GAYATRI VIDYA PARISHAD
COLLEGE FOR DEGREE AND PG COURSES (AUTONOMOUS)
Affiliated to Andhra University | | Accredited by NAAC and NBA
VISAKHAPATNAM

DEPARTMENT OF ORGANIC CHEMISTRY

M.Sc. (Final) CHEMISTRY
SEMESTER-IV SYLLABUS
PAPER IV-DRUG DESIGN AND DRUG CHEMISTRY
(Effective from the admitted batch of 2022-2023)

Credits: 4		**Theory: 4 Hours**
Max Marks: 100	**External: 80**	**Internal: 20**

Course Outcomes (COs)/Course Specific Outcomes (CSOs):

CO 1: Acquire the knowledge of basics of drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs,
CO 2: Understand the synthesis, mode of action, properties, uses and dosage of antineoplastic drugs,
CO 3: Understand the synthesis, mode of action, properties, uses and dosage of cardiovascular drugs
CO 4: Understand the synthesis, mode of action, properties, uses and dosage of oral hypoglycaemic drugs.
CO 5: Understand the synthesis, mode of action, properties, uses and dosage of local anti-infective and antiviral drugs

Course learning outcome (LOs):

Upon completion of the course the students should be able to:

LO 1: Explain basics of drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs,
LO 2: Apply the mechanism of action, synthesis of antineoplastic drugs
LO 3: Apply the mechanism of action, synthesis of cardiovascular drugs
LO 4: Apply the mechanism of action, synthesis of hypoglycaemic drugs.
LO 5: Solve the structure and synthesis of local anti-infective and antiviral drugs
LO 6: Compare various modern synthetic methods, multicomponent reactions, oxidation, reduction and green chemistry related reactions

UNIT I: Introduction to Drugs [12 Hours]

General Classification, nomenclature, drug metabolism. Development of drugs: Procedure followed in drug design, concepts of lead compound lead modification, concept of prodrugs, Structure Activity Relationship (SAR)-factors affecting bio-activity-resonance, inductive effect, isosterism, bio-isosterism, spatial considerations, Quantitative Structure Activity Relationships (QSAR)-Concepts of drug receptors. Elementary treatment of drug receptor interactions. Physico-chemical parameters: lipophilicity, partition coefficient, electronic ionization constants,

UNIT II: Antineoplastic Agents: [12 Hours]

Introduction, classification-alkylating agents- mechanism and mode of action, nitrogen mustards-synthesis, properties, uses and dosage - Chlorambucil and melphalan. Antimetobolites- synthesis, properties, uses and dosage-pyrimidine analogues-5-flurouracil, purine analogues-6-mercaptopurine, folic acid analogues-Methotrexate. Antibiotics-structure, properties and dosage-Doxorubicin.

UNIT III: Cardiovascular Drugs: [12 Hours]

Introduction, cardiovascular diseases, drug inhibitors of peripheral sympathetic function, central intervention of cardiovascular output. Direct acting arteriolar dilators. Synthesis of amyl nitrate, sorbitrate, diltiazem, quinidine, verapamil, methyldopa, atenolol, oxyprenolol.

UNIT IV: Oral Hypoglycaemic Drugs: [12 Hours]

Introduction, Classification, Sulphonylureas- synthesis, mode of action, properties, uses and dosage- tolbutamide, glipizide. Biguanides- synthesis, mode of action, properties, uses and dosage-Metformin.α-glucosidage inhibitors- synthesis, mode of action, properties, uses and dosage- Miglitol. Dipeptidyl Peptidase-4 (DPP-4) inhibitors- synthesis, mode of action, properties, uses and dosage-saxagliptin and sitaglipti.

UNIT V: Local Anti-infective & Antiviral drugs [12 Hours]

Local Anti-infective Drugs: Introduction and general mode of action. Synthesis of sulphonamides, ciprofloxacin, dapsone, amino salicylic acid, isoniazid, econazole and chloroquine.

Antiviral Drugs: Introduction, classification based on mechanism of action, Nucleoside or Nucleotide Reverse Transcriptase Inhibitors (NRTIs)-Synthesis, metabolism, properties and uses and dosage-Acyclovir, Zidovudine (Anti-HIV agent). Non-Nucleoside or Nucleotide Reverse Transcriptase Inhibitors (NNRTIs)-Synthesis, metabolism, properties and uses and dosage-Nevirapine, Efavirenz. Protease Inhibitors (PIs)- Synthesis, metabolism, properties and uses and dosage-Indinavir.

Text Books:

1. Text book of medicinal chemistry, Volume 1 & II, Third edition by V Alagarsamy, CBS-publishers
2. Introduction to Medicinal Chemistry, A. Gringuage, Wiley-VCH.
3. Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry, Ed Robert F. Dorge.
4. An Introduction to Drug Design, S.S. Pandeya and J. R. Dimmock, New Age International.
5. Burger's Medicinal Chemistry and Drug Discovery, Vol-1 (Chapter.-9 and Ch-14), Ed. M. E. Wolff, John Wiley.
6. Goodman and Gilman's Pharmacological Basis of Therapeutics, McGraw-Hill.
7. The Organic Chemistry of Drug Design and Drug Action, R. B. Silverman, Academic Press.
8. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.

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