Program	Diploma in Pharmacy (D.Pharm)	**Year - 1**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
3	1	3	8	80	20	80	20	200

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Introduction to Pharmaceutical chemistry** Scope and objectives Sources and types of errors: Accuracy, precision, significant figures Impurities in Pharmaceuticals: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic.	8	11
2	**Volumetric analysis** Fundamentals of volumetric analysis, Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration Gravimetric analysis: Principle and method.	8	11
3	**Inorganic Pharmaceuticals** Pharmaceutical formulations, market preparations, storage conditions and uses of ▯ Haematinics: Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron ▯ Gastro-intestinal Agents: Antacids: Aluminum hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics ▯ Topical agents: Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate ▯ Dental products: Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes ▯ Medicinal gases: Carbon dioxide, nitrous oxide, oxygen	7	9
4	**nomenclature of organic chemical systems** Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings	2	3
5	**Drugs Acting on Central Nervous System** ▯ Anaesthetics: Thiopental Sodium*, Ketamine Hydrochloride*, Propofol ▯ Sedatives and Hypnotics: Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital* ▯ Antipsychotics: Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone ▯ Anticonvulsants: Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine ▯ Anti-Depressants: Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine	9	11
6	**Drugs Acting on Autonomic Nervous System**	9	11

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	□ Sympathomimetic Agents: Direct Acting: Nor- Epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline. Indirect Acting Agents: Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol □ Adrenergic Antagonists: Alpha Adrenergic Blockers: Tolazoline,Phentolamine □ Phenoxybenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol*, Atenolol*, Carvedilol □ Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine*, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide □ Cholinergic Blocking Agents: Atropine Sulphate*, Ipratropium Bromide Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*		
7	**Drugs Acting on Cardiovascular System** Anti-Arrhythmic Drugs: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone and Sotalol □ Anti-Hypertensive Agents: Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, Antianginal Agents: Isosorbide Dinitrate	5	7
8	**Diuretics** Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone,Benzthiazide, Metolazone, Xipamide, Spironolactone	2	3
9	**Hypoglycemic Agents** Insulin and Its Preparations, Metformin*,Glibenclamide*,Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins	3	4
10	**Analgesic And Anti-Inflammatory Agents** Morphine Analogues, Narcotic Antagonists;Nonsteroidal Anti- Inflammatory Agents (NSAIDs) - Aspirin*,Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac	3	4
11	**Anti-Infective Agents** □ Antifungal Agents: Amphotericin-B, Griseofulvin, Miconazole,Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride □ Urinary Tract Anti-Infective Agents: Norfloxacin, Ciprofloxacin,Ofloxacin*, Moxifloxacin, □ Anti-Tubercular Agents: INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid* □ Antiviral Agents: Amantadine Hydrochloride, Idoxuridine, Acyclovir*,Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir □ Antimalarials: Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin □ Sulfonamides: Sulfanilamide, Sulfadiazine, Sulfametho xazole,Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*	8	11
12	**Antibiotics** Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, Tetracyclines: Doxycycline, Minocycline, Macrolides: Erythromycin, Azithromycin,Miscellaneous: Chloramphenicol* Clindamycin	8	11
13	**Anti-Neoplastic Agents** Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate	3	4
	Total	75	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	30	20	20	10	10	10

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Knowledge and understanding about the chemical class, structure and chemical name of the commonly used drugs and pharmaceuticals of both organic and inorganic nature
CO2	Knowledge and understanding about the pharmacological uses, dosage regimen, stability issues and storage conditions of all such chemical substances commonly used as drugs
CO3	Knowledge and understnading about quantitative and qualitative analysis, impurity testing of the chemical substances given in the official monographs
CO4	Knowledge and understnading about the dosage form & the brand names of the drugs and pharmaceuticals popular in the marketplace
CO5	Ability to Prepare standard solutions,perfom limit test,Test the purity,Synthesize the selected chemical substances and qualitative tests to systematically identify the unknown chemical substances.

Reference Books

1.	**pharmaceutical chemistry** By G.R.Chatwal | himalaya publishing house
2.	**principles of medicinal chemistry** By Dr. S.S. Kadam, Dr. K.G. Bothara | nirali prakashan
3.	**medicinal chemistry** By D. sriram
4.	**pharmaceutical chemistry (TextBook)** By Dr. Dipak P.Kardile | Technical publication
5.	**pharmaceutical chemisty (TextBook)** By A.V. Kasture | Nirali prakashan
6.	**pharmaceutical chemisty (TextBook)** By Dr. Neha Krishnarth | Pee Vee
7.	**Medicinal & Pharmaceutical chemistry** By Harikishan Singh and VK Kapoor
8.	**Text book of Organic Medicinal and pharmaceutical Chemistry (TextBook)** By Wilson and Griswold
9.	**Text book of Practical Organic Chemistry (TextBook)** By Vogel

List of Practical

1.	To Perform the limit test for chloride in dextrose sample
2.	To Perform the limit test for sulphate in dextrose sample
3.	To Perform the limit test for iron in dextrose sample
4.	To Perform the limit test for arsenic in dextrose sample
5.	To perform inorganic qualitative analysis of given sample and find out cation and anion
6.	To perform inorganic qualitative analysis of given sample and find out cation and anion
7.	To prepare and standardize 0.1 N sodium hydroxide
8.	To prepare and standardize 0.1 N Potassium Permanganate
9.	To carry out assay of Ferrous sulphate- by redox titration
10.	To carry out assay of Calcium gluconate-by complexometric
11.	To carry out assay of Sodium chloride-by Modified Volhard's method
12.	To carry out assay of Ascorbic acid by iodometry
13.	To carry out assay of Ibuprofen by alkalimetry
14.	Preparation of Benzoic acid from Benzamide
15.	Preparation of Picric acid from Phenol
16.	Determination of Melting point and boiling point of organic compounds
17.	To perform Identification and test for purity of Aspirin
18.	To perform Identification and test for purity of Caffeine
19.	To perform Identification and test for purity of Paracetamol
20.	To perform Identification and test for purity of Sulfanilamide
21.	To perform Systematic Qualitative analysis of given unknown organic compound
22.	To perform Systematic Qualitative analysis of given unknown organic compound
23.	To perform Systematic Qualitative analysis of given unknown organic compound
24.	To perform Systematic Qualitative analysis of given unknown organic compound

List of Tutorial

1.	Introduction to Pharmaceutical chemistry, error
2.	significant figures, impurities
3.	limit test
4.	volumetric analysis
5.	precipitation titration,complexometric titration,redox titration
6.	gravemetric analysis,heamatinics,gastrointestinal agents
7.	inorganic pharmaceuticals
8.	nomenclature of organic compounds
9.	Drugs Acting on Central Nervous System
10.	Sedatives and Hypnotics, Antipsychotics
11.	Anticonvulsants, Anti-Depressants
12.	Drugs Acting on Autonomic Nervous System
13.	Adrenergic Antagonists
14.	Cholinergic Drugs and Related Agents: Direct Acting Agents,Cholinergic Blocking Agents
15.	Drugs Acting on Cardiovascular System
16.	Anti-Arrhythmic Drugs, Anti-Hypertensive Agents
17.	diuretics
18.	insulin,anti-infective agents
19.	Analgesic And Anti-Inflammatory Agents
20.	anti-Infective Agents
21.	Antiviral Agents, Antimalarials
22.	antibiotics
23.	antibiotics: Amoxicillin*,Cloxacillin, Streptomycin, Tetracyclines, Doxycycline, Minocycline
24.	Macrolides,Azithromycin,miscellaneous
25.	Anti-Neoplastic Agents