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.

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Director,
Board of College and University Development.

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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.

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D.R. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

AURANGABAD.

B.Sc. FIRST YEAR (POLYMER CHEMISTRY)

(REVISED SYLLABI BASED ON UGC MODEL)

Semester System

(Effective from – June - 2013)

Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad.
Subject: Polymer chemistry.
Course Structure in semester system
Based on 50 Marks Theory
B. Sc. First Year

Semester	Course code	Paper No.	Title of paper	Credits	Marks
I	PCH – 101	I	Basic concepts of polymer chemistry	03	50
	PCH – 102	II	Natural polymers.	03	50
	PCH – 103	III	Lab Course – I	0.3	50
II	PCH – 201	IV	Mechanism and techniques of polymerization	03	50
	PCH – 202	V	Basic properties of polymer	03	50
	PCH – 203	VI	Lab Course – III	0.3	50

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

Polymer chemistry
First Year (Semester – I)
Paper I

Basic concepts of polymer chemistry 3 Credits (45 Hrs.)
3Hrs/ Week

1. Introduction and classification of polymers: 15 Hrs.

History of macromolecular science. Definitions of monomer, oligomers, tolomers, polymer, structure of polymers. IUPAC Nomenclature of polymers, classification of polymers.

2. Molecular weight: 15 Hrs.

Concept of average molecular weight of polymers. Polydispersity and Polydispersity index, molecular weight distribution, number average, weight average, viscosity average molecular weight. Determination of molecular weight by end group analysis, osmometry, ultra centrifugation and light scattering method.

3. Polymerization reaction: 15 Hrs.

Types of polymerization reactions. Functionality and average functionality. use of functionality in formation of polymer. Difference between addition and condensation polymerization.

Semester – I
Paper II:

Natural polymers. 3 Credits (45 Hrs.)
3Hrs/ Week

1. Carbohydrates: 15 Hrs.

Cellulose – principle sources, various forms, extraction, physical, mechanical and chemical properties, Applications.

Cellulose modifications – preparation, properties and application of viscous rayon, cupra- ammonium rayon, cellulose acetate, cellulose nitrate, ethyl cellulose, carboxyl methyl cellulose, starch and legnin.

2. Proteins: 15 Hrs.

Structure, properties and application of nucleic acids, casein, wool, silk, shellac, rosin, fossil resin.

3. Natural rubbers: 15 Hrs.

Extraction, structure of latex, conversion of latex into smoke rubber, compounding of rubber. Structure, preparation, properties and application of chlorinated rubber, hydrogenated rubber and cyclo rubber.

Semester I

Practical Paper III

[based on Paper-I & II]

Lab course – I 0.3Credits (45 Hrs.)

3Hrs/ Week

Marks: 50

1. Determination of Saponification values of plasticizer and raw material of polymer. 3 Experiments
2. Determination of acid values of polymers. 3 Experiments
3. Determination of Hydroxyl value of polymer. 2 Experiments
4. Determination of iodine value of polymer. 2 Experiments
5. Determination of percentage loss due to pyrolytic degradation of PVC.
6. To study the degradation of Nylon – 66 by chemical method.
7. To estimate amount of formaldehyde in the given formaldehyde Sample.
8. To estimate percentage purity of phenol.
9. estimate percentage purity of Styrene.
10. estimate melamine content.

Record book

Viva-voce

Second Semester

Paper IV

Mechanism and techniques of polymerization **3 Credits (45 Hrs.)**
3Hrs/ Week

1. Mechanism of condensation polymerization: 15 Hrs.

Condensation polymerization, polycondensation, interfacial polycondensation, ladder polymer, online determination of molecular weight in condensation polymerization.

2. Mechanism of free radical polymerization: 15 Hrs.

Initiators – BPO, AIBN, per oxide, per acetic acid and per sulphate. Propagation, modes of termination, inhibitors, and retarders.

3. Mechanism of ionic polymerization: 15 Hrs.

Cationic polymerization – reactivity of vinyl monomer, catalyst. Anionic polymerization – mechanism, living polymers. Difference between anionic and cationic polymerization.

Paper V

Basic properties of polymer 3 Credits (45 Hrs.)
3Hrs/ Week

1. Analytical properties: 20 Hrs.

Definitions and determination of density, bulk density, bulk factor.

Mechanical properties – tensile strength, flexural strength, compression strength, shear strength, impact strength, hardness, abrasive strength, crap and crap rupture.

Thermal properties – thermal conductivity, HDT (heat distortion temp. / Deflection temp.) vicat softening point, glass transition temperature melt flow index.

Electrical properties – dielectric strength, deception factor and surface and volume receptivity, chemical break down.

2. Polymer reactions: 13 Hrs.

Introduction to acidolysis, hydrolysis, aminolysis , hydrogenation, addition and substitution reaction. Reactions of specific groups hydroxyl, aldehydic, ketonic, carboxylic group.

3. Polymer degradation: 12 Hrs.

Types of degradation – thermal, mechanical, photo, chemical, oxidative, ultrasonic, high energy degradation and biodegradation.

Semester II

Practical Paper VI

Lab course – II 0.3 Credits (45 Hrs.)
3Hrs/ Week

Marks: 50

1. Determination of molecular weight by viscometer. Polyvinyl alcohol / polystyrene 2 Experiments
2. Determination of viscosity by ford cup B_4 method. (calculations of two types, red wood viscometer)
3. To study the oxidative degradation of polyvinyl alcohol.
4. Molecular weight determination by end group analysis.
5. To prepare poly vinyl alcohol from poly vinyl acetate.
6. To prepare cellulose acetate and casting of film.
7. Survey of polymer production through industrial visit a report.

Record book

Viva-voce

Reference Books:

i) Introductory polymer chemistry – G. S. Misra
ii) Text book of polymer science – P. L. Nayak and S. Lenka
iii) Polymer chemistry – M. G. Arora and M. Singh
iv) Polymer science and Technology – J. R. Fried
v) Text book of polymer sciences – F. W. Billmeyer
vi) Polymer science – V. R. Gowarikar and N. V. Vishwanathan.
vii) Polymer science and technology – A. Ghosh
viii) Organic polymer chemistry – K J Saunders
ix) Physical chemistry of polymer – A Tager
x) Principles of polymerization – George Odian
xi) Physical chemistry of macromolecules – D D Deshpande
xii) Text book of polymers Vol I to III – M S Bhatnagar
xiii) Experiments and calculations in engineering chemistry. – S S Dara

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