

PARUL UNIVERSITY

SECOND YEAR PHARM.D. TEACHING SCHEME

Subject code	Subject Name	Teaching Scheme (Hours)			Theory		Practical		Total marks
		Theory	Tutorial	Practical	Ext.	Int.	Ext.	Int.	
08207201	Pathophysiology	3	1	-	70	30	-	-	100
08207202	Pharmaceutical Microbiology	3	1	3	70	30	70	30	200
08207203	Pharmacognosy & Phytopharmaceuticals	3	1	3	70	30	70	30	200
08207204	Pharmacology-I	3	1	-	70	30	-	-	100
08207205	Community Pharmacy	2	1	-	70	30	-	-	100
08207206	Pharmacotherapeutics-I	3	1	3	70	30	70	30	200
	Total	17	6	09	600		300		900

SECOND YEAR PHARM.D. SYLLABUS

Subject Name: **PATHOPHYSIOLOGY**

Subject Code: **08207201**

Theory (3 Hours/ Week, Total: 90 Hours)

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	-	4	70	30	-	-	100

Sr. No.	Course Contents	Hours
1	Basic principles of cell injury and Adaptation a) Causes, Pathogenesis and morphology of cell injury b) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen storage diseases	6
2	Inflammation a) Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation b) Repairs of wounds in the skin, factors influencing healing of wounds	6
3	Diseases of Immunity a) Introduction to T and B cells b) MHC proteins or transplantation antigens c) Immune tolerance <ul style="list-style-type: none"> - Hypersensitivity - Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs. - Autoimmunity Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft. - Acquired immune deficiency syndrome (AIDS) - Amyloidosis 	10
4	Cancer: differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors, etiology and pathogenesis of cancer.	9
5	Types of shock, mechanisms, stages and management.	4
6	Biological effects of radiation	3
7	Environmental and nutritional diseases <ol style="list-style-type: none"> i) Air pollution and smoking- SO₂, NO, NO₂, and CO ii) Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation. 	7

8	Pathophysiology of common diseases a. Parkinsonism b. Schizophrenia c. Depression and mania d. Hypertension, e. Stroke (ischaemic and hemorrhage) f. Angina, CCF, Atherosclerosis, Myocardial infarction g. Diabetes Mellitus h. Peptic ulcer and inflammatory bowel diseases i. Cirrhosis and Alcoholic liver diseases j. Acute and chronic renal failure k. Asthma and chronic obstructive airway diseases	25
9	Infectious diseases: Sexually transmitted diseases (HIV, Syphilis, Gonorrhoea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic), Hepatitis- infective hepatitis.	20

Course Materials:

Text books (Theory)

- a. Pathologic basis of disease by- Cotran, Kumar, Robbins
- b. Text book of Pathology- Harsh Mohan
- c. Text book of Pathology- Y.M. Bhide

Reference books (Theory)

- a. Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication

Assignments :

Topics of the assignment

1. Chemical Mediators of inflammation
2. Drug Hypersensitivity
3. Cigarette smoking & its ill effects
4. Biological Effects of Radiation
5. Etiology and hazards of obesity
6. Complications of diabetes
7. Diagnosis of cancer
8. Disorders of vitamins
9. Methods in Pathology-Laboratory values of clinical significance
10. Pathophysiology of Dengue Hemorrhagic Fever (DHF)

Format of the assignment

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy.
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

Subject Name: PHARMACEUTICAL MICROBIOLOGY**Subject Code: 08207202****Theory (3 Hours/ Week, Total: 90 Hours)**

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr. No.	Course Contents	Hours
1	Introduction to the science of microbiology. Major divisions of microbial world and Relationship among them.	5
2	Different methods of classification of microbes and study of Bacteria, Fungi, virus, Rickettsiae, Spirochetes.	5
3	Nutritional requirements, growth and cultivation of bacteria and virus. Study of different important media required for the growth of aerobic and anaerobic bacteria & fungi. Differential media, enriched media and selective media, maintenance of lab cultures.	10
4	Different methods used in isolation and identification of bacteria with emphasis to different staining techniques and biochemical reactions. Counting of bacteria -Total and Viable counting techniques.	10
5	Detailed study of different methods of sterilization including their merits and demerits. Sterilization methods for all pharmaceutical products. Detailed study of sterility testing of different pharmaceutical preparations. Brief information on Validation.	10
6	Disinfectants- Study of disinfectants, antiseptics, fungicidal and virucidal agents factors affecting their activation and mechanism of action. Evaluation of bactericidal, bacteristatic, virucidal activities, evaluation of preservatives in pharmaceutical preparations.	12
7	Immunology- Immunity, Definition, Classification, General principles of natural immunity, Phagocytosis, acquired immunity (active and passive). Antigens, chemical nature of antigens structure and formation of Antibodies, Antigen-Antibody reactions. Bacterial exotoxins and endotoxins. Significance of toxoids in active immunity, Immunization programme, and importance of booster dose.	14
8	Diagnostic tests: Schick's Test, Elisa test, Western Blot test, Southern Blot PCR Widal, QBC, Mantoux Peripheral smear. Study of malarial parasite.	8
9	Microbial culture sensitivity Testing: Interpretation of results Principles and methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B ₂ and B ₁₂ . Standardization of vaccines and sera.	8
10	Study of infectious diseases: Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhoea and HIV.	8

Course Materials:**Text books (Theory)**

- a. Vanitha Kale and Kishor Bhusari — Applied Microbiology | Himalaya Publishing house Mumbai.
- b. Mary Louis Turgeon — Immunology and Serology in Laboratory Medicines| 2nd edition, 1996 Mosby- Year book inc St. Louis Missouri 63146.
- c. Harsh Mohan, — Text book of Pathology| 3rd edition, 1998, B-3 Ansari road Darya ganj N. Delhi.

Reference books (Theory)

- a. Prescott L.M., Jarley G.P Klein D.A —Microbiology| 2nd- edition Mc Graw Hill Company Inc
- b. Rawlins E.A. |Bentley's Text Book of Pharmaceutics| B ailliere Tindals 24-28 London 1988
- c. Forbisher — Fundamentals of Microbiology| Philidelphia W.B. Saunders.
- d. Prescott L.M. Jarley G.P., Klein.D.A. — Microbiology.|2nd edition WMC Brown Publishers, Oxford. 1993
- e. War Roitt, Jonathan Brostoff, David male, — Immunology|3rd edition 1996, Mosby-year book Europe Ltd, London.
- f. Pharmacopoeia of India, Govt of India, 1996.

Practical (3 Hours/ Week, Total: 90 Hours)

Sr. No.	Experiments
1	Study of apparatus used in experimental microbiology*.
2	Sterilisation of glass ware's. Preparation of media and sterilisation.*
3	Staining techniques – Simple staining ; Gram's staining ; Negative staining**
4	Study of motility characters*.
5	Enumeration of micro-organisms (Total and Viable)*
6	Study of the methods of isolation of pure culture.*
7	Bio chemical testing for the identification of micro*-organisms.
8	Cultural sensitivity testing for some micro-organisms.*
9	Sterility testing for powders and liquids.*
10	Determination of minimum inhibitory concentration.*
11	Microbiological assay of antibiotics by cup plate method.*
12	Microbiological assay of vitamins by Turbidometric method**
13	Determination of RWC.**
14	Diagnostic tests for some common diseases, widal, malarial parasite.**

* Indicate minor experiment & ** indicate major experiment

Assignments:

1. Visit to some pathological laboratories & study the activities and equipment/instruments used and reporting the same.
2. Visit to milk dairies (Pasteurization) and microbial laboratories (other sterilization methods) & study the activities and equipment/instruments used and reporting the same.
3. Library assignments
 - a. Report of recent microbial techniques developed in diagnosing some common diseases.
 - b. Latest advancement developed in identifying, cultivating & handling of microorganisms.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination

	Internal/ Sessional	External
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max. marks	20	70
Duration	3 hours	4 hours

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)

Subject Name: PHARMACOGNOSY & PHYTOPHARMACEUTICALS**Subject Code: 08207203****Theory (3 Hours/ Week, Total: 90 Hours)**

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr. No.	Course Contents	Hours
1	Introduction.	1
2	Definition, history and scope of Pharmacognosy.	3
3	Classification of crude drugs.	4
4	Cultivation, collection, processing and storage of crude drugs.	9
5	Detailed method of cultivation of crude drugs.	3
6	Study of cell wall constituents and cell inclusions.	3
7	Microscopical and powder microscopical study of crude drugs.	10
8	Study of natural pesticides.	4
9	Detailed study of various cell constituents	15
10	Carbohydrates and related products.	3
11	Detailed study carbohydrates containing drugs.(11 drugs)	9
12	Definition sources, method extraction, chemistry and method of analysis of lipids.	8
13	Detailed study of oils.	8
14	Definition, classification, chemistry and method of analysis of protein.	4
15	Study of plants fibers used in surgical dressings and related products.	4
16	Different methods of adulteration of crude drugs.	2

Course Materials:**Text books**

- Pharmacognosy by G.E. Trease & W.C.Evans.
- Pharmacognosy by C.K.Kokate,Gokhale & A.C.Purohit.

Reference books

- Pharmacognosy by Brady &Tyler.E.
- Pharmacognosy by T.E.Wallis.
- Pharmacognosy by C.S. Shah & Qadery.
- Pharmacognosy by M.A. Iyengar.

Practical (3 Hours/ Week, Total: 90 Hours)

General Requirements:

Laboratory Napkin, Observation book- 150 pages, Zero brush, Needle, Blade, Match box.

Sr. No.	Experiments
1	Introduction of Pharmacognosy laboratory and experiments.
2	Study of cell wall constituents and cell inclusions.
3	Macro, powder and microscopic study of Datura.
4	Macro, powder and microscopic study of Senna.
5	Macro, powder and microscopic study of Cassia.cinnamon.
6	Macro, powder and microscopic study of Cinchona.
7	Macro, powder and microscopic study of Ephedra.
8	Macro, powder and microscopic study of Quassia.
9	Macro, powder and microscopic study of Clove.
10	Macro, powder and microscopic study of Fennel.
11	Macro, powder and microscopic study of Coriander.
12	Macro, powder and microscopic study of Isapgol.
13	Macro, powder and microscopic study of Nux vomica.
14	Macro, powder and microscopic study of Rauwolfia.
15	Macro, powder and microscopic study of Liquorice.
16	Macro, powder and microscopic study of Ginger.
17	Macro, powder and microscopic study of Podophyllum.
18	Determination of Iodine value.
19	Determination of Saponification value and unsaponifiable matter.
20	Determination of ester value.
21	Determination of Acid value.
22	Chemical tests for Acacia.
23	Chemical tests for Tragacanth.
24	Chemical tests for Agar.
25	Chemical tests for Starch.
26	Chemical tests for Lipids.(castor oil, sesame oil, shark liver oil, bees wax)
27	Chemical tests for Gelatin.

Scheme of Practical Examination

	Internal/ Sessional	External
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
Max. marks	20	70
Duration	3 hours	4 hours

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)

Subject Name: **PHARMACOLOGY -I**

Subject Code: **08207204**

Theory (3 Hours/ Week, Total: 90 Hours)

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	-	4	70	30	-	-	100

Sr. No.	Course Contents	Hours
1	General Pharmacology a) Introduction, definitions and scope of pharmacology b) Routes of administration of drugs c) Pharmacokinetics (absorption, distribution, metabolism and excretion) d) Pharmacodynamics e) Factors modifying drug effects f) Drug toxicity - Acute, sub- acute and chronic toxicity. g) Pre-clinical evaluations h) Drug interactions	16
2	Pharmacology of drugs acting on ANS a) Adrenergic and antiadrenergic drugs b) Cholinergic and anticholinergic drugs c) Neuromuscular blockers d) Mydriatics and miotics e) Drugs used in myasthenia gravis f) Drugs used in Parkinsonism	16
3	Pharmacology of drugs acting on cardiovascular system a) Antihypertensives b) Anti-anginal drugs c) Anti-arrhythmic drugs d) Drugs used for therapy of Congestive Heart Failure e) Drugs used for hyperlipidaemias	16
4	Pharmacology of drugs acting on Central Nervous System a) General anesthetics b) Sedatives and hypnotics c) Anticonvulsants d) Analgesic and anti-inflammatory agents e) Psychotropic drugs f) Alcohol and methyl alcohol g) CNS stimulants and cognition enhancers h) Pharmacology of local anaesthetics	16
5	Pharmacology of Drugs acting on Respiratory tract a) Bronchodilators b) Mucolytics c) Expectorants d) Antitussives e) Nasal Decongestants	8

6	Pharmacology of Hormones and Hormone antagonists a) Thyroid and Antithyroid drugs b) Insulin, Insulin analogues and oral hypoglycemic agents c) Sex hormones and oral contraceptives d) Oxytocin and other stimulants and relaxants	10
7	Pharmacology of autocooids and their antagonists a) Histamines and Antihistaminics b) 5-Hydroxytryptamine and its antagonists c) Lipid derived autocooids and platelet activating factor	8

Course Materials:

Text books (Theory) (Author, Title, Edition, Publication Place, Publisher, Year of Publication)

- a. Tripathi, K. D. Essentials of medical pharmacology. 4th Ed, 1999. Publisher: Jaypee, Delhi.
- b. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.
- c. Rang, H.P. & Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.

Reference books (Theory) (Author, Title, Edition, Publication Place, Publisher, Publication Year)

- a. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's- The pharmacological Basis of therapeutics. 9th Ed, 1996. Publisher McGraw Hill, Pergamon press.
- b. Craig, C.R.&Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown.Co Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
- c. Shargel and Leon. Applied Biopharmaceutics and pharmacokinetics.Latest edition. Publisher: Prentice Hall, London.

Subject Name: **COMMUNITY PHARMACY**

Subject Code: **08207205**

Theory (2 Hours/ Week, Total: 60 Hours)

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
2	1	-	3	70	30	-	-	100

Sr. No.	Course Contents	Hours
1	Definition, scope, of community pharmacy Roles and responsibilities of Community pharmacist	2
2	Community Pharmacy Management a) Selection of site, Space layout, and design b) Staff, Materials- coding, stocking c) Legal requirements d) Maintenance of various registers e) Use of Computers: Business and health care soft wares	8
3	Prescriptions – parts of prescription, legality & identification of medication related problems like drug interactions.	4
4	Inventory control in community pharmacy Definition, various methods of Inventory Control ABC, VED, EOQ, Lead time, safety stock	6
5	Pharmaceutical care Definition and Principles of Pharmaceutical care	3
6	Patient counselling Definition, outcomes, various stages, barriers, Strategies to overcome barriers Patient information leaflets- content, design, & layouts, advisory labels	5
7	Patient medication adherence Definition, Factors affecting medication adherence, role of pharmacist in improving the adherence.	4
8	Health screening services <ul style="list-style-type: none"> • Definition, importance, methods for screening • Blood pressure/ blood sugar/ lung function and • Cholesterol testing 	4
9	OTC Medication- Definition, OTC medication list & Counseling	3
10	Health Education <ul style="list-style-type: none"> • WHO Definition of health, and health promotion, care for children, pregnant & breast feeding women, and geriatric patients. • Commonly occurring Communicable Diseases, causative agents, • Clinical presentations and prevention of communicable diseases – Tuberculosis, Hepatitis, Typhoid, Amoebiasis, Malaria, Leprosy, Syphilis, Gonorrhoea and AIDS • Balance diet, and treatment & prevention of deficiency disorders • Family planning – role of pharmacist 	9
11	Responding to symptoms of minor ailments Relevant pathophysiology, common drug therapy to, Pain, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhea, constipation), Pyrexia, Ophthalmic	6

	symptoms, worms infestations.	
12	Essential Drugs concept and Rational Drug Therapy Role of community pharmacist	4
13	Code of ethics for community pharmacists	2

Course Materials:

Text Books:

- a. Health Education and Community Pharmacy by N.S.Parmar.
- b. WHO consultative group report.
- c. Drug store & Business management by Mohammed Ali & Jyoti.

Reference books:

- a. Handbook of pharmacy – health care.Edt. Robin J Harman. The Pharmaceutical press.
- b. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams & Wilkins.

Subject Name: PHARMACOTHERAPEUTICS-I

Subject Code: 08207206

Theory (3 Hours/ Week, Total: 90 Hours)

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr. No.	Course Contents	Hours
1	Cardiovascular system: Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, Hyperlipidaemias. Electrophysiology of heart and Arrhythmias.	28
2	Respiratory system: Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases.	19
3	Endocrine system: Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis.	20
4	General prescribing guidelines for a. Paediatric patients b. Geriatric patients c. Pregnancy and breast feeding	8
5	Ophthalmology: Glaucoma, Conjunctivitis- viral & bacterial.	9
6	Introduction to rational drug use Definition, Role of pharmacist Essential drug concept Rational drug formulations.	6

Course Materials:

Text Books:

- Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication.
- Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange.

Reference Books:

- Pathologic basis of disease - Robins SL, W.B.Saunders publication.
- Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication.
- Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication.
- Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- Relevant review articles from recent medical and pharmaceutical literature.

Practical (3 Hours/ Week, Total: 90 Hours)

Practicals :

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion, attending ward rounds, follow up the progress and changes made in drug therapy in allotted patients, case presentation upon discharge.

Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation.

A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination

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Major Experiment	10	25
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Viva	02	15
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