	Description				Hrs
1	<ol style="list-style-type: none"> 1. Design a questionnaire using a word processing package to gather information about a particular disease. 2. Create a HTML web page to show personal information. 3. Retrieve the information of a drug and its adverse effects using online tools 4. Creating mailing labels Using Label Wizard, generating label in MS WORD 5. Create a database in MS Access to store the patient information with the required fields Using access 6. Design a form in MS Access to view, add, delete and modify the patient record in the database 7. Generating report and printing the report from patient database 8. Creating invoice table using – MS Access 9. Drug information storage and retrieval using MS Access 10. Creating and working with queries in MS Access 11. Exporting Tables, Queries, Forms and Reports to web pages 12. Exporting Tables, Queries, Forms and Reports to XML pages 13. Introduction Microsoft Excel - Excel Environment, Entering. Editing and Formatting Data, Formatting Numbers 14. Managing Worksheets, Modifying Rows and Columns, Changing Views, Saving a Workbook, Print Set Up 15. Introduction to Formulas, Lookups, Conditional Logic 16. Text Formulas, Named Ranges, Formula Tools, Conditional Formatting 17. Tables, Charts, Pivot Tables 				30

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Reference 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
3. Bioinformatics (Concept, Skills and Applications) - S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi - 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath - Cary N.Prague - Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002
5. Microsoft Excel 2016 book Pdf

Any other information :

Total Marks of Internal Continuous Assessment (ICA) :10 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	10
Term Work	0
Total Marks :	10

Prepared by

Approved by

Dean, SPP-SPTM

SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

1Program: B. Pharm				Semester :IV	
Course : Pharmaceutical Organic Chemistry III - Theory				Code: BP401T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite:					
<ul style="list-style-type: none"> • Basic knowledge of Stereochemistry, Resonance, IUPAC Nomenclature • Knowledge of Basics in Pharmaceutical Chemistry • Knowledge of Pharmaceutical Organic Chemistry-I and II 					
Scope: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.					
Objectives:					
<ul style="list-style-type: none"> • The course is designed with the aim of imparting the detailed knowledge and understanding about the science behind the organic synthesis of small molecules and to some extent, macromolecules, detailed stereochemistry, reactions of chiral compounds • The types of examples under various types of reaction mechanisms and their utility for the synthesis of organic molecules 					
Outcomes:					
At the end of the course, the student shall be able to					
<ol style="list-style-type: none"> 1. understand the methods of preparation and properties of organic compounds 2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions 3. know the medicinal uses and other applications of organic compounds 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration
Note: To emphasize on definition, types, mechanisms, examples, uses/applications					
1	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				10
2	Geometrical isomerism Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers.				10

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	Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions	
3	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	10
4	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	8
5	Reactions of synthetic importance Metal hydride reduction (NaBH ₄ and LiAlH ₄), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement Claisen-schmidt condensation	7
6	Tutorials	15
	Total	60
Text Books:		
<ul style="list-style-type: none"> • Organic chemistry by I.L. Finar, Volume-I & II. • Organic Chemistry by Morrison and Boyd • Heterocyclic Chemistry by T.L. Gilchrist 		
Reference Books:		
<ul style="list-style-type: none"> • Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part A: Structure and Mechanisms, 4th ed.; Springer: NY, 2006. • Carey, F. A; Sundberg, R. J. Advanced Organic Chemistry Part B: Reactions and Synthesis, 4th ed.; Springer: NY, 2001. • Morrison, R. T.; Boyd, R. N. Organic Chemistry, Pearson Education: USA, 1992. • Advanced organic chemistry - Jerry March 		

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Any other information :

- www.organic-chemistry.org/
- www.acdlabs.com/iupac/nomenclature/
- www.organic-chemistry.org/namedreactions/
- totallysynthetic.com/blog/
- www.chem.ualgary.ca/courses/351/orgnom/index.html
- <http://www.cem.msu.edu/~reusch/vtxtindex.htm>

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

Approved by

(Concerned Faculty/HOD)

Dr. Bala Prabhakar
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SVKM's Narsee Monjee Institute of Management Studies
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 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B. Pharm				Semester : IV	
Course : Medicinal Chemistry I - Theory				Code: BP402T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Prerequisite :					
<ul style="list-style-type: none"> Basic knowledge of Organic Chemistry, Biochemistry, Physiology and Pharmacology. 					
Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.					
Objectives					
<ul style="list-style-type: none"> write the chemical synthesis of some drugs and to carry out synthesis of drug like molecules or intermediates 					
Outcomes:					
Upon completion of the course the student shall be able to					
<ol style="list-style-type: none"> understand the chemistry of drugs with respect to their pharmacological activity understand the drug metabolic pathways, adverse effect and therapeutic value of drugs know the Structural Activity Relationship (SAR) of different class of drugs write the chemical synthesis of some drugs 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration
Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)					
1	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				10
2	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				10

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	<p>Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.</p> <p>•Indirect acting agents: Hydroxyamphetamine,Pseudoephedrine, Propylhexedrine.</p> <p>•Agents with mixed mechanism: Ephedrine, Metaraminol.</p> <p>Adrenergic Antagonists:</p> <p>Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.</p> <p>Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.</p>	
3	<p>Cholinergic neurotransmitters:</p> <p>Biosynthesis and catabolism of acetylcholine.</p> <p>Cholinergic receptors (Muscarinic & Nicotinic) and their distribution.</p> <p>Parasympathomimetic agents: SAR of Parasympathomimetic agents</p> <p>Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine.</p> <p>Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible):</p> <p>Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorophate, Echothiophate iodide, Parathione, Malathion.</p> <p>Cholinesterase reactivator: Pralidoxime chloride.</p> <p>Cholinergic Blocking agents: SAR of cholinolytic agents</p> <p>Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.</p> <p>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.</p>	10
4	<p>Drugs acting on Central Nervous System</p> <p>Sedatives and Hypnotics:</p> <p>Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem</p> <p>Barbiturtes: SAR of barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital</p> <p>Miscellaneous:</p> <p>Amides & imides: Glutethmide.</p> <p>Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol.</p> <p>Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.</p> <p>Antipsychotics</p> <p>Phenothiazines: SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine</p>	8

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	<p>hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.</p> <p>Ring Analogues of Phenothiazines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.</p> <p>Fluro buterophenones: Haloperidol, Droperidol, Risperidone.</p> <p>Beta amino ketones: Molindone hydrochloride.</p> <p>Benzamides: Sulpieride.</p> <p>Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action</p> <p>Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*, Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione Succinimides: Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas: Phenacemide, Carbamazepine*</p> <p>Benzodiazepines: Clonazepam</p> <p>Miscellaneous: Primidone, Valproic acid , Gabapentin, Felbamate</p>	
5	<p>Drugs acting on Central Nervous System</p> <p>General anesthetics:</p> <p>Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.</p> <p>Ultra short acting barbiturates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium.</p> <p>Dissociative anesthetics: Ketamine hydrochloride.*</p> <p>Narcotic and non-narcotic analgesics</p> <p>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.</p> <p>Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.</p> <p>Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepirac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.</p>	7
6	Tutorials	15
	Total	60

Text Books:

- Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
- Foye's Principles of Medicinal Chemistry.
- Burger's Medicinal Chemistry, Vol I to IV.
- Introduction to principles of drug design- Smith and Williams.
- Remington's Pharmaceutical Sciences

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- Text book of practical organic chemistry- A.I.Vogel.

Reference Books:

- Abraham, D. J. Burger's Medicinal Chemistry & Drug Discovery 6th ed.; Wiley Interscience: New Jersey, 2007.
- Hansch, C.; Sammes, P. G.; Taylor, J. B.; Kennewell, P. D. Comprehensive Medicinal Chemistry, Vol 1, 1st ed.; Pergamon, 1989.
- Larsen, P. K.; Liljefors, T.; Madsen, U. Textbook of Drug Design and Discovery, 3rd ed.; Taylor and Francis: London and New York, 2004.

Any other information :

- en.wikipedia.org/wiki/Drug_design
- www.healthtech.com/2002/sbd/
- www.uic.edu/~kbuzik/text/phar331.htm
- www.answers.com/topic/drug-design
- publications.nigms.nih.gov/structlife/chapter4.html
- gtresearchnews.gatech.edu/newsrelease/cd4.htm

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

Approved by

(Concerned Faculty/HOD)

Dr. Bala Prabhakar
Dean, SPP-SPTM

SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B.Pharm				Semester : IV	
Course : Physical Pharmaceutics II - Theory				Code: BP403T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial	Credit	Internal Continuous Assessment (ICA) (Marks - 25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite: Basics of Chemistry and Physics, General Pharmacy and Physical Pharmacy I					
Scope: The course deals with various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.					
Objectives:					
<ol style="list-style-type: none"> 1. Understand various physicochemical properties of drug molecules in the designing the dosage forms. 2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations. 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms. 					
Outcomes:					
Upon completion of the course the student is updated with:					
<ul style="list-style-type: none"> • Various properties, theories and evaluation of colloids. • Formulation of suspensions and emulsions – understanding of evaluation and stability. • Viscosity – concept and evaluation using different instruments, flow behavior of liquids and the influence of thixotropy in pharmaceutical formulations. • Particle size and its measurement – effect on properties of dosage forms. Well-informed about the parameters to be applied in development of solid dosage forms. • Effect of chemical kinetics on pharmaceutical products and its application in stability testing. 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration
1.	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.				7
2.	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				8

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3.	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. Ternary phase diagram.	10
4.	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.	10
5.	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 96	10
6.	Tutorials	15
	Total	60

Prescribed Texts:

- Martins Physical Pharmacy and Pharmaceutical Sciences, (Ed.) Sinko P.J.; 7th edition, Wolters Kluwer, 2016.
- Lachman/Lieberman's The Theory and Practice of Industrial Pharmacy, (Eds.) Khar R.K., Vyas S.P., Ahmad F.J., Jain G.K.; 4th edition, CBS Publishers & Distributors Pvt. Ltd., 2013 (Reprint 2016).

Reference Books:

- Colloidal Dispersions: Suspensions, Emulsions and Foams, (Eds.) Morrison I.D., Ross S.; Wiley - Interscience, 2002.
- Cooper & Gunn's Tutorial Pharmacy, (Ed.) Carter S.J.; 6th edition, CBS publishers and distributors, 2005.
- Remington: The Science and Practice of Pharmacy; (Ed.) Allen L.V.; 22nd edition, Pharmaceutical Press, 2013.
- Bentley's Text Book of Pharmaceutics, (Ed.) Rawlins E.A.; 8th edition, Elsevier, 2010.

Internet Reference:

- https://www.ema.europa.eu/en/documents/scientific-guideline/ich-q-1-r2-stability-testing-new-drug-substances-products-step-5_en.pdf
- <http://www.chemguide.co.uk/physical/acidbaseeqia/buffers.html>

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- http://www.malvern.com/labeng/products/iwtm/rheological_properties.htm
- <http://www.kaltecsci.com/rheology.pdf>

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

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SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B. Pharm				Semester :IV	
Course : Pharmacology I- Theory				Code: BP404T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Pre-requisite: Basic knowledge of human physiology and pathophysiology					
Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.					
Objectives: 1.To understand general principles of Pharmacology 2. To study the effect of drugs on different organ systems					
Outcomes: After completion of the course, students would be able to : 1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/ sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences					
Detailed Syllabus: (per session plan)					
Unit	Description				Durati on
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, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination				08

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2	<p>General Pharmacology</p> <p>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.</p> <p>b. Adverse drug reactions.</p> <p>c. Drug interactions (pharmacokinetic and pharmacodynamic)</p> <p>d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.</p>	12
3	<p>Pharmacology of drugs acting on peripheral nervous system</p> <p>a. Organization and function of ANS.</p> <p>b. Neurohumoral transmission, co-transmission and classification of neurotransmitters. c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.</p> <p>d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents.</p> <p>f. Drugs used in myasthenia gravis and glaucoma</p>	10
4	<p>Pharmacology of drugs acting on central nervous system</p> <p>a. Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.</p> <p>b. General anesthetics and pre-anesthetics.</p> <p>c. Sedatives, hypnotics and centrally acting muscle relaxants.</p> <p>d. Anti-epileptics</p> <p>e. Alcohols and disulfiram</p>	08
5	<p>Pharmacology of drugs acting on central nervous system</p> <p>a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.</p> <p>b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics.</p> <p>d. Opioid analgesics and antagonists</p> <p>e. Drug addiction, drug abuse, tolerance and dependence.</p>	07
	Tutorials	15
	Total	60

Text Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier .

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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.
5. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
6. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
7. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
8. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,

Reference Books:

1. Goodman and Gilman, The Pharmacological basis of therapeutics, 11th edition, Published by McGraw Hill.
2. Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor , Basic & Clinical Pharmacology, 11e McGraw Hill publishers, Philadelphia

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

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Approved by

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SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B.Pharm.				Semester : IV	
Course : Pharmacognosy and Phytochemistry I - Theory				Code: BP405T	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -25)	Term End Examinations (TEE) (Marks- 75 in Question Paper)
3	0	1	4	Marks Scaled to 25	Marks Scaled to 75
Prerequisite : Basic knowledge of botany, chemistry and biology.					
Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.					
Objectives					
<ul style="list-style-type: none"> • To create the awareness regarding importance of Pharmacognosy. • To provide details of drugs form natural origin. • To provide the knowledge regarding cultivation, collection and storage of crude drugs. • To emphasize importance of quality control of crude drugs. • To impart knowledge of traditional systems of medicines. • To provide knowledge of detail pharmacognostic account of natural drugs containing carbohydrates, proteins, lipids. 					
Outcomes: Upon completion of the course, the student shall be able					
<ol style="list-style-type: none"> 1. to know the techniques in the cultivation and production of crude drugs 2. to know the crude drugs, their uses and chemical nature 3. know the evaluation techniques for the herbal drugs 4. to carry out the microscopic and morphological evaluation of crude drugs 					
Detailed Syllabus: (per session plan)					
Unit	Description				Duration
I	<p>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).</p> <p>Classification of drugs: Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs</p> <p>Quality control of Drugs of Natural Origin: Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.</p> <p>Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.</p>				10

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II	<p>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</p> <p>Conservation of medicinal plants</p>	10
III	<p>Plant tissue culture: Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines</p>	7
IV	<p>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.</p> <p>Introduction to secondary metabolites: Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins</p>	10
V	<p>Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs</p> <p>Plant Products: Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens, Natural allergens</p> <p>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:</p> <p>Carbohydrates: Acacia, Agar, Tragacanth, Honey</p> <p>Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).</p> <p>Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax</p> <p>Marine Drugs: Novel medicinal agents from marine sources</p>	8
6	Tutorials	15
	Total	60

Text Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.

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3. Text Book of Pharmacognosy by T.E. Wallis 5th edition, CBS publishers and distributors, New Delhi, 2005.
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.
6. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr.SH.Ansari, 1st edition, Birla publications, New Delhi, 2007
8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhale
9. Anatomy of Crude Drugs by M.A. Iyengar
10. Bruneton J. Pharmacognosy Phytochemistry Medicinal Plants. 2nd edition, Lavoisier Publishing, Paris, France, 1999.
11. Heinrick M, Barnes J, Gibbons S, Williamson EM. Fundamental of Pharmacognosy & Phytotherapy. 1st edition, Churchill Livingstone, London, 2008.

Reference Books:

1. India Pharmacopoeia, Ministry of Health, Govt. of India, Manager of publications, New Delhi, 1966.
2. Indian Pharmacopoeia. Indian Pharmacopoeia Commission, Ghaziabad, 2014.
3. Atal CK, Kapoor BM. Cultivation and Utilization of Medicinal Plants, Vol I and II 1982.
4. Indian Herbal Pharmacopoeia, IDMA, Mumbai, 2002.
5. The Wealth of India A dictionary of Indian raw materials and industrial products. Publication and Information Directorate, Council of Scientific & Industrial Research, New Delhi, 2003.
6. World Health Organization, Quality control methods for medicinal plants. AITBS publishers and distributors, Delhi, 1998.
7. Mukherjee PK. Quality Control of Herbal Drugs. Business Horizons, India, 2008.
8. Rajpal V. Standardisation of Botanicals. Vol-I & II. Eastern publishers, New Delhi, 2005.
9. Stahl E. Thin Layer Chromatography. Springer International Student Edition, 2005.
10. Wagner H., Plant drug analysis: Thin layer chromatography. 2nd edition, Springer Verlag Berlin, New York, 2004.
11. Harborne JB. Phytochemical Methods. 3rd edition, Chapman and Hall, London, 2011.
12. Kirtikar KR, Basu BD. Indian medicinal plants. International book distributors, Dehradun, 2005.
13. Nadkarni KM. Indian Materia Medica. Popular Prakashan, Mumbai, 2007.
14. Kokate CK, Practical Pharmacognosy. 4th edition, Vallabh Prakashan, New Delhi, 2010.
15. Gokhale SB, Gokhale AS, Kulkarni YA, Yele SU, Experimental Pharmacognosy. 3rd edition, Nirali Prakashan, Pune, 2016.
16. Gokhale SB, Kalaskar M, Kulkarni YA, Yele SU, Pharmacognosy of Animal Drugs. 2nd Edition, Nirali Prakashan, Pune, India.
17. Quality Standards of Indian Medicinal Plants Volume-I to IX, Indian Council for Medical Research, New Delhi, 2003-2011.
18. Reviews on Indian Medicinal Plants Volume-I to IX, Indian Council for Medical Research New Delhi, 2004-2011.
19. Medicinal Plants of India. Vol I to VI, Indian Council for Medical Research New Delhi, 1987.

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20. Rastogi RP, Malhotra BN, Compendium of Indian Medicinal Plants. Vol I to VII, Publication and Information Directorate, New Delhi, 1960-1994.

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 25 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Examination	15
Term Work	10
Total Marks :	25

Prepared by

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Approved by

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SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B.Pharm				Semester : IV	
Course : Medicinal Chemistry I - Practical				Code: BP406P	
Teaching Scheme			Evaluation Scheme		
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Prerequisite :					
<ul style="list-style-type: none"> Basic knowledge of Organic Chemistry, Biochemistry, Physiology and Pharmacology. 					
Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.					
Objectives					
<ul style="list-style-type: none"> write the chemical synthesis of some drugs and to carry out synthesis of drug like molecules or intermediates 					
Outcomes:					
Upon completion of the course the student shall be able to					
<ol style="list-style-type: none"> understand the chemistry of drugs with respect to their pharmacological activity understand the drug metabolic pathways, adverse effect and therapeutic value of drugs know the Structural Activity Relationship (SAR) of different class of drugs write the chemical synthesis of some drugs 					
Detailed Syllabus: (per session plan)					
Unit	Description				
1	Preparation of drugs/ intermediates: 1,3-pyrazole				
2	1,3-oxazole				
3	Benzimidazole				
4	Benztriazole				
5	2,3- diphenyl quinoxaline				
6	Benzocaine				
7	Phenytoin				
8	Phenothiazine				
9	Barbiturate				
10	Assay of drugs: Chlorpromazine				
11	Assay of drugs: Phenobarbitone				

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12	Assay of drugs: Atropine
13	Assay of drugs: Ibuprofen and Aspirin
14	Assay of drugs: Furosemide
15	Determination of Partition coefficient for any two drugs

Text Books:

- Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
- Foye's Principles of Medicinal Chemistry.
- Burger's Medicinal Chemistry, Vol I to IV.
- Introduction to principles of drug design- Smith and Williams.
- Remington's Pharmaceutical Sciences
- Text book of practical organic chemistry- A.I.Vogel.

Reference Books:

- Abraham, D. J. Burger's Medicinal Chemistry & Drug Discovery 6th ed.; Wiley Interscience: New Jersey, 2007.
- Hansch, C.; Sammes, P. G.; Taylor, J. B.; Kennewell, P. D. Comprehensive Medicinal Chemistry, Vol 1, 1st ed.; Pergamon, 1989.
- Larsen, P. K.; Liljefors, T.; Madsen, U. Textbook of Drug Design and Discovery, 3rd ed.; Taylor and Francis: London and New York, 2004.

Any other information :

- en.wikipedia.org/wiki/Drug_design
- www.healthtech.com/2002/sbd/
- www.uic.edu/~kbuzik/text/phar331.htm
- www.answers.com/topic/drug-design
- publications.nigms.nih.gov/structlife/chapter4.html
- gtresearchnews.gatech.edu/newsrelease/cd4.htm

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

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 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B.Pharm				Semester: IV	
Course: Physical Pharmaceutics II - Practical				Code: BP407P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Pre-requisite: Basics of Chemistry and Physics, General Pharmacy					
Scope: The course deals with various physical and physicochemical properties, and principle involved in dosage forms design. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.					
Objectives: Upon the completion of the course student shall be able to					
<ol style="list-style-type: none"> 1. Understand particle size measurement and flow properties of powders. 2. Determine physical stability of suspensions. 3. Determine rate of order of reaction and its effect on stability. 4. Understand viscosity of fluids and its measurement. 5. Prepare colloids and study their properties. 					
Outcomes: Upon completion of the course the student is able to:					
<ul style="list-style-type: none"> • Determining particle size and flow properties of powders. • Sedimentation of suspensions and evaluate effect of suspending agents on stability of suspension. • Determine order of reaction and apply it to drug stability determination. • Determine viscosity of various formulations (Newtonian and Non-newtonian). • Prepare colloids and evaluate them. 					
Detailed Syllabus: (per session plan)					
Unit	Description				
1.	Determination of particle size, particle size distribution using sieving method.				
2.	Determination of particle size, particle size distribution using microscopic method.				
3.	Determination of bulk density, true density and porosity.				
4.	Determine the angle of repose and influence of lubricant on angle of repose.				
5.	Determination of viscosity of liquid using Ostwald's viscometer.				
6.	Determination of sedimentation volume with effect of different suspending agent.				
7.	Determination of sedimentation volume with effect of different concentration of single suspending agent.				
8.	Determination of viscosity of semisolid using Brookfield viscometer.				

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9.	Determination of reaction rate constant first order.
10.	Determination of reaction rate constant second order.
11.	Accelerated stability studies of Aspirin.
12.	Determination of order of reaction - Half-life method.
13.	Preparation and evaluation of sulfur colloids.
14.	Verification of Schulze Hardy rule using hydrated ferric oxide colloid.
15.	Preparation of emulsion using ternary phase diagram. Its Identification and Evaluation

Recommended Books

1. Martins Physical Pharmacy and Pharmaceutical Sciences, (Ed.) Sinko P.J.; 7th edition, Wolters Kluwer, 2016.
2. Lachman/Lieberman's The Theory and Practice of Industrial Pharmacy, (Eds.) Khar R.K., Vyas S.P., Ahmad F.J., Jain G.K.; 4th edition, CBS Publishers & Distributors Pvt. Ltd., 2013 (Reprint 2016).
3. Experimental Pharmaceutics, (Eds.) Parrott E.L., Sasaki W.; 4th edition, Burgess Publishing Company, Minneapolis, 1977.
4. Cooper & Gunn's Tutorial Pharmacy, (Ed.) Carter S.J.; 6th edition, CBS publishers and distributors, 2005.
5. Pharmaceutical Dosage forms: Tablets, Liberman H.A., Lachman L., Schwartz J.B.; Volume 1 to 3, 2nd edition, Marcel Dekker Inc., 1989.
6. Pharmaceutical Dosage forms: Disperse systems, Liberman H.A., Lachman L., Schwartz J.B.; Volume 2, 2nd edition, Marcel Dekker Inc., 1989.
7. Physical Pharmaceutics, Manavalan R., Ramasamy C.; PharmaMed Press/BSP Books.
8. Laboratory Manual of Physical Pharmaceutics, Subrahmanyam C.V.S., Setty J.T.; Vallabh Prakashan, Delhi, 2005.
9. Theory and Practice of Physical Pharmacy (E-Book), Jain G., Khar R.K., Ahmad F.J.; Elsevier Health Sciences, 2013.

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

Prepared by

Approved by

(Concerned Faculty/HOD)

Dr. Bala Prabhakar
Dean, SPP-SPTM

SVKM's Narsee Monjee Institute of Management Studies
SPP-School of Pharmacy & Technology Management
 B.PHARM & B.PHARM+MBA SECOND YEAR - SEMESTER IV, 2020-21

Program: B. Pharm				Semester :IV	
Course : Pharmacology I - Practical				Code: BP408P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Pre-requisite: Basic knowledge of human physiology and pathophysiology					
Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.					
Objectives: To understand general principles of Pharmacology To study the effect of drugs on different organ systems					
Outcomes: After completion of the course, students would be able to : 1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences					
Detailed Syllabus: (per session plan)					
Description					
<ol style="list-style-type: none"> 1. Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines. 5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats. 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice 8. Effect of drugs on ciliary motility of frog oesophagus 9. Effect of drugs on rabbit eye 10. Effects of skeletal muscle relaxants using rota-rod apparatus. 11. Effect of drugs on locomotor activity using actophotometer. 12. Anticonvulsant effect of drugs by MES and PTZ method 					

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13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Text Books:

1. Rang & Dale's Pharmacology, 7th Edition
2. Tripathi K D., Essentials of Medical Pharmacology, 4th edition, Published by Jaypee brothers.
3. Lippincott's Illustrated Reviews, Pharmacology 3rd edition
4. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
5. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,

Reference Books:

1. Goodman and Gilman, The Pharmacological basis of therapeutics, 11th edition, Published by McGraw Hill.
2. Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor , Basic & Clinical Pharmacology, 11e McGraw Hill publishers, Philadelphia

Any other information : All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

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Program: B.Pharm.				Semester : IV	
Course : Pharmacognosy and Phytochemistry I - Practical				Code: BP408 P	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -15)	Term End Examinations (TEE) (Marks- 35 in Question Paper)
0	4	0	2	Marks Scaled to 15	Marks Scaled to 35
Prerequisite : Basic knowledge of botany, chemistry and biology.					
Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.					
Objectives					
<ul style="list-style-type: none"> • To create the awareness regarding importance of Pharmacognosy. • To provide details of drugs form natural origin. • To provide the knowledge regarding cultivation, collection and storage of crude drugs. • To emphasize importance of quality control of crude drugs. • To impart knowledge of traditional systems of medicines. • To provide knowledge of detail pharmacognostic account of natural drugs containing carbohydrates, proteins, lipids. 					
Outcomes: Upon completion of the course, the student shall be able					
<ol style="list-style-type: none"> 1. to know the techniques in the cultivation and production of crude drugs 2. to know the crude drugs, their uses and chemical nature 3. know the evaluation techniques for the herbal drugs 4. to carry out the microscopic and morphological evaluation of crude drugs 					
Detailed Syllabus: (per session plan)					
Unit	Description				
1.	Analysis of crude drugs by chemical tests: (i)Tragacanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil				
2.	Determination of stomatal number and index				
3.	Determination of vein islet number, vein islet termination and palisade ratio.				
4.	Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer				
5.	Determination of Fiber length and width				
6.	Determination of number of starch grains by Lycopodium spore method				
7.	Determination of Ash value				

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8.	Determination of Extractive values of crude drugs
9.	Determination of moisture content of crude drugs
10.	Determination of swelling index and foaming index
11.	Analysis of crude drugs by chemical tests: Castor oil, Wool Fat, Bees Wax
12.	Analysis of crude drugs by chemical tests: cotton, silk, wool, jute
13.	Study of different types of stomata.
14.	Study of different types of trichomes.
15.	Preliminary phytochemical screening

Text Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & 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 5th edition, CBS publishers and distributors, New Delhi, 2005.
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.
6. Anatomy of Crude Drugs by M.A. Iyengar

Reference Books:

1. India Pharmacopoeia, Ministry of Health, Govt. of India, Manager of publications, New Delhi, 1966.
2. Indian Pharmacopoeia. Indian Pharmacopoeia Commission, Ghaziabad, 2014.
3. Indian Herbal Pharmacopoeia, IDMA, Mumbai, 2002.
4. World Health Organization, Quality control methods for medicinal plants. AITBS publishers and distributors, Delhi, 1998.
5. Mukherjee PK. Quality Control of Herbal Drugs. Business Horizons, India, 2008.
6. Rajpal V. Standardisation of Botanicals. Vol-I & II. Eastern publishers, New Delhi, 2005.
7. Stahl E. Thin Layer Chromatography. Springer International Student Edition, 2005.
8. Wagner H., Plant drug analysis: Thin layer chromatography. 2nd edition, Springer Verlag Berlin, New York, 2004.
9. Harborne JB. Phytochemical Methods. 3rd edition, Chapman and Hall, London, 2011.
10. Kokate CK, Practical Pharmacognosy. 4th edition, Vallabh Prakashan, New Delhi, 2010.
11. Gokhale SB, Gokhale AS, Kulkarni YA, Yele SU, Experimental Pharmacognosy. 3rd edition, Nirali Prakashan, Pune, 2016.
12. Quality Standards of Indian Medicinal Plants Volume-I to IX, Indian Council for Medical Research, New Delhi, 2003-2011

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Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 15 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Sessional Practical Examination	15
Term Work	0
Total Marks :	15

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