INSTITUTE	**FACULTY OF PHARMACY**
PROGRAM	**BACHELOR OF PHARMACY**
SEMESTER	**6**
COURSE TITLE	**MEDICINAL CHEMISTRY-III**
COURSE CODE	**13PH0601**
COURSE CREDITS	**6**

Objective:

1 This subject is designed to impart fundamental knowledge on the structure, chemistry, and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug
design like quantitative structure-activity relationship (QSAR), Prodrug concept, combinatorial
chemistry, and Computer-aided drug design (CADD). The subject also emphasizes the chemistry, mechanism of action, metabolism, adverse effects, Structure-Activity Relationships
(SAR), therapeutic uses, and synthesis of important drugs.

2 This subject is designed to impart fundamental knowledge on the structure, chemistry, and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure-activity relationship (QSAR), Prodrug concept, combinatorial chemistry, and Computer-aided drug design (CADD). The subject also emphasizes the chemistry, mechanism of action, metabolism, adverse effects, Structure-Activity Relationships (SAR), therapeutic uses, and synthesis of important drugs.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the importance of drug design and different techniques of drug design.

2 Understand the chemistry of drugs with respect to their biological activity.

3 Know the metabolism, adverse effects and therapeutic value of drugs.

4 Know the importance of SAR of drugs.

Pre-requisite of course: Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry, and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure-activity relationship (QSAR), Prodrug concept, combinatorial chemistry, and Computer-aided drug design (CADD). The subject also emphasizes the chemistry, mechanism of action, metabolism, adverse effects, Structure-Activity Relationships (SAR), therapeutic uses, and synthesis of important drugs. Objective: Upon completion of the course the student shall be able to: 1. Understand the importance of drug design and different techniques of drug design. 2. Understand the chemistry of drugs with respect to their biological activity. 3. Know the metabolism, adverse effects and therapeutic value of drugs. 4. Know the importance of SAR of drugs.

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Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	1	4	75	15	10	35	15

Contents : Unit	Topics	Contact Hours
1	**Unit-1: Antibiotics** Historical background, Nomenclature, Stereochemistry, Structure-activity relationship, Chemical degradation classification, and important products of the following classes. Beta-Lactam antibiotics: Penicillin, Cephalosporins, Beta-Lactamase inhibitors, Monobactams. Aminoglycosides: Streptomycin, Neomycin, Kanamycin. Tetracyclines: Tetracycline,Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline.	
2	**Unit-2: Antibiotics** Historical background, Nomenclature, Stereochemistry, Structure-activity relationship, Chemical degradation classification, and important products of the following classes.Macrolide: Erythromycin Clarithromycin, Azithromycin. Miscellaneous: Chloramphenicol*, Clindamycin Prodrugs: Basic concepts and application of prodrugs design. Antimalarials: Etiology of malaria. Quinolines: SAR, Quinine sulfate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine. Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil. Miscellaneous: Pyrimethamine, Artesunate, Artemether, Atovaquone.	
3	**Unit-3: Synthetic anti-tubercular agents** Synthetic anti-tubercular agents: Isoniazid*, Ethionamide, Ethambutol, Pyrazinamide, Para aminosalicylic acid.* Anti-tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycin, Capreomycin sulfate Urinary tract anti-infective agents Quinolones: SAR of quinolones, Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin Miscellaneous: Furazolidone, Nitrofurantoin*, Methanamine Antiviral agents: Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.	

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Contents : Unit	Topics	Contact Hours
4	**Unit-4: Antifungal agents** Antifungal agents:Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, GriseofulvinSynthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*. Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine. Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantel, Ivermectin. Sulphonamides and Sulfones: Historical development, chemistry, classification, and SAR of Sulfonamides: Sulphamethizole, Sulfisoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxaole*, Sulphadiazine, Mefenide acetate, Sulfasalazine Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole Sulfones: Dapsone*.	
5	**Unit-5: Introduction to Drug Design** Introduction to Drug Design: Various approaches used in drug design. Physicochemical parameters used in a quantitative structure-activity relationship (QSAR) such as partition coefficient, Hammet's electronic parameter, Taft's steric parameter, and Hansch analysis Pharmacophore modeling and docking techniques. Combinatorial Chemistry: Concept and applications of Combinational chemistry solid phase and solution phase synthesis.	
Total Hours		

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Tutorials** Workshop no.1, Workshop no.2, Workshop no.3, Workshop no.4, Workshop no.5, Workshop no.6, Workshop no.7, Workshop no.8, Workshop no.9, Workshop no.10, Workshop no.11, Workshop no.12, Workshop no.13, Workshop no.14, Workshop no.15	
2	**Practicals** Experiment no.1, Experiment no.2, Experiment no.3, Experiment no.4, Experiment no.5, Experiment no.6, Experiment no.7, Experiment no.8, Experiment no.9, Experiment no.10, Experiment no.11, Experiment no.12, Experiment no.13, Experiment no.14, Experiment no.15	
Total Hours		

Textbook :

1 Wilson and Giswold's, Organic medicinal, and Pharmaceutical Chemistry., 2010

References:

1 Foye's Principles of Medicinal Chemistry.
2 Burger's Medicinal Chemistry, Vol I to IV
3 Introduction to principles of drug design- Smith and Williams.
4 Remington's Pharmaceutical Sciences.
5 Martindale's extra pharmacopoeia.
6 Organic Chemistry by I. L. Finar, Vol. II.
7 The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
8 Indian Pharmacopoeia
9 Textbook of practical organic chemistry- A.I.Vogel.

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	35.00	20.00	15.00	10.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by the blackboard may also use any tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.
2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.
3 Students will use supplementary resources such as online videos, NPTEL videos, MOOCs/ e-courses, virtual laboratories.

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