

[School of Pharmacy
Syllabus]

**Bachelor of Pharmacy 2nd year (3rd Semester)
(Theory and Practical)**

S No.	Course	Subject name	Credits		Sessional			Exam	Total
			T	P	TA	MSE	Total	ESE	
1	GSP-301	Pharmaceutical Organic Chemistry-II	3	0	30	20	50	50	100
2	GSP-302	Unit Operation-II	3	0	30	20	50	50	100
3	GSP-303	Physical Pharmacy-II	3	0	30	20	50	50	100
4	GSP-304	Pharmacognosy- I	3	0	30	20	50	50	100
5	GSP-305	Human Anatomy Physiology and Pathophysiology III	4	0	30	20	50	50	100
PRACTICAL									
1	GSP-301P	Pharmaceutical Organic Chemistry- II	0	2	30	20	50	50	100
2	GSP-302P	Unit Operation-II	0	2	30	20	50	50	100
3	GSP-303P	Physical Pharmacy- II	0	2	30	20	50	50	100
4	GSP-304P	Pharmacognosy- I	0	2	30	20	50	50	100
								Total	900

T- Theory, P- Practical, TA- Teacher Assessment, MSE- Mid Semester Examination, ESE-
End semester examination.

[School of Pharmacy
Syllabus]

GSP-301

PHARMACEUTICAL ORGANIC CHEMISTRY-II

UNIT-1.

Methods of Preparation with Mechanism, Properties And Mechanism Of Name Reaction Associated With:-

- a. Active methylene compounds (acetoacetic ester and malonic ester) and their synthetic importance.
- b. α , β -unsaturated carbonyl compounds.
- c. Polynuclear hydrocarbons- Naphthalene, anthracene and phenanthrene.
- d. Polymers and polymerisation.

UNIT-2.

Carbohydrate: Monosaccharide:- Glucose (mutarotation, ring structure of glucose) configuration of monosaccharides).

UNIT- 3.

Disaccharides (Sucrose and maltose), Polysaccharides (Starch and cellulose).

UNIT-4.

Heterocyclic Compounds: Nomenclature, Chemistry, preparation, properties of 5-membered heterocycles with one hetero atom (Pyrrole, Furan and Thiophene), 5-membered heterocycles with two hetero atom (Imidazole, Thiazole, Oxazole, Pyrazole).

UNIT-5.

Nomenclature, Chemistry, preparation, properties of 6-membered heterocycles with one hetero atom (Pyridine, Pyran), 6-membered heterocycles with two hetero atoms (Pyrimidine, Piperazine) Benz fused heterocycles (Quinoline, Isoquinoline, Indole).

GSP-301P

PHARMACEUTICAL ORGANIC CHEMISTRY-II (PRACTICAL).

1. Identification of organic compounds and their mixture with derivatization. (Not more than two)
2. Synthesis of Organic Compounds involving two steps.

BOOKS RECOMMENDED:-

1. March Jerry, Advance organic Chemistry 4th ed. A Wiley
2. Jenkins, The Chemistry of Organic Medicinal Products 4th Ed, Pharma Medpress
3. Finar I.L. Organic chemistry, Pearson education, New Delhi
4. Mann P G & Saunders B C, Practical Organic Chemistry, ELBS/Longman, London.
5. Furniss B A, Hannaford A J, Smith P W G and Tatehell A R, Vogel's Textbook of Practical Organic
6. Morrison, R.T., and Boyd R.N., Organic Chemistry, Prentice Hall of India Pvt. Ltd, New Delhi.
7. Joule J.A., Mills K. and . Smith G.F, Hetrocyclic Chemistry, Staanely Thornes Ltd., U.K.

GSP- 302

UNIT OPERATIONS - II

UNIT-1.

Drying:- Moisture content, Equilibrium relative humidity & Mechanism of drying, Rate of drying & time of drying calculations, Classifications of dryers, Principle, material of construction, applications advantages and disadvantages of tray, fluidized bed, Rotary, Drum, Vacuum, Spray and Freeze dryer.

UNIT-2.

Humidity Ventilation and Air Conditioning Systems (HVAC):- Basic concepts & definitions, Wet bulb & Dry bulb thermometer, Adiabatic saturation temperature, Psychometric charts & Measurement of humidity, Application of humidity measurement in pharmacy, Equipment for dehumidification operations. Principles, Materials of constructions and applications of Refrigeration and Air-conditioning.

UNIT-3.

Evaporation:- Basic concepts of phase equilibrium, Factors affecting evaporation, principle, materials of construction, Applications, advantages and disadvantages of Climbing and falling film evaporators, Evaporating pan, Vacuum evaporators, Horizontal and Vertical evaporators.

UNIT-4.

Distillation:- Raoult's law, Phase diagrams, Simple, Steam, & Flash distillation, Principle of McCabe Thiele method of calculation of number of theoretical plates, Equipment for rectification, Azeotropic, Extractive & molecular distillation.

UNIT-5.

Crystallization: Characteristics of Crystals- purity, size, shape, geometry, habit, forms and factors affecting them. Miers supersaturation theory & caking of crystals and its prevention Classification of crystallizers, Principle, Materials of construction, applications, advantages and disadvantages of Swenson Walker, Agitated batch, Vacuum, Tank and Krystal Crystallizer.

GSP-302P

UNIT OPERATIONS-II (PRACTICAL)

Experiments based on drying, distillation, evaporation, and crystallization, to be performed.

BOOKS RECOMMENDED:-

1. McCabe W.L, Smith J.C. & Peter Harriot. Unit operations of chemical engineering. 5th Ed.
2. International student addition, McGraw hills international book co. New Delhi. 1993.
3. Cooper J.W. & Gunn G., Tutorial Pharmacy, CBS Publisher & distributors New Delhi
4. Perry R.H. & Don Green, Chemical engineering's hand book, McGraw hill book company, New Delhi.
5. Walter. I. Badger & Julius. T. Banchero, Introduction to chemical engineering, McGraw hill Company, New Delhi.
6. Subramanian C.V.S, Pharmaceutical engineering, Vallabh Prakashan, Delhi.

[School of Pharmacy
Syllabus]

7. Remington's Pharmaceutical Sciences, Vol. I & Vol. – II, Mack Publishing Co., U.S.A

[School of Pharmacy
Syllabus]

GSP- 303

PHYSICAL PHARMACY-II

UNIT-I.

Micromeritics and Powder Rheology: Average particle size, Particle size distribution, number and weight distribution, particle number; methods for determining particle size – optical microscopy, sieving, sedimentation , particle volume measurement , shape, specific surface; methods for determining surface area- air permeability, adsorption; derived properties of powders- porosity, packing arrangement, densities, bulkiness and flow properties, pore size.

UNIT-2.

Rheology: Newtonian systems- Newton's Law, kinematics viscosity, effect of temperature; non- Newtonian systems- plastic, pseudo plastic, dilatant; thixotropy- thixotropy in formulation; determination of viscosity choice of viscometer, capillary, falling sphere, cup & bob ,plate & cone viscometers, application of rheology in pharmacy.

UNIT-3.

Surface and Interfacial Phenomenon: Liquid interface, surface and interfacial tensions, surface free energy, measurement of surface and interfacial tensions (capillary rise method, drop number method, drop weight method, Wilhelm plate method), spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB classification, solubilization, detergency, adsorption at solid interfaces, solid gas and solid- liquid interfaces, complex films, electrical properties of interface.

UNIT-4.

Colloidal Dispersions: Definition, types, properties of colloids-optical, kinetics, electrical; protective colloids, applications of colloids in pharmacy. Suspensions: Interfacial properties of suspended particles, settling in suspensions- theory of Sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation Parameters; wetting of particles, controlled flocculation, flocculation in structured vehicles, rheological considerations, stability. Emulsions: Types, theories of emulsification, physical stability, preservation, rheological properties, pharmaceutical applications of emulsions, microemulsions.

UNIT-5.

Stability: Decomposition of medicinal agents- Influence of light, temperature and medium, half life, shelf life; stabilization of medicinal agents, accelerated stability and stress testing, ICH guidelines.

GSP- 303P

PHYSICAL PHARMACY-II (PRACTICAL)

Practicals based on the above mentioned theory topics.

BOOKS RECOMMENDED:

1. Martin Alfred, Physical Pharmacy, 5th ed. B.I. Waverly Pvt. Ltd., New Delhi.
2. Rawlins E.A, Bentley's textbook of Pharmaceutics 8th ed. Bailliere Tindall, London.
3. Gennaro A.R, Remington Pharmaceutical Sciences and practice of Pharmacy, vol. I & II, 20th Ed.
4. Aggarwal S.P., Khanna Rajesh, Physical Pharmacy, CBS Publishers & Distributors, New

[School of Pharmacy
Syllabus]

Delhi.

[B Pharm]

[School of Pharmacy
Syllabus]

GSP-304

PHARMACOGNOSY-I

UNIT-1.

- a. The origin of Pharmacognosy, Present status and scope.
- b. Sources of Drug: Biological and geographical sources of drugs.
Significance of Pharmacognosy in various systems of medicine viz; Ayurveda, Unani, Homeopathic, Siddha and Allopathic systems practiced in India.

UNIT-2.

Classification of Drugs: Alphabetical, Morphological, taxonomical, chemical & Pharmacological, chemo taxonomical.

UNIT-3.

Cultivation, Collection, Processing & Storage of crude drugs:

Factors influencing cultivation of medicinal plants, humidity, rainfall, irrigation,

Type of Soils & fertilizers, fertilization, pest and pest control.

Plant growth regulators.

UNIT-4.

Adulteration and Quality Control of crude drugs:

Causes and types of Adulteration, Organoleptic, Microscopic, Biological, Chemical and Physical method of evaluation.

WHO and current Indian Pharmacopoeial guidelines for the standardization of medicinal plants.

UNIT-5.

Systematic Pharmacognostic Study of the Following:

Carbohydrates and derived products:

Agar, Guar gum, Xanthum gum, Acacia, Honey, Isabgol, Pectin, Starch, Sterculia, Tragacanth, Alginates.

GSP-304P

PHARMACOGNOSY-I (PRACTICAL)

1. Study of morphological characters of plants belonging to families Apocynaceae, Solanaceae, Rutaceae, Umbelliferae, leguminosae, Rubiaceae, Liliaceae, Graminae, Labiatae, Cruciferae, and Papaveraceae, Compositae
2. Microscopical measurement of , starch grains(wheat ,maize,starch,potato),
3. Various types of calcium-oxalate crystals, their study and microscopical measurements (Rhubarb, Senna, Liquorice etc.)
4. Determination of leaf constant such as Stomatal index, Stomatal numbers, Veinlet numbers, Vein termination numbers and Palisade ratio
5. Chemical Tests of Agar, Acacia, Sterulia and Tragacanth.,Pectin, Starch and Honey.
6. Swelling factor and average wt. of Isapaghula husk.
7. Physical characteristics of fixed oils.
8. Preparation of herbarium sheets.

BOOKS RECOMMENDED:

[School of Pharmacy
Syllabus]

1. Trease. GE & Evans WC, Pharmacognosy, Bailleire tindall East bourne. UK. a. 6
2. Wallis. TE, Text book of Pharmacognosy,JA ChurchillLtd.
3. Kokate. CK, Practical Pharmacognosy, Vallabh Prakashan, Delhi.
4. Wallis. T.E, Analytical Microscopy, J & A Churchill Limited London.
5. Kokate, CK, Pharmacognosy, Nirali Prakashan. Pune.
6. United States Pharmacopoeia (National Formulary). (latest edition)
7. Pharmacopoeia of India, The Controller of Publications, Delhi. (latest edition)

HUMAN ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY– III

UNIT-1.

Digestive system– Parts of digestive system, their structure and functions. Various gastrointestinal secretions & their role.

UNIT-2.

Pathology of disorders related to digestive system Peptic Ulcer, Ulcerative colitis, Crohns disease, Zollinger- Ellison syndrome, Amoebiasis, typhoid, Hepatitis, Cirrhosis of liver, Pancreatitis.

UNIT-3.

Central Nervous System: Functions of different parts of brain and spinal cord. Neurohumoral transmission in the central nervous system, reflex action, electroencephalogram, specialized functions of the brain. Cranial nerves and their functions.

UNIT-4.

Pathology of the disease like meningitis, psychosis, depression, anxiety, epilepsy, Parkinson & Alzheimer's, multiple sclerosis, amyotrophic lateral sclerosis

UNIT-5.

Demography and Family Planning, Medical termination of pregnancy.

First Aid: Emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.

BOOKS RECOMMENDED

1. Tortora, Principles of Anatomy & Physiology, Wiley
2. Guyton AC, Hall JE., Text book of Medical Physiology, WB Saunders Company.
3. Chatterjee C.C. Human Physiology, Medical Allied Agency, Calcutta.
4. Ross & Wilson, Anatomy & Physiology in Health & Illness, Churchill Livingstone.
5. Zdanowich Martin, Essentials of Pathophysiology for Pharmacy, CRC