GONDWAN UNIVERSITY, GADCHIROLI

Four Year Degree Course in Pharmacy

I Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject	Teaching Scheme							Exam	ination Sch	ieme			
Code		Hou	rs per v	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP101	Pharmaceutics-I	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 102	Pharmaceutical inorganic chemistry -I	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 103	Pharmaceutical Biochemistry –I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 104	Anatomy and Physiology –I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 105	Pharmacognosy –I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 106	Pharmaceutics-I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 107	Pharmaceutical inorganic chemistry -I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 108	Pharmaceutical Biochemistry –I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 109	Anatomy and Physiology –I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 1010	Pharmacognosy –I	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	17	0	20	27				500				500	
	Semester total				1000									

II Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject	Teaching Scheme				Examination Scheme								
Code		Hour	rs per	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP201	Pharmaceutics-II	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 202	Pharmaceutical inorganic chemistry -II	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 203	Pharmaceutical Biochemistry -II	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 204	Anatomy and Physiology –II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 205	Pharmacognosy –II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 206	Statastics and computer application in pharmacy	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 207	Pharmaceutics-II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 208	Pharmaceutical inorganic chemistry -I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 209	Pharmaceutical Biochemistry –I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 2010	Anatomy and Physiology –I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 2011	Pharmacognosy –I	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0	20	28				600				500	
	Semester total					1100								

III Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject	Teaching Scheme				Examination Scheme								
Code		Hou	rs per v	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP301	Physical Pharmacy –I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 302	Pharmaceutical Organic Chemistry-I	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 303	Pharmaceutical Analysis-I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 304	Pharmaceutical Microbiology	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 305	Pharmacology-I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 306	Hospital and community Pharmacy	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 307	Physical Pharmacy –I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 308	Pharmaceutical Organic Chemistry-I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 309	Pharmaceutical Analysis-I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 3010	Pharmaceutical Microbiology	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 3011	Pharmacology-I	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0	20	28				600				500	
	Semester total				1100									

IV Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

subject	Subject	Teaching Scheme							Exam	ination Sch	neme			
Code		Hou	rs per v	veek	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP401	Physical Pharmacy-II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 402	Pharmaceutical Organic chemistry-II	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 403	Pharmaceutical Analysis- II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 404	Pharmaceutical Biotechnology	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 405	Pharmacology-II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 406	Pharmaceutical Management	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 407	Physical Pharmacy-II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 408	Pharmaceutical Organic chemistry-II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 409	Pharmaceutical Analysis- II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 4010	Pharmaceutical Biotechnology	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 4011	Pharmacology-II	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0	20	28				600				500	
	Semester total				1100									

V Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject	Teaching Scheme				Examination Scheme								
Code		Hou	rs per v	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP501	Pharmaceutics-III (D.F.T.)	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 502	Pharmaceutical Engineering-I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 503	Pharmaceutical organic chemistry-III	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 504	Pharmacology-III	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 505	Pharmacognosy –III	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 506	Biopharmaceutices	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 507	Pharmaceutics-III (D.F.T.)	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 508	Pharmaceutical Engineering-I	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 509	Pharmaceutical organic chemistry-III	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 5010	Pharmacology-III	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 5011	Pharmacognosy –III	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0	20	28				600				500	
	Semester total									1100				

VI Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject		Teachi	ng Sche	eme	Examination Scheme								
Code		Hou	rs per v	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP601	Pharmaceutics-IV (D.F.T.)	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 602	Pharmaceutical Engineering-II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 603	Medicinal Chemistry-I	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 604	Pharmacology-IV	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 605	Pharmacognosy –IV	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 606	Pharmaceutical Analysis- III	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 607	Pharmaceutics-IV (D.F.T.)	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 608	Pharmaceutical Engineering-II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 609	Pharmaceutical Analysis- III	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 6010	Pharmacology-IV	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 6011	Pharmacognosy –IV	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0	20	29				600				500	
	Semester total				1100									

VII Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

Subject	Subject	Teaching Scheme				Examination Scheme								
Code		Hou	rs per v	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessio nal	Total	Min Passing Marks	Max Marks	Max. Marks Sessio nal	Total	Min Passing Marks
BP701	Pharmaceutics-V	4	-	-	4	3	80	20	100	45	-	-	-	-
BP 702	Medicinal chemistry -II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 703	Pharmaceutical Analysis- IV	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 704	Pharmacology-V	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 705	Pharmacognosy –V	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 706	Pharmaceutical Jurisprudence	2	-	-	2	3	80	20	100	45	-	-	-	-
BP 707	Pharmaceutics-V	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 708	Medicinal chemistry -II	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 709	Pharmaceutical Analysis- IV	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 7010	Pharmacology-V	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 7011	Pharmacognosy –V	-	-	4	2	5	-	-	-	-	80	20	100	50
	Total	18	0		28				600				500	
	Semester total				1100									

subject	Subject		Teaching Schem						Exam	ination Sche	eme			
Code		Ho	urs per	week	No. of			Theory				Prac	tical	
		L	Т	Р	Credits									
						Duration of Paper (Hrs.)	Max. Mark	Max. Marks Sessional	Total	Min Passing Marks	Max Marks	Max. Marks Sessional	Total	Min Passing Marks
BP801	DFT-II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 802	Medicinal Chemistry-III	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 803	Pharmaceutical Analysis-V	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 804	Clinical pharmacotherapeutics-II	3	-	-	3	3	80	20	100	45	-	-	-	-
BP 805	Industrial Pharmacognosy	3			3									
BP 806	Pharmaceutical Jurisprudance	3			3									
BP 807	DFT-II	-	-	4	2	-	-	-	-	-	80	20	100	50
BP 808	Medicinal Chemistry-III	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 809	Pharmaceutical Analysis-V	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 8010	Industrial Pharmacognosy	-	-	4	2	5	-	-	-	-	80	20	100	50
BP 8011	Seminar & Project work	-	-	6	3	5	-	-	-	-	80	20	100	50
	Total	18	0	20	29				600				500	
Semester total					1100 500 500 100 100 100 100 100 100 100									

VIII Semester B.Pharm [Course and Examination Scheme with Credit Grade System]

SEMESTER STATEMENT

Semester	No	of passing h	eads		Teaching	Scheme		Max Mark				
	Theory	Practical	Total	Lectures	Tutorial	Practical	Credit	Theory	Practical	Total		
I	5	5	10	17	-	20	27	100	100	200		
II	6	5	11	18		20	28	100	100	200		
III	6	5	11	18		20	28	100	100	200		
IV	6	5	11	18		20	28	100	100	200		
v	6	5	11	18		20	28	100	100	200		
VI	6	5	11	19		20	29	100	100	200		
VII	6	5	11	18		20	28	100	100	200		
VIII	4	4+Project	08+ Project	13		16+Project	29	100	100+ Project(200)	300		
Total	45	40	85	141		157	225	900	800	1700		

SEMESTER STATEMENT

Semester	No	of passing h	eads		Teaching	Scheme		Max Mark				
	Theory	Practical	Total	Lectures	Tutorial	Practical	Credit	Theory	Practical	Total		
I	5	5	10	17	-	20	27	500	500	1000		
II	6	5	11	18	-	20	28	600	500	1100		
III	6	5	11	18	-	20	28	600	500	1100		
IV	6	5	11	18	-	20	28	600	500	1100		
V	6	5	11	18	-	20	28	600	500	1100		
VI	6	5	11	19	-	20	29	600	500	1100		
VII	6	5	11	18	-	20	28	600	500	1100		
VIII	4	4+Project	08+ Project	13	-	16+Project	29	400	400+ Project(200)	1000		
Total	45	40	85	141	-	157	225	4500	4100	8600		

1. Pharmaceutical Literature and Ethics :

Historical background. Introduction and Importance of various pharmacopoeias with special reference Indian pharmacopoeia, B.P, USP, and International pharmacopoeia .General introduction to pharmaceutical ethics.

2. Introduction to dosage forms :

Classification of solids, semisolids, liquid dosage forms, conventional and novel drug delivery.

3. Pharmaceutical calculation and metrology:

Calculation of dosage for infants, children, adults, and elderly patients, percentage calculation, % w/v, v/v, and w/w, alcohol dilution, use of allegation method, proof spirit, isotonic solution and displacement value of suppositories.Posology (factor influencing dose, calculation of dose on the basis of age sex and surface area.

4. Pharmaceutical Additive:

Diluents, vehicles, bases, solvents, organoleptic additives, surfactants, polymer and Their applications.

5. Incompatibilities:

Definitions study of types of compatibilities –physical, chemical and therapeutic, Inorganic compatibilities and organic compatibilities.

(semester –I)

Subject Code:BP106 Subject: Pharmaceutics-I PRACTICAL

45 Hour 3hrs/week)

1. Preparation of following classes of products involving the use of calculations in metrology (at least two products from each category wherever applicable): Aromatic waters, injections, solutions, spirits, glycerine, syrups, elixirs, lotions, mucilages and liniments, suppositories, tablets, powders and capsules.

2. Study of one monograph from the latest edition of Indian Pharmacopoeia.

SEMESTER –II

Subject Code:BP 201 Subject: Pharmaceutics-II THEORY

45 Hour (3hrs/week)

1. Prescription:

Various parts of prescription and their function, handling of prescription, sources of error, care required in dispensing procedures including labeling and packaging of

dispensed product. Prescription container and closures, pricing the prescription .Latin term related to prescription and translation in to English.

2. Pharmaceutical Preparation:

Principal and procedure adopted in dispensing of following classes of pharmaceuticals:

Aromatic water, syrups, elixirs, spirits, tinctures, emulsions, suspensions, powders, Lozenges, hard and soft gelatin capsules, gargles, dentifrices, lotions, liniments, creams, ointments, pastes, suppositories, pessaries, urethral, and nasal bougies, glycerites, jellies, inhalations and sprays, throat paints, eye and ear drops, douches, enemas, effervescent granules.

3. Surgical Aids :

Surgical dressings, sutures and their standards.

(semester –II) SEMESTER –II

Subject Code: BP207 Subject: Pharmaceutics-II PRACTICAL

45 Hour (3hrs/week)

1. Preparation of following classes of product involving the use of calculation in metrology (atleast three product from each category whenever applicable).Liniments, suppositories, tablets, powder and capsule, mixture, solution, emulsion, cream, ointments, pastes, jellies, Lozenge, lotions, inhalations and paints etc.

2. Identification of various types of incompatibilities in prescription. correction and dispensing of

such prescription.

3. Prescription Reading: Minimum of 20 prescriptions from the clinical practice.

Books Recommended:

- 1. Pharmaceutical dosage and drug delivery system-Ansel-Popovich and Allen (Williams and Wilkins).
- 2. Lachman Liberman and Kanig-Industrial Pharmacy (leci Febiger)
- 3. Bentley's T.B.of Pharmaceutics-Rawlins (ELBS)
- 4. Dispensing of medication, by Hooper (Mach Publishing)
- 5. Altaon M.E, Pharmaceutics-The science of dosage form design, ELBS/Churchill Livingstone.
- 6. Remington's Pharmaceutical Sciences (Latest Edition).
- 7. The Extra Pharmacopoeia-Martindale (Latest Edition).
- 8. S.J Carter: Tutorial Pharmacy.
- 9. Cooper and Gunn's: Dispensing Pharmacy.
- 10. N.K.Jain and S.N.Sharma: The theory and practice of Professional Pharmacy
- 11. B.M. Mittal: Textbook of Pharmaceutical Formulation, 4th Edition, Vallabh Prakashan, Delhi.
- 12 Indian Pharmacopoeia- Edition2010.
- 13. British Pharmacopoeia (Latest Edition).
- 14. Hurry's Cosmetology
- 15. Thomssen S.G, Modern Cosmetics, Lea and Febiger, Philadelphia.

Subject code: BP102 Subject: Pharmaceutical Inorganic Chemistry II THEORY

- 1. Sources of impurities in Pharmaceutical Importance of limit test and general principles and procedure for limit test of Chloride, Sulphate Iron, Arsenic Lead and Heavy Metals.
- 2. Radiopharmaceuticals used in medicine- therapeutic and diagnostic application of Radiopharmaceutical's, Radio- Opaque Contrast Media including I, P, Cr, Au, Fe, Ra.
- 3. Pharmacopoeia and monograph-different pharmacopeia and content of official monograph
- 4. Water hardness of water methods to remove hardness of water, different official water
- 5. Pharmaceutical Aids and Necessities acids, bases, buffers, antioxidant, suspending agent, tableting aids and pharmaceutically acceptable glasses.
- 6. Inhalants inorganic gasses used in pharmacy, oxygen, nitrogen, nitrous oxide, carbon dioxide, ammonia helium.

(Semester-I)

Subject code:BP10/	
Subject: Pharmaceutical Inorganic Chemistry II	45 hrs. (3 hrs/ week)
PRACTICAL	

- 1. Semi-micro inorganic qualitative analysis of mixture containing two acidic and two basic radicals (10 mixtures)
- 2. Limit test for chloride, sulfate, iron, lead, arsenic
- 3. Swelling power of bentonite

C--1-1-- J-- DD107

(Semester-II)

Subject code:BP202 Subject: Pharmaceutical Inorganic Chemistry II THEORY

45 hrs. (3 hrs/ week)

- 1. Major intra and extra cellular electrolyte- major physiological ions, electrolyte used in replacement therapy, physiological acid base balance, electrolyte, used in acid base therapy electrolyte in combination therapy
- 2. Dental product- anticarries agent, dentifrices
- 3. Antidote classification, sodium thiosulphate, sodium nitrite
- 4. Gastrointestinal agent- acidifying agent, antacid, protective and adsorbent saline cathartics.
- 5. Essential and trace ions- copper, zinc, iron, selenium, sulfur, iodine and their official compound as per I.P.
- 6. Expectorant and emetics ammonium chloride, potassium iodide, antimony potassium tartarate, mode of action of the entire compound.
- 7. Topical agent general introduction and mode of action of antimicrobials and astringent.

(Semester-II)

Subject code: BP208 Subject: Pharmaceutical Inorganic Chemistry II PRACTICAL

- 1. Preparation of some inorganic pharmaceutical compound(minimum 6)
 - a. Boric acid
 - b. Ferrous sulphate
 - c. Calcium carbonate
 - d. Barium sulphate

- e. Magnesium sulphate
- f. Zinc oxide
- 2. Standardization of compound belonging to different categories as per I.P(minimum 6)
- 3. Prepare and test purified water of pharmacopoeia standard (I.P)
- 4. Acid neutralizing capacity of Aluminum Hydroxide gel
- 5. Presence of iodate in potassium iodide
- 6. Ammonium salts in Potash Alum
- 7. Adsorption property in heavy Kaolin

Recommended Books For Semester I And II

- 1. Inorganic, Medicinal and Pharmaceutical Chemistry by J.H. Block, E. B. Roche, Indian Edition, Varghese Publication.
- 2. Modern Inorganic Pharmaceutical Chemistry by C. A. Dicher.
- 3. Concise Inorganic Chemistry J.D. Lee.
- 4. Bentley and Driver's Text Book of Pharmaceutical Chemistry Revised by L. M. Atherden, 8th Edition, and Oxford Medical Publications.
- 5. Pharmaceutical Inorganic Chemistry by Dhake and Tipnis, 2nd Edition.
- 6. Indian Pharmacopoeia 2010
- 7. Remington the Science and Practice of Pharmacy by Remington, 20th Edition, Lipincott, William and Wilkins.
- 8. Advanced Inorganic Chemistry, 18th Edition, Cotton And Wilkinson (Wiley Eastern Ltd., Delhi)
- 9. Inorganic Pharmaceutical Chemistry (Practical), 2nd Edition, Dhake and Belsare.
- 10. Vogel's Text Book of Quantitative Analysis, 5th Edition]
- 11. Vogel's Quantitative Inorganic Analysis.
- 12. Wilson and Gisvold's Principles of Organic and Medicinal Chemistry
- 13. Harkishan Singh and A. K. Kapoor- Principles of Inorganic Chemistry

(Semester-I)

Subject code:BP103 Subject: Pharmaceutical Biochemistry I (PB-I) THEORY

- 1) **Introduction to biochemistry:** scope of biochemistry in pharmaceutical science, biochemical reactions.
- 2) **Cell:** biochemical organization of cell, prokaryotic and eukaryotic cell metabolism, transport across the cell membrane.
- 3) General introduction to biomolecules: Carbohydrates, proteins, fats.
- 4) **Nutrition:** concept of balanced diet, principle nutrients, nutritional diseases, role of crude fibers, energy metabolism, BMR.
- 5) **Vitamins:** vitamins as co-enzymes and their biological significance, metals as coenzymes, water soluble and fat soluble vitamin with biochemical role and pharmaceutical application.
- 6) **Enzymes:** nomenclature, classification, enzyme kinetics and its mechanism of action, mechanism of inhibition, enzymes and iso-enzymes, application in clinical diagnosis.
- 7) **Electron transport chain:** biological oxidation and its biochemical importance, redox potential and energy rich compounds, respiratory chain and oxidative phosphorylation (schematic diagram).

Subject code: BP108 Subject: Pharmaceutical Biochemistry I (PB-I) PRACTICAL

- 1) Quantitative estimation of glucose in urine by Benedict method.
- 2) Quantitative estimation of carbohydrates by Follin-wu method.
- 3) Determination of ascorbic acid using dye 2,6-dichlorophenol indophenol.
- 4) A study of activity of enzyme salivary amylase.
- 5) Separation of amino acid by paper chromatography.
- 6) Estimation of total proteins in given sample of serum/plasma.

(Semester-II)

Subject code: BP203Subject: Pharmaceutical Biochemistry II (PB-II)45 hrs. (3 hrs/ week)THEORY

- 1) **Bioenergetics:** introduction, concept of free energy, role of high energy nucleotide phosphate, production of ATP and its biological significance.
- 2) **Carbohydrate metabolism:** introduction to metabolism, glycolysis, citric acid cycle, gluconeogenesis, glycogenolysis, glycogen formation, pentose phosphate pathway, uronic acid pathway- significance and abnormalities.
- 3) Lipid metabolism: oxidation of fatty acid (alpha, beta), ketone bodies and their significance, Biosynthesis of saturated and unsaturated fatty acid, sphingolipids and phospholipids, control of lipid metabolism, essential fatty acids, biosynthesis of eicosanoids (Prostaglandins, Prostacyclins, Thromboxanes, Leucotrienes), abnormalities of lipid metabolism.
- 4) Protein metabolism (metabolism of ammonia and nitrogen containing monomers): nitrogen and sulphur cycles, nitrogen balance, biosynthesis and catabolism of amino acids, transamination (SGOT and SGPT), assimilation of ammonia (deamination), urea cycle, metabolic disorders of urea cycles, metabolism of sulphur containing amino acids, porphyrin biosynthesis, formation of bile pigment, porphyrias, hyperbilirubenemia.
- 5) **Nucleic acid and protein biosynthesis:** DNA and RNA bases nucleotides, role of DNA and different type of RNA, salient features of protein biosynthesis (with diagram).
- 6) **Hormones:** classification, hypothalamic and pituitary hormones(anterior and posterior), thyroid hormone, hormones of adrenal cortex, adrenal medulla, gonads, gastro-intestinal (or gut) hormones.
- 7) **Organ function test:** liver function test, jaundice, kidney function test, gastric function test, other organ function test.

- 1) Estimation of total albumins in given sample of serum/ plasma.
- 2) Estimation of total cholesterol in given sample of serum/ plasma.
- 3) Estimation of total triglyceridines in given sample of serum/ plasma.
- 4) Estimation of total LDL in given sample of serum/ plasma.
- 5) Estimation of total HDL in given sample of serum/ plasma.
- 6) Estimation of total bilirubin in given sample of serum/ plasma.

RECOMMENDED BOOKS:

1. Lehninger's Principles of Biochemistry by Albert Lehninger, 4/Ed., Palgrave Macmillon.

- 2. Biochemistry by Lubert Stryer, W.H., Freeman & Company, New York.
- 3. Harper's Illustrated Biochemistry by R.K. Murray & D.K. Granner, 27/Ed, McGraw Hill.
- 4. Molecular Biology by J.D. Watson, The Benjamin/Cummings Company Inc.

5. Clinical Biochemistry by Herold Varley, CBS Publishers, New Delhi.

6. Text Book of Biochemistry with Clinical Correlations by Thomas & Devlin, A Wiley Medical Publication.

7. Clinical Chemistry Interpretation and Techniques by Alex Kaplan Lavernel L. & Szebo Kent E. Opheim Published Lea and Febiger.

8. Text Book of Pathology by Harsh Mohan, 5/Ed., Jaypee Brothers Medical Publishers (P) Ltd.

9. Clinical Biochemistry by S. P. Dandekar 2/Ed

10. Pathophysiology of Disease by Mephee & Lingappa, 2/Ed., Appleton & Lane.

- 11. Pharmaceutical Biochemistry by Sharma P.K & Dandiya P.C, Vallabh Prakashan.
- 12. Text book of Biochemistry by A. C. Deb
- 13. Human Biochemistry by Jamam, Orten publisher.
- 14. Biochemistry by U.Satyanarayan.

15. Varley's Practical Clinical Biochemistry by Harold Varley, 6/Ed., CBS Publishers, New Delhi.

16. Clinical Chemistry Interpretation and Techniques by Alex Kaplan Lavernel L. & Szebo Kent E. Opheim Published Lea and Febiger.

17. Mukherjee K.L. Medical Laboratory Technology. Tata McGraw Hill. New Delhi (Vol. I, II, III)

18. Deb A.C. Viva & Practicals in biochemistry. Central book agency. Calcutta.

19. Plummer D.T. An Introduction to Practical Biochemistry. Tata Mc-Graw Hill, New Delhi.

20. Godkar P.B. Clinical Biochemistry- Principles and Practice. Bhalani Publishing House, Bombay.

(Semester-I)

Subject code:BP104 Subject: Anatomy and physiology-I THEORY

- 1. Basic terminology used in Anatomy and Physiology
- 2. Structure of cell, its component and their structure and functions
- 3. Elementary tissue of human body Epithelial , Muscular , Nervous tissue , their characteristic

- 4. Blood composition and function of blood RBC, WBC, Platelets, Haemopoiesis, mechanism of clotting, Anemia.
- 5. Lymphatic system- Lymph(composition, function, circulation), Lymph Nodes (structure and functions, spleen and its function)
- 6. Cardiovascular system-blood vessels , anatomy of heart , conducting system, cardiac cycle, and heart sounds, blood vessels and circulation, (pulmonary , coronary , and systemic and portal), ECG, blood pressure (maintenance and regulation), disorder of cardio vascular system
- 7. Endocrine system and their abnormalities,
 - a. Pituitary glands
 - b. Thyroid glands and parathyroid glands
 - c. Adrenal glands
 - d. Pancreas
 - e. Gonads
- 8. Sense organ eye, ear, tongue, skin, nose

(Semester-I)

Subject code: BP109 Subject: Anatomy and physiology-I PRACTICAL

45 hrs. (3 hrs/ week)

- 1. Brief introduction to use of Microscope
- 2. Study of instrument use in experimental Pharmacology
- 3. Determination of Hemoglobin content of own blood
- 4. Determination of RBC count of own blood
- 5. Determination of deferential WBC count of own blood
- 6. Determination of blood group count of own blood
- 7. Determination of Vital Capacity
- 8. Determination of Blood Pressure
- 9. Determination of Bleeding Time
- 10. Determination of Breathing rate
- 11. Determination of Erythrocyte Sedimentation Rate (ESR)
- 12. Determination of Respiratory Volume
- 13. Study of gross Anatomy and Physiology of Circulatory system by models, charts, specimen
- 14. Study of gross Anatomy and Physiology of Lymphatic system by models, charts, specimen
- 15. Study of gross Anatomy and Physiology of Ear by models, charts, specimen
- 16. Study of gross Anatomy and Physiology of Eye by models, charts, specimen

(Semester-II)

Subject code: BP204 Subject: Anatomy and physiology-II THEORY

- 1. Respiratory system
 - a. Mechanism and regulation of respiration
 - b. Transport of respiratory gases
 - c. Respiratory volumes and vital capacity
 - d. Disorders of respiratory system (types, definition and cause in brief)
- 2. Digestive system

- a. Physiology of salivary glands, stomach, liver, pancreas and intestine,
- b. Digestion of fat, carbohydrates and proteins
- c. Disorder of GIT (types , definition and cause in brief)
- 3. Urinary system
 - a. Kidney and structure of Nephron
 - b. Formation of urine
 - c. Disorder of urinary system (types, definition and cause in brief)
- 4. Muscular system-Characteristic and function of Muscle Tissue, Neurotransmitters, process of Nervous System (Sympathetic and Parasympathetic), fundamentals of neurotransmitters, process of Neuroconduction and Neurotransmission.
- 5. Reproductive system- Anatomy and Physiology of various parts of male and female Reproductive Systems, Physiology of Menstruation, Spermatogenesis, and Oogenesis.
- 6. Nervous System
 - a. Classification of Nervous System
 - b. Functional areas and function of Cerebrum, Cerebellum, Pons and Medulla, Thalamus and Hypothalamus, Basal Ganglia,
 - c. Spinal cord- structure and reflexes
 - d. Cranial nerves: name and functions
 - e. ANS: Anatomy and Physiology of Sympathetic and Parasympathetic Nervous System
 - f. Disorders of Nervous System (types, definition and cause in brief)

(Semester-II)

Subject code:BP2010 Subject: Anatomy and physiology-II PRACTICAL

- 1. Recording of body temperature
- 2. Recording of Clotting Time
- 3. Recording of Electro Cardiogram
- 4. Study of Anatomy and Physiology of Human Skeleton
- 5. Study of Axial Skeleton
- 6. Study of Joints
- 7. Study of first aid measures
- 8. Determination of WBC count of own blood
- 9. Determination of deferential Leukocyte count of own blood
- 10. Study of gross Anatomy and Physiology of Digestive system by models , charts and specimen
- 11. Study of gross Anatomy and Physiology of Respiratory system by models , charts and specimen
- 12. Study of gross Anatomy and Physiology of Cardiovascular system by models , charts and specimen
- 13. Study of gross Anatomy and Physiology of Nervous System by models , charts and specimen
- 14. Study of gross Anatomy and Physiology of Urinary System by models , charts and specimen
- 15. Study of different of different family planning devices
- 16. Study of various disorder of CVS
- 17. Study of various disorder of GIT

Recommended Books:

- 1. Goyal Ramesh K Basic of Human Anatomy and Physiology (with Practical) B.S.Shah Prakashan, Ahmedabad.
- 2. Tortora G.J. and Derrickson B. Principal of Anatomy and Physiology. 11 Ed. Join Weley and Sons Inc, N.J.
- 3. Kimber, Gray and Stackpole Anatomy and Physiology 11 Th Ed Macmillan Pub.Co. New York.
- 4. Chakrabarti B.K., Ghosh H.N. and Sahana S.N. Human Physiology (New Book Stall, Calcutta)
- 5. Gyton, A.C., Text Book of Medical Physiology(W.B. Saunders Co., Philadelphia)
- 6. Chatterjee C.C.: Human Physiology (Medical Allied Agency, Calcutta).
- 7. Chaudhari, A.R., Textbook of Practical Physiology. Paras Publishers, New Delhi.
- 8. Chaudhari, A.R., Viva in Physiology. Paras Publishers, New Delhi.
- 9. Difiore-Mariano, S.N., Atlas of Human Histology. Lea and Febiger, Philadelphia.
- 10. Garg, K., Bahel, I: and Shah, S, A., Practical Anatomy, Physiology and Biochemistry. B.S. Shah Prakashan, Pune.
- 11. Ross and willson text book of anatomy and physiology

(Semester-I)

Subject code:BP105 Subject: Pharmacognosy-I THEORY

 Introduction to Pharmacognosy
Historical development, modern concept &scope of Pharmacognosy significance
of Pharmacognosy in various system of medicine viz Ayurveda, unani, siddlha,
Homeopathy, Chinese medicine & Aromatherapy

- Classification of crude drugs Based on alphabetical morphological, chemical &taxonomical methods, official & unofficial drugs, organized & unorganized drugs.
- 3. Adulteration & types of adulteration
- 4. Plant cell &it structure, study of plant tissue: parenchyma, collenchymas, sclerenchyma, xylem & phloem
- 5. Study of morphological & histological characters of crude drugs viz stem barks, wood, leaf, flower, fruit & seed.
- 6. Botanical source, names, chemical constituents &uses of Ayurvedic drugs : Amla, Gokhru, Ashwagandha, Ashoka, Bramhi, Neem, Arjuna, Shatavari, Tulsi, Shankapuspi, Guggul, Kalmegh.

(Semester-I)

Subject code: BP109 Subject: Pharmacognosy-I PRACTICAL

45 hrs. (3 hrs/ week)

- 1) To study compound microscope.
- 2) To understand the techniques of section cutting, staining, mounting & microchemical reagent.

- 3) To study the scheme for Pharmacognostic studies of crude drugs.
- 4) To study tissue &tissue system.
- 5) To study morphological & microscopical charactecristics of Arjuna bark.
- 6) To study morphological & microscopical charactecristics of Ashwagandha root.
- 7) To study morphological & microscopical charactecristics of Tulsi leaf.
- 8) To study morphological charactecristics of vitamin (Amala)`
- 9) To study morphological charactecristics of diuretic (Gokhru), antiseptic (Turmeric, Neem), antihypertensive (rauwolfia).
- 10) To study morphological & microscopical charactecristics of Ashoka bark.
- 11) Determination of swelling factor of Isapphula seeds.
- 12) Isolation of starch from potatoes.
- 13) To study morphological & microscopical charactecristics of sandal wood.
- 14) To study morphological & microscopical charactecristics of Isapphula seeds.
- 15) To study morphological & microscopical charactecristics of datura leaf.
- 16) To study morphological charactecristics of shankhpushpi, shatavari and liquorice.

(Semester-II)

Subject code: BP205
Subject: Pharmacognosy-II
THEORY

- 1) Detailed study of cultivation, collection processing & storage of crude drugs: detailed study of method of cultivation, merits & demerits of cultivation.
- 2) Exogenous & endogenous factors affecting cultivation, quality of crude drugs & collection & processing (Garbling Drying, preservation & storage & preparation of crude drugs for commercial market.
- Brief outline of occurrence, distribution ,outline of isolation, identification tests, therapeutic effects & pharmaceutical application of carbohydrates, lipids ,proteins ,alkaloids , terpenoids ,glycosides ,volatile oils ,tannins &resins
- 4) Pharmacognostic study of following crude drugs : Carbohydrates –Agar, Isapgual, guar gum, alginate honey, pectin & starch Lipid – castor oil, olive oil, neem oil, chaulmoogra oil, linseed oil. Tannins –Black catechu, myrobalan, Gambier Protein – gelatin Resins – balsam of told, turmeric, asafoetida, podophyllum
- 5) Fibers : introduction , classification , chemical tests & uses of following fibers cotton, jute ,hemp, silk &wool
- 6) Brief study of drugs from microbial origin
 - 1) Antibiotics derived from amino acid metabolites penicillin
 - 2) Polypeptide antibiotics derived from acetate metabolism Tetracycline
 - 3) Polyenes Griseofulvin
 - 4) Antibiotics derived from carbohydrate metabolism streptomycin

- 1. Identification of fibers -cotton, jute, hemp, silk, wool.
- 2. Identification of following crude drug by morphological study and chemical test
 - a. Tragacanth
 - b. Acacia
 - c. Agar
 - d. Sodium alginate
 - e. Honey
 - f. Pectin
 - g. Starch
 - h. Guargum
 - i. Gelatin
 - j. Gum karaya
- 3. To study the morphological and microscopical characteristics of cinchona bark.
- 4. To study the morphological and microscopical characteristics of cinnamon bark.
- 5. To study the morphological and microscopical characteristics of clove buds.
- 6. To study the morphological and microscopical characteristics of fennel fruit.
- 7. To study the morphological and microscopical characteristics of coriander fruit.
- 8. To study the morphological and microscopical characteristics of senna leaf.
- 9. To study the morphological and microscopical characteristics of cassia bark.
- 10. To study the morphological and microscopical characteristics of ipecac.
- 11. To study the morphological and microscopical characteristics of picorrhiza.
- 12. To study the morphological and microscopical characteristics of nux-vomica.
- 13. To study the morphological and microscopical characteristics of rauwolfia.
- 14. To study the morphological characteristics of carminative (ajowan, balckpepper, cardamom, nutmeg) and laxative(isaphghula, rhubarb)
- 15. To study the morphological and microscopical characteristics of ginger rhizome.
- 16. To study morphological & microscopical characteristics of ephedra stem

RECOMMENDED BOOKS:

- 1. Trease, G. E. and Evans, W. C., Pharmacognosy, W. B. Saunders Co.Ltd. Harourt Publishers Ltd., UK.
- 2. T.E. Wallis: Textbook of Pharmacognosy, CBS Publishers and Distributors New Delhi.
- 3. E.P. Clause; B.E. Tyler; Lea and Febiger: Pharmaconosy, Philadelphia USA.
- 4. L.R. Brady; V.E. Tyler; and Robbers J.E.; Pharmaconosy, Lea and Febiger Philadelphia USA.
- 5. V.D. Rangari: Pharmacognosy and Phytochemisty- Part-I and Part-II: Carreer Publications, Nashik.
- 6. M.P. Vickery and B. Vickery: Secondary Plant Metaboslim, Basingstoke, Macmillan.
- 7. C.K. Kokate; S.B. Gokhale; A.P. Purohit: Pharmacognosy, Nirali Prakashan Pune.

- 8. Atal C.K. and Kapur B.M. Cultivation and Utilization of Medicinal Plants, RRL, Jammu.
- 9. Chopra R.N., Nayar S. L. and Chopra I. C., Glossary of Indian Medicinal Plants CSIR, New Delhi.
- 10. Iyengar M.A., Study Of Crude Drugs, Manipal Power Press, Manipal.
- 11. Medicinal Plants of India, Zafar R., C.B.S. Publisher, New Delhi.
- 12. Kokate C.K. Practical Pharmacognosy, Vallabh Prakashan, Delhi.
- 13. Khandelwal K.R, Practical Pharmacognosy, Nirali Prakashan Pune.

(Semester-II)

Subject code: BP206Subject: STATISTICS & COMPUTER APPLICATION IN PHARMACYTHEORY45 Hours (3 hrs. /week)

- 1. Basic concepts in Statistics
 - Meaning , definition & scope of statics
 - Statically date ,data graphic, type of variables
 - Coactions & classification of data
 - Measurement of central tendency –arithmetic mean, mode, median.
 - Measurement of data –ranges mean deviation & slandered deviation.
- 2. Analysis of variance
 - Meaning &techniques- one way classification ,two way classification
- 3. Correlation & refraction analysis
 - Concept & method; signification ; lines of refraction properties of

coefficient of variance &lines of regration method to find regration line

- 4. Experimented design & consumer testing
- 5. Statistical interferences
- 6. Probability

COMPUTER APPLICATION IN PHARMACY

- **1.** Computer fundamental
 - Over view of computer system
 - Classification of computer hardware general components of computer ;viz memory ;various input –output unit ;C.P.U. secondary storage unit ;low

& high level language classification of computer on the basics of size & capacity ,printer ,Flow Chart .

- Introduction to Operating System ,types of language and Computer network
- 2. **computer application in pharmacy** such as drug information strong & retrieval pharmacokinetics ; drug design ; crude drug ;identification , hospitals & clinical pharmacy pharmaceuticals analysis ; diagnosis & data analysis

References:

- 1. Introduction to Biostatastics & Computer Science Y.I.Shah, Dr.A.R.Paradkar, M.G.Dhayagure
- 2. Stanford Bolton –Pharmaceutical statics
- 3. N.T.J.Bailey Stastical method in biology
- 4. Computer and Commonsense (4th Edition) Roger Hunt, John Shelly
- 5. Computer Today (3rd Edition) Donald Landers.
- 6. Computer Medicine S.Rose
- 7. Computer Applications in Pharmacy William and fassett
- 8. MS-CIT Computing Essentials Timothy J.O'Leary, Linda I O'Leary.