DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/NP/B.Sc.-Ist Yr./SEM.-I & II/173/2013

It is hereby notified for information of all concerned that, on the recommendations of the Board of Studies/Ad-hoc Boards/ Committee under the Faculty of Science, the Hon'ble Vice-Chancellor has accepted the **following revised syllabi for B.Sc. First Year progressively and Syllabus of B.Sc. Textile and Interior Decoration, Semester-V & VI** on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** ***as appended herewith.***

Sr. No.	*Revised Syllabus*	
[1]	*B.Sc. [Instrumentation Practice]*	*Semester- I & II,*
[2]	*B.Sc. [Forensic Science]*	*Semester- I & II,*
[3]	*B.Sc. [Bio-Chemistry]*	*Semester- I & II,*
[4]	*B.Sc. [Networking & Multimedia]*	*Semester- I & II,*
[5]	*B.Sc. [Agro Chemical Fertilizer]*	*Semester- I & II,*
[6]	*B.Sc. [Analytical Chemistry]*	*Semester- I & II,*
[7]	*B.Sc. [Polymer Chemistry]*	*Semester- I & II,*
[8]	*B.Sc. [Environmental Science]*	*Semester- I & II,*
[9]	*B.Sc. [Textile & Interior Decoration]*	*Semester- V & VI,*

This is effective from the **Academic Year 2013-2014** and onwards.

These **syllabi are available on the University Website www.bamu.net**

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/NP/B.Sc.-IST YEAR/
Sem-I & II/2013/10191-640
V.C.14[7] A-03.

Date:- 03-06-2013.

★ ★ ★ ★ ★ ★ ★
******

Director,
Board of College and
University Development.

..2..

:: [2] ::

Copy forwarded with compliments to :-

1] **The Principals, affiliated concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University.

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above all syllabi on University Website [www.bamu.net].**

Copy to :-

1] The Controller of Examinations,

2] The Superintendent, [B.Sc. Unit],

3] The Superintendent, [Eligibility Unit],

4] The Programmer [Computer Unit-1] Examinations,

5] The Programmer [Computer Unit-2] Examinations,

6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,

7] The Public Relation Officer,

8] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

-=**=-

S/-030613/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Revised Syllabus of

B.Sc. (Analytical Chemistry) (optional)

Semester I and II

[Effective From- June 2013]

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

B.Sc. Analytical Chemistry Course Structure in Semester System

B.Sc. First Year

Semester	Course Code	P. No.	Title of the Paper	Credits	Marks
I	ACH-101	I	Fundamentals of Anal chemistry	03	50
	ACH-102	II	Basic concepts of Anal chemistry	03	50
	ACH-103	III	Lab Course-I	03	50
II	ACH-201	IV	Statistical treatment & modern methods of analysis	03	50
	ACH-202	V	Classical and spectral methods of Analysis	03	50
	ACH-203	VI	Lab Course-II	03	50

Note: For theory paper one credit =15 periods and for practical paper one credit =30 periods.

ACH-101 Paper-I Fundamentals of Analytical Chemistry

1. **Scope and Importance of Analytical Chemistry**:-

Definition, scope, functions of Analytical chemistry, analytical methods procedure and technique, importance of Analytical chemistry Methods of quantitative analysis, Criteria for selection of method for analysis, chemical analysis and analytical chemistry, quantitative analysis with scale of operation, steps In quantitative analysis , methods of analytical determination. Role of Instrumentation.

2. **Sampling of Analytical Samples**:-

Definition of terms: sample, sampling, universe, sampling unit, increment, gross sample, sub-sample, analytical sample, purpose of sampling, theory of sampling.

Types of sampling: Random and non random sampling, sampling of solids, liquids, and gases, problems associated with sampling preparation of sample solution.

3. **Reagents Solvents and their Classification**:-

***Reagents**:* classification of reagents according to their action as, Acids, Bases,

Salts, oxidizing, reducing, complexing, chelating and precipitating reagents with suitable examples.

***Solvents**:* Classification of solvents as protic, aprotic and amphoteric solvents, Acidic basic and neutral solvents, polar and non polar solvents, aqueous and non-aqueous solvents. Explanation with suitable examples.

4. Working in Analytical Laboratory

Good laboratory practices, Basic laboratory Operations, Requirements for the suitability of the reactions for use in chemical analysis, Rules of work in an analytical laboratory, General safety regulations, Handling of reagants,Rules for working with harmfull substances, Rules of fire prevention, Prevention of accidents and first aid in laboratory.

5. Digital electronics and Computers

Analog and digital signals, Counting and arithmetic with binary numbers, Basic digital circuis,Computer and computerized instruments, Components of computers, Computer software, Applications of computers, Computer networks.

ACH-102 Paper-II Basic Concepts of Analytical Chemistry

1. **Balance***:-*

Analytical Balance: Construction and working of mechanical and electronic analytical balance. Weighing with single pan balance, Precautions in using analytical balance. Sources of errors in weighing, Care and use of balance. Weighing and methods of weighing, Calibration of weights.

2 . Chemical Apparatus and Laboratory Note Book for Analytical Chemistry:-

Classification of chemicals reagents, grade (LR grade, and AR grade, CP grade, spectroscopic grade) primary standard grade and special purpose reagent and chemicals. Rules for handling reagents, apparatus, cl‘ning and marking of lab- wares, handling of volumetric flask, calibration of burette, pipette, volumetric flask.

Laboratory Note Book: Rules for its aintenance, format, safety in the laboratory.

3. **Chemical Calculations**:-

Mole concepts: Mole atom, Mole molecule, molar volume, molar mass. Atomic weight, Molecular weight, Equivalent weight. Relationship between molecular weight and equivalent weight, with respect to acid-base and redox reagents.

Concentration units: molarity, molality, nonnality, formality, percentage

(w / w , w / v , v / v) strength, weight fraction, mole fraction, p.pm. and p.p.b. *stoichiometry:* Numerical examples on above terms.

. **4)Commen Apparatus.**

- Graduated glasswares, Units of volumes, graduated apparatus , Temperature standards, Flasks, Pipettes, Burettes, Weight Burettes, Piston burettes, Measuring cylinders, Purified water, Wash botteles, Glasswares and Plastic Wares,Metal apparatus, Heating Apparatus, Dessiccators and dry boxes, Stirring and filtration apparatus

5 . **Acid-Base Equilibria**

Acid-base theories(Arrheni's,lowry-bronsted & lewis), Acid-base equilibrium in water, the P^H scale, Weak acid & bases, Salts of weak acids & bases, buffers, polyprofic acids & their salts, Phynological buffers, buffers in biological +and clinical measurements.

ACH-103 Paper-III Lab Course-I

1. Calibration of weight and calculation of errors in it.

2. Calibration of burette, pipettes and Standard Flasks.

3. Prepare a standard solution of Na_2CO_3 and standardize the given solution of HCl / H_2SO_4.

4. Prepare a standard Solution of sodium oxalate and standardize the given solution of $KMnO_4$.

5. Prepare a standard solution of NaC1 and standardizes the given solution of $AgNO_3$.

6. Prepare a standard solution of $K_2Cr_2O_7$ and standardize the given solution of Na2S2O3.

7. Determine % purity of commercial sample of NaOH

8. Prepare 100 p.p.m. K solution using $K2SO_4$.

9. Prepare 100 p.p.rn. Fe solution using FAS

10. Assay of $FeSO_4$. $7H_20$.

11. Assay of Boric acid titrimetrically.

12. You are provided with 0.1 N solutions of acetic acid, using this solution prepare 50 ml 0.02 N acetic acid and standardization.
13. You are provided with 0.1 N FAS, using this solution prepare 50 ml of FAS (II) suitable dilution and standardize against $KMnO_4$
14. Estimation of polyphenols present in tea sample.
15. Ash content of milk powder,
16. Estimation of chlorine in bleaching powder.
17. Determine Empirical formula using mole ratio method.
18. Determination of Phosphoric acid content of soft drink.

ACH-201 Paper-IV Statistical Treatment & Modern Methods of Analysis

1. Data Handling:-

Statistical Terms: - Mean, median, spread, absolute deviation, average deviation, relative average deviation, precision and accuracy, significant figure and rounding off figures.

Errors: Types of errors (Determinant and indeterminate), absolute error, relative error, constant and proportionate errors, standard deviation, coefficient of variation, confidence limit, student test, Rejection of data, Q-test, 2.5-4d rules, Graphical representation of results, method of averages, method of least of squares, numerical problems.

2. Chromatography:-

Chromatography as the method of separation, historical development, classification of chromatographic methods, fundamentals of chromatogeraphy, special features of chromatographic methods, principles of chromatography (brief), principal, techniques, types and applications of paper chromatography and thin layer chromatography (TLC)

3) Electrophoresis.:-- Introduction, Theory of electrophoresis,Types of electrophoresis,Moving boundry electrophoresis,zone electrophoresis--- a)Paper electrophoresis b) Cellulose acetate elevtrophoresis c) Gel electrophoresis.

4) Flame photometry:-

Principle, instrumentation and applications.

5) Environmental pollution:

Introduction, Classification of pollution, pollutants, classification of pollutants.

Acid rain:- Introduction, rule of winds in acid rain, adverse effect of acid rain, control of acid rain, global warming & climate change, ozone layer depletion, Effect of ozone layer depletion, remedial steps.

ACH-202 Paper-V Classical and Spectral Methods of Analysis

1. Titrimetric Methods of Analysis:-

Definitions of some important terms:- Titrant, Titrand, Titrations, indicators, titre value, equivalence point, end point, neutralization point, classification of reactions in titrimetric analysis.

Primary and secondary standards: Definitions, characteristics and uses, Theory of acid base indicators, Factors affecting indicator use, neutralization curves.

2. Gravimetric analysis:-

Introduction, precipitation, filtration, filter papers, filter mats, types of filtering crucible, drying, ignition, incineration of precipitate, nucleation, particle size, crystal growth, colloidal state. Solubility product, principle and its applications, factors affecting solubility of precipitate, aging, co precipitation and post precipitation. Precipitation from homogeneous solution (hydroxide, phosphates, oxalates & sulphates) use of organic and inorganic precipitation reagents.

3. Spectral Method of analysis:-

Introduction, advantages of instrumental methods, limitations of instrumental methods, regions of electromagnetic radiations, properties of electromagnetic radiation, absorption and emission phenomenon, numerical.

Visible Spectroscopy*:-* Lambert and Beers' law and its validity, deviations, Instrumentations and applications for determination of single component and multi components mixtures. Job's method, mole ration and slope ration method for investigation of complex ions. Photometric titrations**.**

4. Precipitation titration:-

Introduction, mohr's method, Volhard's method, adsorption indicators and its use in precipitation titrations.

5. Complexometric titrations & some basic concepts of redox titrations:-

Introduction, stability of complexes, factors affecting stability of complexes, types of EDTA titrations, masking and demasking agents, theory of metal ion indicators.

Oxidation reduction, equivalent weight in oxidation reduction reaction, detection of end point in oxidation reduction titrations.

ACH-203 Paper-VI Lab Course-II

1. Estimation of Barium as $BaS0_4$-gravirnetrically.
2. Estimation of Iron as Fe203.
3. Preparation of 0.1 N solutions of HC1 / HNO_3 using density and percentage by weight and their standardization by using Na_2CO3.
4. Prepare a calibration curve using $KMnO_4$ solution and determine concentration in unknown given sample solution.
5. Prepare a calibration curve using $CuSO_4$ solution and determine concentration of $CuSO_4$ in given solution.
6. Preparation of 0.05 N H_2SO_4 using density and weight percentage and its standardization.
7. To determine the molar absorptivity of Fe-5-sulphosaiicylic
8. Estimation of Na / K by using flame photometer.
9. To separate chlorophyll from green leaves by paper chrpmatography.
10. Calculate the equivalent weight of H_2SO4 & Standardise it with standard NaOH.
11. Measure the absorbance of series of solutions of 1(Mna4 and find the equation of line using least squares method. •
12. Measure the absorbance of series of Solution of K2Cr207 and find the equation of line using least squares method. 7

Estimate the total amount of halides present in the given solution using Volhard's method..

13. Separation of amino acids by thin layer chromatography.

14. Separation of metal ions by thin layer chromatography. . Estimation of

calcium from chalk by EDTA / KMn04

15. Calculate the standard deviation from the results obtained by redox titration of oxalic acid against standard $KMnO_4$.

16. Analysis of the given sample of antacid using standard HCl and NaOH solutions.

17. Separation of Copper Sulphate &alum by fractional crystallization.

18. Calculate the equivalent weight of Ferrous Ammonium Sulphate.

LIST OF RECOMMENDED BOOKS

1) College Analytical Chemistry by –Joshi Baliga, Shetty & Dhakkappa

2) Analytical Chemistry by ---B. K. Sharma

3) Quantiitative Analysis by ---A. I. Vogel

4) Environmental Chemistry by---H. Kaur

5) Analytical Chemistry by Usharani

6) Analytical Chemistry by Alka Gupta

7) Analytical Chemistry by Gary D. Christian

8) Instrumental Methods of Analysis by Skoog West and Holler.

-==-**

S*/-100513/-