डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद

परिपत्रक क्रमांक/एस.यु./विज्ञान/अभ्यासक्रम/७४/२०१४

या परिपत्रकाद्वारे सर्व संबंधीतांना सुचित करण्यात येते की, विज्ञान विद्याशाखेने शिफारस केल्यानुसार बी. एस्सी. / एम. एस्सी. प्रथम व द्वितीय वर्षाच्या सुधारित अभ्यासक्रमास आणि बी. एस्सी. प्रथम वर्षाच्या अभ्यासक्रमात किरकोळ बदल करण्यास विद्यापरिषदेच्या वतीने मा. कुलगुरु यांनी, त्यांना प्राप्त असलेल्या विशेष अधिकार महाराष्ट्र विद्यापीठ अधिनियम-१९९४ कलम १४(७) अन्वये मान्यता दिलेली आहे. त्या अनुषंगाने सुधारीत तयार केलेल्या अभ्यासक्रमाची प्रत या परिपत्रकासोबत आपल्या पुढील कार्यवाहीसाठी पाठविण्यात येत आहे.

[1]	B.Sc. Physics	Semester-III & IV,
[2]	B.Sc. Chemistry	Semester-III & IV,
[3]	B.Sc. Botany	Semester-III & IV,
[4]	B.Sc. Zoology with minor changes	Semester-I & II,
[5]	B.Sc. Zoology	Semester-III & IV,
[6]	B.Sc. Fisheries	Semester-III & IV,
[7]	B.Sc. Electronics (Opt.)	Semester-III & IV,
[8]	B.A./B.Sc. Mathematics	Semester-III & IV,
[9]	B.Sc. Computer Science	Semester-I & II,
[10]	B.Sc. Information Technology	Semester-I & II,
[11]	B.C.A.	Semester-I & II,
[12]	B.Sc. Computer Science(Opt.)	Semester-I & II,
[13]	B.Sc. Information Technology(Opt.)	Semester-I & II,
[14]	B.Sc. Computer Application(Opt.)	Semester-I & II,
[15]	B.Sc. Computer Maintenance(Opt.)	Semester-I & II,
[16]	B.Sc. Biotechnology (Progressively)	Semester-I to VI,
[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

..2..

[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
औरंगाबाद-४३१ ००४.
संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
६५९९-७०२
दिनांक :- २७-०५-२०१४.

संचालक,
महाविद्यालये व विद्यापीठ
विकास मंडळ.

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या परिपत्रकाची एक प्रत :-

१) मा. परिक्षा नियंत्रक, परिक्षा विभाग,

२) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,

३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थंळावर उपलब्ध करुण देण्यात यावेत.

४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,

५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,

६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,

७) कक्ष अधिकारी, बी.ए. / बी.एस्सी./ बी.सी.एस./एम.एस्सी. विभाग, परीक्षा भवन,

८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,

डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

B.Sc. SECOND YEAR

ANALYTICAL-CHEMISTRY

[OPTIONAL]

Semester–III & IV

[Effective for 2014-15]

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Syllabus: B.Sc. Analytical Chemistry course structure in semester System.

B. Sc. Second Year

Semester	Course Code	Paper No.	Title of the Paper	Credit	Marks
III	ACH 301	VII	Laboratory Techniques: Inorganic and Organic Analysis	03	50
	ACH 302	VIII	Advance Analytical Techniques	03	50
	ACH 303	IX	Laboratory Course III	1.5	50
	ACH 304	X	Laboratory Course IV	1.5	50
IV	ACH 401	XI	Instrumental methods of analysis-I	03	50
	ACH 402	XII	Instrumental methods of analysis-II	03	50
	ACH 403	XII	Laboratory Course V	1.5	50
	ACH 404	XIV	Laboratory Course VI	1.5	50

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

Paper ACH-301

Laboratory Techniques: Inorganic and Organic Analysis

1. Theroy of Redox titration and Iodometric titration

Balancing redox reactions, equivalent weight in redox reaction, electrochemistry, theory of redox reaction, titration curve, dectection offend point in redox titration, internal indicator, reagent itself as an indicator, external indicator, oxidation with potassium permangnet, preparation of solution and standardization, estimation of nitrates and persulfates, oxidation with potassium dichlromate, preparation of solution , estimation of iron and chromium, oxidation with cerium sulphate solution, preparation of standard solution Estimation of copper and molybdate.

Iodometric titration: Detecting end point, preparation of standard solution. Estimation of copper and hydrogen peroxide.

2. Complexometric titration

Definition of terms, complex ion, complex or coordinate compound, ligand, coordination number, unidentate ligands, pluydentate ligands, chelates, stability or formation constant of complex, stepwise formation constant, titration involving unidentate ligands and polydentate ligands.

3. Organic Estimations

Estimation of the following functional groups in the organic compounds, OH, C=O, COOH, CHO, NO_2. Ester and amine group.

4. Non aqueous titrations

Introduction, types of solvents, Estimation using perchloric acid, Theory of non aqueous titrations and its applications.

5. Common Laboratory Techniques

Method for the determination of M.P., B.P & mixed M.P., Reaction progress by TLC, Purification by crystallization, Fractional crystallization, simple distillation, , fractional distillation, sublimation.

Paper ACH-302

Advance Analytical Techniques

1. Solvent Extraction

Classification of extraction methods, theoretical principles, efficiency of extraction, mechanism of extractions process, extraction equilibria, application in analytical chemistry.

Numerical problem in solvent extraction.

2. Gas Chromatography

Introduction, principle, instrumentation, evaluation, retention value, resolution and applications.

3. Column (adsorption) chromatography

Introduction, principles of adsorption chromatography, experimental requirements, identification of compounds and applications

4. Ion Exchange chromatography:

Introduction, ion exchangers, cation exchange resins, anion exchange resin, ion exchange equilibria factors affecting ion exchange equilibria, instrumentation and applications.

5. Affinity chromatography:

Introduction, classification of affinity chromatography, column matrices, affinity ligands and applications.

Paper ACH-303

Laboratory course III

1. Estimation of copper iodometrically
2. Estimation of hydrazine iodometrically
3. Estimation of nitrate using $KMnO_4$
4. Estimation of persulphate using $KMnO_4$
5. Estimation of iron using $KMnO_4$
6. Estimation of copper using $Ce(SO_4)_2$
7. Determination hardness of water using by EDTA
8. Estimation of percentage purity of given sample of $KNO_2/NaNO_2$
9. Estimation of Pb^{2+} and Sn^{2+} by EDTA
10. Estimation of bismuth and lead using xylenol orange as indicator
11. Turbidimetric determination of traces of chloride

Paper ACH-304

Laboratory course IV

1. Determination of iron as 8-hydroxy quinolate by solvent extraction method.
2. Separation of nickel and cobalt using ion exchange chromatography
3. Separation of zinc and magnesium using of ion exchange column
4. Determination of ion exchange capacity of Dowex-50 resin
5. Determination of ion exchange of amberlite resin
6. Estimation of phenolic hydroxy group
7. Determination of ester by hydrolysis
8. Determination of saponification value of an oil
9. Determination of iodine value of an oil
10. Determination of acid value of an oil

Paper ACH-305
Instrumental methods of Analysis-I

1. Conductance measurements

Theory and terms used (equivalent conductance and molecular conductance)measurements of conductance, theoretical principles of conductometric titrations, Types of conductometric titrations: Neutralization, precipitation, complexometric titrations and redox titrations, advantages and limitations of conductometric titrations and applications

2. Potentiometry:

Reference and indicator electrodes: Calomel Electrode, Glass Electrode, quinhydrone electrode. Principles of potentiometric titrations, experimental procedure involved in potentiometric titrations, location of equivalence point using plot of emf Vs volume and $\Delta E/\Delta V$ Vs Volume of titrant added. Types of potentiometric titrations: neutralization, precipitation, redox and complexometric titrations.

3. High frequency titrations:

Intoruduction, theory, instrumentation, advantages and disadvantages of high frequency method and applications

4. Atomic absorption spectroscopy

Theory, instrumentation and applications of atomic absorption spectroscopy

5. Nephlometry & Turbidimetry

Principle, instrumentation and application

Paper ACH-306

Instrumental Methods of Analysis-II

1. Polarography:-

Principle of polarography, diffusion controlled process, residual, migration diffusion and limiting current, Dropping Mercury Electrode (DME), Ilkovic equation, half wave potential, instrumentations and applications.

2. Physical methods of analysis:-

Definitions experimental techniques of measurement and applications of following properties in analytical chemistry, viscosity, surface tension.

3. Thermal methods of analysis:-

Theory, instrumentation and applications of thermo gravimetric analysis, DTA and DSC.

4. Radio chemical methods of analysis:-

Detection and measurements of nuclear radiations, Tracer techniques, Isotope dilution analysis & neutron activation analysis.

5. Fluorimetry:-

Introduction fluorescence, factors affecting fluorescence, reaction between fluorescence intensity and concentration (Derivation is not expected), Instrumentation and applications.

Paper ACH-307

Laboratory course V

1. Turbidumetric determination of traces of sulphate
2. Assay of boric acid conductometrically
3. Determination of percentage purity of phosphoric acid by potentiometrically
4. Estimation of chloride iodine in the given mixture potentiometrically
5. Conductometric titration of H_2SO_4, $CuSO_4$ and CH_3COOH against NaOH
6. Photometric titration of copper by EDTA
7. Photometric titration of nickel by EDTA
8. Titration of phosphate mixture by potentiometyrically
9. Estimation of amine in glacial acetic acid by potentiometrically
10. Colometric estimation of iron by 1-10 phenonthroline

Paper ACH-308

Laboratory course VI

1. Determination of percentage purity of optical active compound using woking curve
2. Determination of specific rotation and calculations of concentration in given unknown
3. Determination of molecular weight of higher polymer by viscosity measurement
4. Determination of surface tension of given liquid
5. To compare cleansing powder of two samples of detergents by surface tension measurements
6. Determination of refractive index of a given organic liquid by Abbe' refractometer
7. Estimation of cadmium by polarography using standard deviation method
8. Analysis of mixture to cations by polarography
9. Determination of stability constant of monobasic acid potentionmetrically
10. Estimation of HCl using KOH conductomerically

Reference Books

1. Instrumental methods of chemical analysis by- Chatwal Anad (New Edition) Himalaya Publication House
2. Instrumental methods of chemical analysis by H. Kaur (A Pragati Edition) Fifth Edition 2009
3. Instrumental methods of chemical analysis by B.K. Sharma
4. Chromatography Kamlesh Bansal Campus Book
5. Analytical chemistry by R. M Verma
6. Fundamentals of Analytical Chemistry Skoog D. A. & West D.M., Saunders
7. Principle of instrumental analysis by Skoog Holler-Niemann
8. Instrumental methods of chemical analysis by Willard H.H., Meritt Jr. L.L. & Dean J.A.
9. Experiments I chemistry by Dr. D.V. Jahagirdar
10. Systematic experimental physical chemistry by Dr. Chondekar T.K. & S.W Rajbhoj
11. Text book of practical organic chemistry by A.I. Vogel

PRINCIPAL
Deogiri College
Aurangabad.