

बाबासाहेब भीमराव अम्बेडकर विष्णुविद्यालय
विद्या विहार, रायबरेली रोड, लखनऊ-226025
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY
(A Central University)
Vidya Vihar, Rae Bareli Road, Lucknow-226025

Letter No. –

Date –

सूचना

रसायन विज्ञान विभाग के समस्त प्रथम सेमेस्टर के विद्यार्थियों को सूचित किया जाता है कि अन्य विभाग में सी0बी0सी0एस0 पेपर के अंतर्गत चल रहे ओपन एलेक्टिव कोर्स (Open Elective) के सलाहकार (advisor) डा0 अन्जनी के तिवारी हैं एवं विष्णुविद्यालय के समस्त प्रथम सेमेस्टर के विद्यार्थियों को सूचित किया जाता है कि रसायन विज्ञान विभाग में सी0बी0सी0एस0 पेपर के अंतर्गत चल रहे ओपन एलेक्टिव (Open Elective) कोर्स के सलाहकार डा0 ज्योति पाण्डेय हैं।

विभागाध्यक्ष
रसायन विज्ञान विभाग
भौतिकीय एवं निर्णय विज्ञान विद्यापीठ

प्रतिलिपि :-

1. अधिष्ठाता (शैक्षणिक), बी0बी0ए0यू0, लखनऊ।
2. समस्त संकायाध्यक्ष, बी0बी0ए0यू0, लखनऊ।
3. समस्त विभागाध्यक्ष, बी0बी0ए0यू0, लखनऊ।
4. डा0 अन्जनी के तिवारी, रसायन विज्ञान विभाग, बी0बी0ए0यू0, लखनऊ।
5. सूचना पट्ट रसायन विज्ञान विभाग, बी0बी0ए0यू0, लखनऊ।
6. प्रभारी विश्वविद्यालय वेबसाइट, बी0बी0ए0यू0, लखनऊ।

NOTICE

This is to inform to all concerned that the Department of Chemistry is offering the following 02 (Two) optional papers under Open Elective Course in Ist semester. Any one of these can be opted by any student under the Choice Based Credit System being followed by the University. Refer to Notice Board of Department of Chemistry for time table & other details. Dr. Anjani Kumar Tiwari, Associate Professor, Department of Chemistry is student's advisor.

Course Code	Course Title	Maximum Marks				Credit
		End Semester	Test-I	Test-II	Presentation	
MCH-CBCS-I	Chemistry in Life	70	10	10	10	4
MCH-CBCS-II	Applied Chemistry	70	10	10	10	4

Head
Department of Chemistry
School for Physical & Decision Sciences

Copy to:

1. AR to VC for kind information of the Hon'ble Vice-Chancellor, BBAU, Lucknow
2. Dean (Academic), BBAU, Lucknow
3. All Dean with a request to give it a wide publicity among the stakeholders of all departments under their School
4. Registrar, BBAU, Lucknow
5. COE, BBAU, Lucknow
6. Notice Board, Department of Chemistry, BBAU, Lucknow
7. I/C University website for its uploading on University website.

Head
Department of Chemistry
School for Physical & Decision Sciences

Department of Chemistry
School of Physical and Decision Sciences
Course Folder/Course Overview

SEMESTER I

Subject Code	Subject name	Credit	Marks
MCH-CBCS-101	Elective-I MCH-CBCS-101 (01): Chemistry in Life-I MCH-CBCS-101 (02): Applied Chemistry-I	4	70 (End semester exam) +30 (Internal exam)

SEMESTER II

MCH-CBCS-201	Elective-I MCH-CBCS-201 (01): Chemistry in Life-II MCH-CBCS-201 (02): Applied Chemistry-II	4	70 (End semester exam) +30 (Internal exam)
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SYLLABUS

SEMESTER I

MCH-CBCS-101 (01): CHEMISTRY IN LIFE-I

60hrs

Unit-I
Pharmaceutical and Drug Regulations
Regulatory aspects of pharmaceutical and bulk drug manufacture: DRA, FDA, CDSCO, IPR- Patent, Patent approval process, Industrial Design, Trade mark, copyright, regularity aspects of pharmaceutical & drug manufactures. Good manufacturing practices (GMP). Diagnostic and therapeutic Radio pharmacy

Unit II
Drugs and Medicines- Similarity and differences, mode of Drug action, types of medicines; **Role of medicinal chemists-** Journey of molecules from lab to market; Lipinski's Rule; **Current trends in Drug discovery-**Drug Discovery Pipeline, **Chiral Drugs:** Importance & their stereo electronic properties of drug molecule, **Classification of drugs:** on basis of pharmacological activity, chemical structure, and origin, Methods of administration of drugs. **Modern Drugs for CNS, Clinical trials-** Testing of new compound on human.

Unit-III
Green Chemistry
Introduction: Principles and Concepts of Green Chemistry, Prospects and future of Green Chemistry, Twelve guiding principles of green chemistry, Green solvents, Green catalysis, Non-conventional energy sources.

Unit IV
Polymer Chemistry
Basic concept: Classification of polymers (with suitable examples) based on origin, structure, backbone, branching. Types of polymerization, Important thermoplastic and thermosetting resins, Biomedical applications of polymers, Polymer supported reagents.

Recommended Books:

1. Drug Regulatory Affairs by V.Sai Kishore (Ikon Books)
2. Fundamentals in medicinal chemistry- G. Thomas. 2nd edition
3. Introduction to medical Chemistry, G. L. Patrick
4. Medicinal Chemistry- Ashutoshkar
5. Medicinal Chemistry- Sreeram and Yogeshwari
6. Medicinal Chemistry & Drug discovery- Burger (Volume 1-6)
7. Strategies for organic synthesis and Design -D. Lednicer
8. Burger's Medicinal Chemistry vol. 1to6
9. Green Chemistry: Theory and Practice. P.T. Anastas and J.C. Warner. Oxford University Press.
10. Green Chemistry: Introductory Text. M. Lancaster Royal Society of Chemistry (London).
11. Introduction to Green Chemistry. M.A. Ryan and M.Tinnesand, American Chemical Society (Washington).
12. Alternative Solvents for Green Chemistry. F.M. Kerton. Royal Society of Chemistry (London).
13. Textbook of polymer science, F.W. Billmayer Jr. Wiley
14. Polymer Science, V.R. Gowarikar, N.V. Vishwanathan and J. Shreedhar, Wiley-Eastern
15. Introduction to Polymer Chemistry by Carraher Jr.

Unit- 1**Surface active agents, Micelles, Advance Surface Chemistry**

Surface active agent, classification of surface active agent, micellization, hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of surfactant, counter ion binding to micelles, thermodynamics of micellization – phase separation and mass action models, solubilization, micro emulsion, reverse micelles.

Gibbs adsorption isotherm, estimation of surface areas (BET equation), Surface film of liquids electro- kinetic phenomenon), catalytic activity at surface. Chemical reactions on surfaces and their mechanisms, various adsorption isotherms, Viz Freundlich, Langmuir, BET, Tempkin, Radleich - Peterson, Dubini - Astakhov equation, Giles classification of adsorption isotherms. Shapes. Activated carbon properties, adsorption capacity, iodine number, molasses number, product density, mesh size, ash content, IUPAC classification of macro, meso and micro-porous materials (pore size distribution), and industrial applications of adsorption.

Unit-2**Standard Protocols for Validation of Methods**

Protocol for the design, conduct & interpretation of collaborative studies- 2005(IUPAC) AOAC official 2002 methods of analysis, Appendix D: Guidelines for collaborative study procedure to validate Characteristics of a method of analysis, ISO 5725 document.

Unit-3**Environmental Chemistry**

The Atmosphere: Composition and structure of the atmosphere: troposphere, stratosphere, mesosphere and thermosphere. Ozone layer and its role. Major air pollutants : CO, SO₂, NO and particulate matters –their origins and harmful effects, problems of ozone layer depletion, green house effect, acid rain and photochemical smog, La Nino & El Nino. Air pollution episodes. Air quality standard. Air pollution control measures: cyclone collector, electrostatic precipitator, catalytic converter.

The Hydrosphere: Environmental role of water, Water pollution control measures: waste water treatment: chemical treatment and microbial treatment; water quality standards: DO. BOD, COD, TDS and hardness parameters. Desalination of sea water: reverse osmosis, electro dialysis.

The Lithosphere: Water and air in soil, waste matters and pollutants in soil, waste classification, treatment and disposal. Soil pollution and control measures.

Unit-4**Nanomaterial and Applied Green Chemistry**

Nanomaterial, Role of size in nanomaterial, Semiconductor/Nanostructures/ nanowires/Nano clusters/Carbon nanotubes: Synthesis & Application, Characterization techniques, Properties of nanomaterial: optical, electronic, magnetic.

Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry, Strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes. Examples of Green Synthesis/ Reactions and some real world cases, Green chemistry in sustainable development.

Recommended Books:

1. Physical Chemistry–P. W. Atkins, Oxford University press, VIIth edition, 2002
2. Physical Chemistry-K. L. Kapoor (Part-V)

- Physical Chemistry- G. K. Vemulapalli, Prentice- Hall of India.
- Environmental chemistry by A.K. De
- Green Chemistry: Theory and Practice. P.T. Anastas and J.C. Warner. Oxford University Press.
- Green Chemistry: Introductory Text. M. Lancaster Royal Society of Chemistry (London).
- Introduction to Green Chemistry. M.A. Ryan and M.Tinnesand, American Chemical Society (Washington).
- Alternative Solvents for Green Chemistry. F.M. Kerton. Royal Society of Chemistry (London).

SEMESTER-II

MCH-CBCS-201 (01): CHEMISTRY IN LIFE-I

60hrs

Unit-I

Drug Design and Action:

Introduction to Drug Design- Different, Mode of Drug action, Drug receptors, types of receptors -general introduction, Drug-Receptor Interaction, Drug action, Pharmacokinetics, and pharmacodynamic properties of drugs, Biological factors affecting metabolism, Drug metabolism, Prodrug concept, natural and synthetic compounds of medicinal importance.

Unit II

Industrial Chemicals

Explosives (Primary and Secondary Explosives). Corrosion, surface coating, refractories and abrasives, lubricants, Cement, Paper Industry (Pulp and Pulping Process).

Unit-III

Bioinorganic Chemistry

Role of metal ions in biological processes, Oxygen uptake proteins-Myoglobin and Haemoglobin. Metalloenzymes and metalloproteins: Introduction and role in biological systems. Biological nitrogen fixation. PS-I, PS-II.

Unit IV

Biopolymers

Definition of Biopolymers and types of biopolymers, structure and isolation of biopolymers: chitosan, alginates, and cellulose, modification of biopolymers, environmental impact of biopolymers, latest development and applications of biopolymers.

Recommended Books:

- Applied chemistry for Engineer by Diamont.
- Industrial poisons and solvents by Jacobs.
- Chemistry of engineering materials by Jain & Jain.
- Engineering chemistry by B. K. Sharma.
- P.S.Kalsi, Bioorganic, Bioinorganic and Supramolecular Chemistry
- Biopolymers: Biomedical and Environmental Applications by Susheel Kalia and Luc Averous-Wiley Publications

Unit-I

Water treatment and analysis: characteristics of water - alkalinity - hardness - unit of hardness, Purification of water for drinking purpose - potability of water - clarification - coagulation - contact & electro chemical coagulation - sterilization & disinfection of water - precipitation - aeration - ozonisation - Chlorination.

Unit-II

Food Preservatives & additives: Definition - classification - Food Spoilage, Methods of preservation - classification - Low and high temperature - preservatives examples - Dehydration - osmotic pressure - food irradiation, Food additives- classification - their functions - chemical substance, Packaging of foods - classification-Materials used for packaging.

Unit-III

Ecosystem and biodiversity: Ecosystem Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosphorus) Biodiversity – magnitude and distribution of biodiversity – trends - biogeographical classification of india – biodiversity at national, global and regional level.

Unit-IV

Clinical analysis of blood: Composition of blood,clinical analysis,trace elements in the body.Estimation of blood cholesterol,glucose,enzymes,RBC & WBC ,Blood gas analyser.

Recommended Books:

1. Industrial Chemistry (including chemical - engineering) - B.K. Sharma - Goel publishing house.
2. 2. Water pollution and management - C.K. Varashney - Wiley Eastern Ltd., Chennai - 20.
3. Food Science - III Edition - B. Sri Lakshmi. New Age International Publisher, 2005.
4. Food Chemistry - Lilian Hoagland Meyer CBS Publishers & Distributors, 2004.
5. Food Science, Nutrition and Health - Brian.A.Fox, Allan G.Cameron Edward Arnold, London.
6. Fundamentals of ecology by M.C.Dash
7. A Text book of Environmental chemistry by W. Moore and F.A. Moore
8. Environmental Chemistry by Samir k. Banerji
9. A.I.Vogel-A text book of quantitative Inorganic analysis-ELBS,
10. F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
11. J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.