RAJASTHAN UNIVERSITY OF HEALTH SCIENCE
D. Pharm IInd Year Syllabus

Sagar Pharmacy Collage

DIPLOMA IN PHARMACY (PART-II)

Sr. No.	Subject Code	Name of the Subject
1	ER20-21T	Pharmacology – Theory
2	ER20-22T	Community Pharmacy & Management – Theory
3	ER20-23T	Biochemistry & Clinical Pathology – Theory
4	ER20-24T	Pharmacotherapeutics – Theory
5	ER20-25T	Hospital & Clinical Pharmacy – Theory
6	ER20-26T	Pharmacy Law & Ethics
7	ER20-21P	Pharmacology – Practical
8	ER20-22P	Community Pharmacy & Management – Practical
9	ER20-23P	Biochemistry & Clinical Pathology – Practical
10	ER20-24P	Pharmacotherapeutics – Practical
11	ER20-25P	Hospital & Clinical Pharmacy – Practical

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DIPLOMA IN PHARMACY (PART-II) SYLLABUS

PHARMACOLOGY : THEORY – THEORY (ER20-21T)

Chapter No.	TOPICS
1	**General Pharmacology** • Introduction and scope of Pharmacology • Various routes of drug administration - advantages and disadvantages • Drug absorption - definition, types, factors affecting drug absorption • Bioavailability and the factors affecting bioavailability • Drug distribution - definition, factors affecting drug distribution • Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms • Excretion of drugs - Definition, routes of drug excretion • General mechanisms of drug action and factors • modifying drug action
2	**Drugs Acting on the Peripheral Nervous System** • Steps involved in neurohumoral transmission • Definition, classification, pharmacological actions, dose, indications, and contraindications of (a) Cholinergic drugs (b) Anti-Cholinergic drugs (c) Adrenergic drugs (d) Anti-adrenergic drugs (e) Neuromuscular blocking agents (f) Drugs used in Myasthenia gravis (g) Local anaesthetic agents (h) Non-Steroidal Anti-Inflammatory drugs (NSAIDs)
3	**Drugs Acting on the Eye** Definition, classification, pharmacological actions, dose, indications and contraindications of • Miotics • Mydriatics • Drugs used in Glaucoma
4	**Drugs Acting on the Central Nervous System** Definition, classification, pharmacological actions, dose, indications and contraindications of • General anaesthetics • Hypnotics and sedatives • Anti-Convulsant drugs • Anti-anxiety drugs • Anti-depressant drugs • Anti-psychotics • Nootropic agents • Centrally acting muscle relaxants • Opioid analgesics

5	**Drugs Acting on the Cardiovascular System** Definition, classification, pharmacological actions, dose, indications and contraindications of • Mydriatics • Anti-hypertensive drugs • Anti-anginal drugs • Anti-arrhythmic drugs • Drugs used in atherosclerosis and • Congestive heart failure • Drug therapy for shock
6	**Drugs Acting on Blood and Blood Forming Organs** Definition, classification, pharmacological actions, dose, indications and contraindications of • Hematinic agents • Anti-coagulants • Anti-platelet agents • Thrombolytic drugs
7	Definition, classification, pharmacological actions, dose, indications and contraindications of • Bronchodilators • Expectorants • Anti-tussive agents • Mucolytic agents
8	**Drugs Acting on the Gastro Intestinal Tract** Definition, classification, pharmacological actions, dose, indications and contraindications of • Anti-ulcer drugs • Anti-emetics • Laxatives and purgatives • Anti-diarrheal drugs
9	**Drugs Acting on the Kidney** Definition, classification, pharmacological actions, dose, indications and contraindications of • Diuretics • Anti-Diuretics
10	**Hormones and Hormone Antagonists** Physiological and pathological role and clinical uses of • Thyroid hormones • Anti-thyroid drugs • Parathormone • Calcitonin • Vitamin D • Insulin • Oral hypoglycemic agents • Estrogen • Progesterone • Oxytocin • Corticosteroids

11	**Autocoids** • Physiological role of Histamine, 5 HT and Prostaglandins • Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists
12	**Chemotherapeutic Agents:** Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes: • Penicillins • Cephalosporins • Aminoglycosides • Fluoroquinolones • Macrolides • Tetracyclines • Sulphonamides • Anti-tubercular drugs • Anti-fungal drugs • Anti-viral drugs • Anti-amoebic agents • Anthelmintics • Anti-malarial agents • Anti-neoplastic agents
13	**Biologicals :** Definition, types, and indications of biological agents with examples

COMMUNITY PHARMACY AND MANAGEMENT – THEORY (ER20-22T)

Chapter No.	TOPICS
1	**Community Pharmacy Practice** - Definition, history and development of community pharmacy - International and Indian scenarios
2	Professional responsibilities of community pharmacists Introduction to the concept of Good Pharmacy Practice and SOPs.
3	**Prescription and prescription handling** • Definition, parts of prescriptions, legality of prescriptions, prescription handling, labelling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage • Dispensing process, Good Dispensing Practices, dispensing errors and strategies to minimize them

4	**Communication skills** • Definition, types of communication skills • Interactions with professionals and patients • Verbal communication skills (one-to-one, over the telephone) • Written communication skills • Body language • Patient interview techniques
5	**Patient counselling** • Definition and benefits of patient counseling • Stages of patient counselling - Introduction, counseling content, counselling process, and closing the counseling session • Barriers to effective counseling - Types and strategies to overcome the barriers • Patient counselling points for chronic diseases/disorders - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS • Patient Package Inserts - Definition, i mportance and benefits, Scenarios of PPI use in India and other countries • Patient Information leaflets - Definition and uses
6	**Medication Adherence :** Definition, factors influencing non- adherence, strategies to overcome non-adherence
7	**Health Screening Services in Community Pharmacy** Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, and referral of undiagnosed cases
8	**Over The Counter (OTC) Medications** • Definition, need and role of Pharmacists in OTC medication dispensing • OTC medications in India, counseling for OTC products • Self-medication and role of pharmacists in promoting the safe practices during self-medication • Responding to symptoms, minor ailments, and advice for self-care in conditions such as - Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling)
9	**Community Pharmacy Management** • Legal requirements to set up a community pharmacy • Site selection requirements • Pharmacy designs and interiors • Vendor selection and ordering • Procurement, inventory control methods, and inventory management • Financial planning and management • Accountancy in community pharmacy - Day book, Cash book • Introduction to pharmacy operation softwares - usefulness and availability • Customer Relation Management (CRM) • Audits in Pharmacies • SOP of Pharmacy Management • Introduction to Digital Health, mHealth and Online pharmacies

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BIOCHEMISTRY & CLINICAL PATHOLOGY – THEORY (ER20-23T)

Chapter No.	TOPICS
1	**Introduction to biochemistry**: Scope of biochemistry in pharmacy; Cell and its biochemical organization
2	**Carbohydrates** • Definition, classification with examples, chemical properties • Monosaccharides - Structure of glucose, fructose, and galactose • Disaccharides - structure of maltose, lactose, and sucrose • Polysaccharides - chemical nature of starch and glycogen • Qualitative tests and biological role of carbohydrates
3	**Proteins** • Definition, classification with examples, chemical properties • **Definition, classification of** proteins based on composition and solubility with examples • Definition, classification of amino acids based on chemical nature and nutritional requirements with examples • **Structure of proteins** (four levels of organization of protein structure) • Qualitative tests and biological role of proteins and amino acids • Diseases related to malnutrition of proteins.
4	**Lipids** • Definition, classification with examples • Structure and properties of triglycerides (oils and fats) • Fatty acid classification - Based on chemical and nutritional requirements with examples • Structure and functions of cholesterol in the body • Lipoproteins - types, composition and functions in the body • Qualitative tests and functions of lipids
5	**Nucleic acids** • Definition, purine and pyrimidine bases • Components of nucleosides and nucleotides with examples • Structure of DNA (Watson and Crick model), RNA and their functions
6	**Enzymes** • Definition, properties and IUB and MB classification • Factors affecting enzyme activity • Mechanism of action of enzymes, Enzyme inhibitors • Therapeutic and pharmaceutical importance of enzymes

7	**Vitamins** • Definition and classification with examples • Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins
8	**Metabolism** (Study of cycle/pathways without chemical structures) • **Metabolism of Carbohydrates**: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates • **Metabolism of lipids: Lipolysis**, β-oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia • **Metabolism of Amino acids (Proteins):** General reactions of amino acids and its significance- Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice. • **Biological oxidation**: Electron transport chain and Oxidative phosphorylation
9	**Minerals:** Types, Functions, Deficiency diseases, recommended dietary requirements
10	**Water and Electrolytes** • Distribution, functions of water in the body • Water turnover and balance • Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance • Dehydration, causes of dehydration and oral rehydration therapy
11	Introduction to Biotechnology
12	**Organ function tests** • Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances • Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances • Lipid profile tests and its clinical significances
13	**Introduction to Pathology of Blood and Urine** • Lymphocytes and Platelets, their role in health and disease • Erythrocytes - Abnormal cells and their significance • Normal and Abnormal constituents of Urine and their significance

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PHARMACOTHERAPEUTICS – THEORY (ER20-24T)

Chapter No.	TOPICS
1	Pharmacotherapeutics - Introduction, scope, and objectives. Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs)
	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with
2	**(a) Cardiovascular System** • Hypertension • Angina and Myocardial infarction • Hyperlipidaemia • Congestive Heart Failure
3	**(b) Respiratory System** • Asthma • COPD
4	**(c) Endocrine System** • Diabetes • Thyroid disorders - Hypo and Hyperthyroidism
5	**(d) Central Nervous System** • Epilepsy • Parkinson's disease • Alzheimer's disease • Stroke • Migraine
6	**(e) Gastro Intestinal Disorders** • Gastro oesophageal reflux disease • Peptic Ulcer Disease • Alcoholic liver disease • Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)
7	**(f) Haematological disorders** • Iron deficiency anaemia • Megaloblastic anaemia
8	**(g) Infectious diseases** • Tuberculosis • Pneumonia • Urinary tract infections • Hepatitis • Gonorrhoea and Syphilis • Malaria • HIV and Opportunistic infections • Viral Infections (SARS, CoV2)
9	**(h) Musculoskeletal disorders** • Rheumatoid arthritis • Osteoarthritis

10	**(i) Dermatology** • Psoriasis • Scabies • Eczema
11	**(j) Psychiatric Disorders** • Depression • Anxiety • Psychosis
12	**(k) Ophthalmology** • Conjunctivitis (bacterial and viral) • Glaucoma
13	**(l) Anti-microbial Resistance**
14	**(m) Women's Health** • Polycystic Ovary Syndrome • Dysmenorrhea • Premenstrual Syndrome

HOSPITAL AND CLINICAL PHARMACY – THEORY (Course Code: ER20-25T)

Chapter No.	TOPICS
1	**Hospital Pharmacy** • Definition, scope, national and international scenario • Organisational structure • Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships • Good Pharmacy Practice (GPP) in hospital • Hospital Pharmacy Standards (FIP Basel Statements, AHSP) • Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists
2	**Different Committees in the Hospital** • Pharmacy and Therapeutics Committee - Objectives, Composition, and functions • Hospital Formulary - Definition, procedure for development and use of hospital formulary • Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance
4	**Supply Chain and Inventory Control** • Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics. • Procedures of Drug Purchases – Drug selection, short term, long term, and tender/e-tender process, quotations, etc. • Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc. • Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms) • FEFO, FIFO methods • Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs • Documentation - purchase and inventory

5	**Drug distribution** • Drug distribution (in- patients and out - patients) - Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit DoseDrug Distribution Method, Drug Basket Method. • Distribution of drugs to ICCU/ICU/NICU/Emergency wards. • Automated drug dispensing systems and devices • Distribution of Narcotic and Psychotropic substances and their storage
6	Compounding in Hospitals. Bulk compounding, IV admixture services and incompatibilities, Total parenteral nutrition
7	Radio Pharmaceuticals - Storage, dispensing and disposal of radiopharmaceuticals
8	Application of computers in Hospital Pharmacy Practice, Electronic health records, Softwares used in hospital pharmacy
9	Clinical Pharmacy: Definition, scope, and development – in India and other countries Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc. Daily activities of clinical pharmacists: Definition, goal, and procedure of • Ward round participation • Treatment Chart Review • Adverse drug reaction monitoring • Drug information and poisons information • Medication history • Patient counseling • Interprofessional collaboration Pharmaceutical care: Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care Medication Therapy Management, Home Medication Review
10	**Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results** • Haematological, Liver function, Renal function, thyroid function tests • Tests associated with cardiac disorders • Fluid and electrolyte balance • Pulmonary Function Tests
11	**Poisoning**: Types of poisoning: Clinical manifestations and Antidotes **Drugs and Poison Information Centre and their services** - Definition, Requirements, Information resources with examples, and their advantages and disadvantages
12	**Pharmacovigilance** • Definition, aim and scope • Overview of Pharmacovigilance
13	Medication errors: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP Drug Interactions: Definition, types, clinical significance of drug interactions

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PHARMACY LAW AND ETHICS – THEORY (Course Code: ER20-26T)

Chapter No.	TOPICS
1	General Principles of Law, History and various Acts related to Drugs and Pharmacy profession
2	**Pharmacy Act-1948 and Rules:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of Pharmacists, Offences and Penalties. **Pharmacy Practice Regulations 2015**
3	**Drugs and Cosmetics Act 1940 and Rules 1945 and New Amendments** Objectives, Definitions, Legal definitions of schedules to the Act and Rules **Import of drugs** - Classes of drugs and cosmetics prohibited from import, Import under license or permit. **Manufacture of drugs** - Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license. **Study of schedule C and C1, G, H, H1, K, P, M, N, and X.** **Sale of Drugs** - Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy Drugs Prohibited for manufacture and sale in India **Administration of the Act and Rules** – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors.
4	**Narcotic Drugs and Psychotropic Substances Act 1985 and Rules** Objectives, Definitions, Authorities and Officers, Prohibition, Control and Regulation, Offences and Penalties.
5	**Drugs and Magic Remedies (Objectionable Advertisements) Act 1954** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties.
6	**Prevention of Cruelty to Animals Act-1960 :** Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.
7	**Poisons Act-1919 :** Introduction, objective, definition, possession, possession for sales and sale of any poison, import of poisons
8	**FSSAI (Food Safety and Standards Authority of India) Act and Rules**: brief overview and aspects related to manufacture, storage, sale, and labelling of Food Supplements
9	**National Pharmaceutical Pricing Authority :** Drugs Price Control Order (DPCO) - 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM)

10	**Code of Pharmaceutical Ethics:** Definition, ethical principles, ethical problem solving, registration, code of ethics for Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath.
11	Medical Termination of Pregnancy Act and Rules - basic understanding, salient features, and Amendments
12	Role of all the government pharma regulator bodies - Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)
13	Good Regulatory practices (documentation, licenses, renewals, e-governance) in Community Pharmacy, Hospital pharmacy, Pharma Manufacturing, Wholesale business, inspections, import, export of drugs and medical devices
14	Introduction to BCS system of classification, Basic concepts of Clinical Trials, ANDA, NDA, New Drug development, New Drugs and Clinical Trials Rules, 2019. Brand v/s Generic, Trade name concept, Introduction to Patent Law and Intellectual Property Rights, Emergency Use Authorization
15	Blood bank - basic requirements and functions
16	Clinical Establishment Act and Rules - Aspects related to Pharmacy
17	Biomedical Waste Management Rules 2016 - Basic aspects, and aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals
18	Bioethics - Basic concepts, history and principles. Brief overview of ICMR' s National Ethical Guidelines for Biomedical and Health Research involving human Participants
19	Introduction to the Consumer Protection Act
20	Introduction to the Disaster Management Act
21	Medical Devices - Categorization, basic aspects related to manufacture and sale

Guidelines for the Examinations

SESSIONAL EXAMINATIONS (Theory)

- There shall be two or more periodic sessional (internal assessment) examinations during eachacademic year.
- The duration of the sessional exam shall be 90 minutes.
- The highest aggregate of any two performances shall form the basis of calculating the sessionalmarks.
- The scheme of the question paper for theory sessional examinations shall be as given below.

✓ **Objective type Answers** (Answer all 10 out of 10) 10 x 1 =10
(Multiple Choice Questions / Fill-in the Blanks /One word OR one Sentence questions)

✓ **Short Answers** (Answer 5 out of 6) 5 x 3 = 15

✓ **Long Answers** (Answer 3 out of 4) 3 x 5 = 15

✓ **Total** = 40 marks

Internal assessment (Sessional Exam Marks): The marks secured by the students out of the total 40 shall be reduced to 20 in each sessional, and then the internal assessment shall be calculated based on the best two averages for 20 marks.

SESSIONAL EXAMINATIONS (Practical)

- There shall be two or more periodic sessional (internal assessment) practical examinations duringeach academic year. The duration of the sessional exam shall be three hours.
- The highest aggregate of any two performances shall form the basis of calculating the sessionalmarks.
- The scheme of the question paper for practical sessional examinations shall be as given below.

✓ Synopsis = 10

✓ Experiments = 50*

(Marks for the experiments shall be divided into various categories, viz. major experiment, minorexperiment, spotters, etc. as per the requirement of the course.)

Viva voce = 10

✓ Practical Record Maintenance = 10

✓ Total = 80 marks

Internal assessment (Sessional Exam Marks): The marks secured by the students out of the total of 80 shall be reduced to 10 in each sessional, and then the internal assessment shall be calculated based onthe best two averages for 10 marks from the sessional and other 10 marks shall be awarded as per the details given below.

✓ Actual performance in the sessional examination = 10 marks

✓ Assignment marks (Average of three) = 5 marks

✓ Field Visit Report marks (Average for the reports) = 5 marks

✓ **Total = 20 marks**

Note:

1) For the course having both assignments and field visit/s the assessments of shall be done for 05marks (assignments) & 05 marks (field visit/s) and added to the sessional marks.
2) For the courses having either assignments or field visit/s, the assessments of assignments or fieldvisit/s shall be done directly for 10 marks and added to the sessional marks.
3) For the courses not having both assignment and field visit, the whole 20marks shall be calculatedfrom the sessional marks.

ASSIGNMENTS AND FIELD VISIT DETAILS: DIPLOMA IN PHARMACY (PART-II)

Sr. No.	Subject Code	Name of the Subject	Assignments	Field Visits
1	ER20-21T	Pharmacology – Theory	YES	YES
2	ER20-22T	Community Pharmacy & Management – Theory	YES	**NO**
3	ER20-23T	Biochemistry & Clinical Pathology – Theory	YES	YES
4	ER20-24T	Pharmacotherapeutics – Theory	**NO**	**NO**
5	ER20-25T	Hospital & Clinical Pharmacy – Theory	YES	YES
6	ER20-26T	Pharmacy Law & Ethics		

- Number of courses which have given assignments = 4
- One assignment per student per sessional period. i.e., a minimum of THREE assignments per student
- Number of courses which have field visit = 3

DIPLOMA IN PHARMACY - PART-III (PRACTICAL TRAINING)

After having appeared in Part-II examination for the Diploma in Pharmacy held by an approved Examining Authority a candidate shall be eligible to undergo practical training in one or more of the following institutions namely:

✓ Hospitals/Dispensaries run by Central /State Governments.

✓ A pharmacy licensed for retail sale of drugs under the Drugs and Cosmetics Rules, 1945 having the services of registered pharmacists.