

PROF. K.SAYULU  
REGISTRAR



KAKATIYA UNIVERSITY  
VIDYARANYAPURI  
WARANGAL - 506 009

No. 609/B2/ACAD/KU/2014

Date: 03/06/2014  
07

The Principals of University and  
Affiliated Colleges offering M.Sc. Chemistry course  
KAKATIYA UNIVERSITY

Sub:- SYLLABUS - Sending of revised syllabus of M.Sc. Chemistry I-  
Semester, Paper-IV and II - Semester, Paper-II - Regarding.  
Ref:- Lr.No. 155/Chem/KU/2014, dated 11<sup>th</sup> June, 2014 of the  
Chairperson, Board of Studies in Chemistry, KU.

Sir/Madam,

I am to inform you that the Chairperson, Board of Studies in Chemistry, KU has sent the revised syllabus of M.Sc. Chemistry I - Semester, Paper-IV and II - Semester, Paper-II as recommended by the Board of Studies at its meeting held on 31<sup>st</sup> May, 2014 for implementation during the academic year 2014-2015 onwards. The Dean, Faculty of Science, KU forwarded the minutes for implementation.

In view of urgency, the Vice-Chancellor, in anticipation of approval by the Standing Committee of the Academic Senate, has accorded approval for implementation of revised syllabus of M.Sc. Chemistry I - Semester, Paper-IV and II - Semester Paper-II with effect from 2014-1015 onwards as recommended by the Board of Studies in Chemistry, KU. The remaining syllabi stands unchanged.

A copy of the revised syllabus is enclosed herewith. Further, it is also available at the University Website [www.kakatiya.ac.in](http://www.kakatiya.ac.in). The same may be brought to the notice of the students and the staff concerned.

Yours faithfully,

REGISTRAR

Encl.: As stated.

Copy to:

1. The Dean, Faculty of Science, KU
2. The Chairperson, Board of Studies in Chemistry, KU
3. The Controller/Addl. Controller of Examinations (PG/Confdl.), KU
4. The Director, Campus Network/Website, KU with a request to place the revised syllabi on the website.
5. The Secretary to the Vice-Chancellor, KU
6. The P.A. to Registrar, KU
7. The SF.

## Revised II semester syllabus paper-II (2014-2015)

### Unit:I

#### Drug Design and Drug Discovery (15 periods)

Introduction to drug discovery. Folklore drugs, stages involved in drug discovery- disease, drug targets, bioassay. **Chiral drugs:** Role of chirality on biological activity: examples of Diastomers – a) with no side effects b) with undesirable side effects c) both isomers having independent therapeutic value d) combination products having therapeutic advantages e) metabolic chirality inversion.

#### Drugs acting on metabolic process, cell wall and specific enzymes

Basic concepts of mechanism of drug action: Introduction to macromolecular targets, carbohydrates, proteins, lipids and nucleic acids as possible drug targets. Classification of drugs. Enzyme inhibition and its types.

#### 1) Drugs acting on metabolic process:

Antifolates –Discovery and mechanism of action of sulphonamides,

Diaminopyrimidines -trimethoprim, bacterial resistance to sulfonamides and drug synergism

b)Drugs acting on cell wall: Structure of bacterial cell wall,  $\beta$ -Lactam antibiotics – mechanism of action of penicillins and cephalosporins.

.  $\beta$ -Lactamase inhibitors – Structural formulae and mode of action of clavulanic acid and sulbactam

c)Drugs acting on specific enzymes:  $H^+/K^+$ -ATPase inhibitors

#### 2 )Drugs acting on genetic material and immune system

Drugs acting on genetic material: Introduction, classification and mechanism of action.

a) DNA-intercalating agents-Anticancer and antimalarial agents. Structural formulae of Daunomycin, Adriamycin and Amsacrine.

b) DNA- Binding and nicking agents: Antiprotozoal drugs. Metronidazole,

(Note: Synthesis of drugs are not included in the syllabus)

### Unit II

#### . Drugs acting on receptors and ion channels (15 periods)

Introduction to nervous system: structure of neuron, nerve transmission. Definition and examples of agonist, antagonist, neurotransmitters and receptors.

Drugs acting on receptors:

a)Adrenergic receptors - Introduction and classification.  $\alpha$ -Adrenergic-receptor agonists and antagonists- Synthesis and biological activity of Nor-adrenaline, Methyl L dopa and Tetrazosin.

$\beta$ -Adrenergic-receptor - agonists and antagonists – Synthesis and pharmacological activity of Salbutamol, Terbutalin, Propranolol and Atenolol.

b)Cholinergic-receptors: Introduction and classification. Cholinergic-receptor agonists and antagonists- Structural formulae of Nicotine, Atropine and Tubocurarine.

c)Dopamine receptors: Introduction and classification.

d)Serotonin receptors: Introduction and classification. Serotonin receptor agonists and antagonists-.

e)Histamine receptors: Introduction and classification. Histamine receptor agonists and antagonists- biological action of Histamine, Chlorpheniramine, and Ranitidine.

- f) Hormones and their receptors: Introduction to estrogen receptors, Structural formulae of Tamoxifen
- g) Drugs acting on ion channels: Introduction to ion channels, drugs acting on  $\text{Ca}^{2+}$ ,  $\text{Na}^+$  and  $\text{Cl}^-$  channels and their mode of action. Structural formulae of Nifedipine, Diltiazem, Tetracaine and 4-Aminopyridine.

(Note: Synthesis of drugs are not included in the syllabus)

### **Unit.III: Reaction Mechanisms-II**

Study of the free radicals: Mechanism of free radical substitution at paraffinic, allylic and benzylic carbons – free radical aromatic substitutions – auto oxidation – Introduction to free radical rearrangements.

Selective organic name reactions: Mannich reaction, Michael addition, Tschitchibabin reaction, Shapiro reaction, Barton reaction

Rearrangement reactions: Hoffmann, Curtius, Favorskim Baeyer-Villiger, Beckmann, Fries, Benzidine, Benzilic acid and Dienone-Phenol rearrangements.

### **Unit-IV: Non benzenoid aromatic compounds:**

Concept of aromaticity, Robinson's sextet theory, Huckel's rule, basis for the Huckel's rule, Limitations of the Huckel's rule – various nonbenzenoid aromatic molecules – Synthesis and properties of aromatic 3,4,5,6,7,8- membered rings, metallocenes, annulenes, heteroannulenes, azulenes, fullerenes ( $\text{C}_{60}$ ), Sydnones – Anti-aromatic compounds, alternant and non –alternant hydrocarbons.

### **Recommended books**

1. Reaction mechanisms – Jerry March
2. A guide book to reaction mechanisms in organic chemistry – Peter Sykes
3. Mechanism and structure in organic chemistry – S.Mukharji
4. Organic Chemistry – Volume – I & II-I.L Finar
5. Carbohydrate chemistry – Davidson
6. Text book of organic chemistry – Morrison and Boyd
7. Organic reagents – Fieser and Fieser
8. Organic reagents – house
9. Modern text book of organic chemistry - Furguson
10. Burger's medicinal chemistry and drug discovery by Manfred E. Wolf.
11. Introduction to Medicinal chemistry by Patrick.
12. Wilson and Gisvolds, text book of Organic, Medicinal and Pharmaceutical Chemistry By
13. Principles of medicinal chemistry. by William Foye
14. Biochemical approach to medicinal chemistry. by Thomas Nogrady.
- 15 Medicinal Chemistry by Ashtoshkar
16. Medicinal Chemistry by Chatwal
17. Medicinal Chemistry Graham Patrick