



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Pharmacy College
Semester-5 (B. Pharm.)

Subject: Medicinal Chemistry- II -BPHBP15320

Type of course: Major

Prerequisite: Medicinal Chemistry I

Rationale: Medicinal Chemistry II is designed to deepen students' understanding of drug design, synthesis, and the relationship between chemical structure and biological activity. The rationale behind this course includes Advancing Drug Development It equips students with knowledge of how drugs are discovered, optimized, and brought to market. Understanding Drug Mechanisms Learners explore how different pharmaceutical compounds interact with biological systems. Enhancing Analytical Skills, the course fosters critical thinking in evaluating drug efficacy, safety, and pharmacokinetics. Bridging Chemistry and Medicine It connects organic chemistry principles with therapeutic applications, making it essential for pharmaceutical sciences.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	1	-	4	75	25	-	-	50	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr No.	Course content	Hrs	% Weightage
1.	Antihistaminic agents: Histamine, receptors and their distribution in the human body H1-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Tripeleennamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*,	10	25



	<p>Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium</p> <p>H2-antagonists: Cimetidine*, Famotidine, Ranitidin. Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole</p> <p>Anti-neoplastic agents: Alkylating agents: Meclorothamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa</p> <p>Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate Miscellaneous: Cisplatin, Mitotane</p>		
2	<p>Anti-anginal:</p> <p>Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine. Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide. Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride, * Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.</p>	10	25
3.	<p>Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol. Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol</p> <p>Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel</p> <p>Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.</p>	10	20
4.	<p>Drugs acting on Endocrine system Nomenclature, Stereochemistry and metabolism of steroids Sex hormones: Testosterone, Nandralone, Progesterones, Oestriol, Oestradiol, Oestrone, Diethyl stilbestrol.</p> <p>Drugs for erectile dysfunction: Sildenafil, Tadalafil.</p> <p>Oral contraceptives: Mifepristone, Norgestrel, Levonorgestrol</p> <p>Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone</p> <p>Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.</p>	8	15



5.	Antidiabetic agents: Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acarbose, Voglibose. Local Anesthetics: SAR of Local anesthetics Benzoic Acid derivatives; Cocaine, Hexylcaine, Mepylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Doperodon, Dibucaine. *	7	15
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Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1.	Case Study on Allergic Reactions: students have to Present a case where a patient has allergy symptoms. Students have to choose appropriate antihistaminic agents and justify their choice and upload it in GMIU web Portal.	10
2.	Drug Class Debate: Faculty will Divide students into teams and assign each team a class of anti-hypertensive. They must argue why their class is the best treatment for hypertension and upload it in GMIU web Portal.	10
3.	Structure-Activity Relationship (SAR) Puzzle: Faculty will Provide molecular structures of various class with missing functional groups. Students complete the structure and relate it to potency and duration of action & upload it in GMIU Web Portal.	10
4.	Drug Mechanism Relay: Faculty will Divide the class into groups. Each group explains the action of one class of drugs in a relay format, upload it in GMIU web Portal	10
5.	Diet-Drug Strategy Game: Faculty will Design a game where students match lifestyle interventions and medications to different lipid profiles, upload it in GMIU web Portal	10
Total		50

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	35 %	20%	05%	05%	05%

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



Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand the principles of drug discovery and development.
CO2	Learn about the chemical properties and mechanisms of action of various drug classes.
CO3	Explore the synthesis and modification of pharmaceutical compounds
CO4	Evaluate the pharmacokinetics and pharmacodynamics of drugs.
CO5	Apply medicinal chemistry concepts to real-world pharmaceutical challenges.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Organic chemistry by I.L. Finar, Volume-I&II.
- [2] A text book of organic chemistry—Arun Bahl, B.S. Bahl
- [3] Heterocyclic Chemistry by Raj K. Bansal
- [4] Organic Chemistry by Morrison and Boyd
- [5] Heterocyclic Chemistry by T.L. Gilchrist

