DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./Syllabus/93/2014

It is hereby notified for information of all concerned that, on the recommendations of the Ad-hoc Boards and Dean, Faculty of Science, the **Academic Council at its meeting held on 08-07-2014** has accepted the following revised syllabi as mentioned against their nomenclature for **B.Sc. & M.Sc. under the Faculty of Science** :-

Sr. No.	*Revised Syllabus*		*Semester*
[1]	*B.Sc. Environment Science*	*[Optional]*	*I & II*
[2]	*B.Sc. Sericulture*	*[Optional]*	*I & II*
[3]	*B.Sc. Automobile Technology*	*Degree Course*	*I & II*
[4]	*B.Sc. Workshop Technology*	*Degree Course*	*I & II*
[5]	*B.Sc. Refrigeration & Air Conditioning*	*Degree Course*	*I & II*
[6]	*B.Sc. Forensic Science*	*Degree Course*	*III & IV*
[7]	*B.Sc. Polymer Chemistry*	*[Optional]*	*III & IV*
[8]	*B.Sc. Environment Science*	*[Optional]*	*III & IV*
[9]	*M.Sc. Plant Breeding & Molecular Genetics*		*III & IV*

This is effective from the **Academic Year 2014-2015** and onwards.

These **syllabi are available on the University Website.**

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/SU/B.SC. & M.SC./
2014/16264-463
A.C.S.A.I.No.462[18].

Date:- 12-08-2014.

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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.**

Copy to :-

1] The Controller of Examinations,

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

3] The Superintendent, [M.Sc. Unit],

4] The Superintendent, [Eligibility Unit],

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

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

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

8] The Public Relation Officer,

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

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S/-120814/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

B.Sc. SECOND YEAR (POLYMER CHEMISTRY)

(REVISED SYLLABI BASED ON UGC MODEL)

Semester System

(Effective from – June - 2015)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Subject: Polymer chemistry.

Course Structure in semester system

B. Sc. Second Year

Semester	Course code	Paper No.	Title of paper	Marks
III	PCH – 301	VII	Physico chemical Aspects of polymer – I	50
	PCH – 302	VIII	Chemistry of polymer material – I	50
	PCH – 303	IX	Lab Course – III	100
IV	PCH – 401	X	Physico chemical Aspects of polymer – II	50
	PCH – 402	XI	Chemistry of polymer material – II	50
	PCH – 403	XII	Lab Course – IV	100

Polymer Chemistry
Second Year (Semester – III)

Paper VII 50 Marks

Physico chemical Aspects of polymer – I (45 Hrs.) 3Hrs/ Week

1. Polymer Solution: 20 Hrs.

   The process of polymer dissolution, thermodynamics of polymer dissolution, theories of polymer solution, nature of polymer molecules in solution, size and shape of polymer molecules in solution, solubility of crystalline and amorphous polymer, effect of molecular weight on solubility, viscosity of dilute and concentrated polymer solution.

2. Experimental methods: 10 Hrs.

   Monomer purification, isolation and purification by polymer fractionation, fractionation technique, methods of fractionation, gel permeation chromatography, gradient elution technique, partial dissolution technique.

3. Morphology and Crystallinity: 15 Hrs.

   Introduction, Development of Crystallinity, morphology and order of crystalline polymer, factors affecting Crystallinity, relation of morphology with structure and chemical properties, morphology of single crystal, crystallization from melt, during flow and from dilute solution.

Paper VIII 50 Marks

Chemistry of polymer material – I (45 Hrs.) 3Hrs/ Week

1. Polyamide: 15Hrs.

   Introduction, history, nomenclature, raw material of nylon 6 and 66 and their preparation, polymerization reaction, properties and application.

2. Polyvinyl Chloride: 10 Hrs.

   Preparation of vinyl chloride monomer, polymerization methods, solution and suspension polymerization and application of PVC.

3. Poly Urethanes : 10 Hrs.

Raw material and their preparation, polymerization reaction, PU foam, elastomer and fibers, properties and application.

4. Poly Carbonates: 10 Hrs.

Raw material and their preparation, polymerization reaction, preparation by direct phosgenation, ester interchange method, properties and application.

Semester III

Practical Paper IX

Lab course – III (45 Hrs.) 3Hrs/ Week

Marks: 100

1. Fractional distillation. 3 Experiments

   Distillation of phenol, benzene, toluene.

2. Preparation of Polyester resin by solution condensation method. 2 Experiments

3. Preparation of Aminoplasts. 2 Experiments

4. Preparation of Nylon6, 6 Or Nylon6, 10 by interfacial polymerization. 3 Experiments

5. Identification of engineering plastic. 4 Experiments

6. Identification of cellulose polymer. 4 Experiments.

7. Analysis of plasticizers and fillers. 4 Experiments.

Fourth Semester

Paper X — 50 Marks.

Physico chemical Aspects of polymer - II (45 Hrs.) 3Hrs/ Week

1. Kinetics of polymerization: 20 Hrs.

   Basic Concepts of theory of polymer solution, deviation of polymer solution from ideal solution, true solution. Cohesive energy density, Headle brand theory – Flory Huggins theory and its modifications.Kinetics of free radical chain, cationic, anionic polymerization.

2. Compounding ingredients: 15 Hrs.

   Introduction to compounding ingredients, plasticizers, stabilizers, fillers, colorants. Additives, their effects on processing and cost.

3. Transitions in polymers: 10 Hrs.

   Glass transition temperature, determination of glass transition temperature and factors affecting glass transition temperature, glassy solids.

Paper XI — 50 Marks

Chemistry of polymer material – II (45 Hrs.) 3Hrs/ Week

1. Poly Methacrylate: 10Hrs.

   Introduction, monomer preparation, polymerization by bulk and suspension polymerization, properties and application.

2. Bisphenol A epoxide: 10 Hrs.

   Raw material and their preparation, types of polymerization reaction, resin preparation liquid and solid epoxies their properties and application.

3. Poly ethylene Terphthalate: 10 Hrs.

   Raw material and their preparation, polymerization reaction, properties and application.

4. Synthetic polymer: 15 Hrs.

Phenolic resin, introduction, raw material, preparation of novolacs, resols, resin manufacture and moulding powder. UF resin introduction, raw material theories of resinification, resin manufacture, adhesive, properties and application.

Practical Paper XII

Marks: 100

Lab course – IV (45 Hrs.) 3Hrs/ Week

1. End group analysis by conduct metrically.	2 experiments.
2. End group analysis by pH metrically.	2 experiments.
3. Preparation of PF resin/ Resol.	2 experiments
4. Preparation of monoglyceride.	2 experiments.
5. Preparation of Epoxy resin.	2 experiments
6. Depolymerization of PS/ PMMA.	2 experiments.
7. Pyrolytic degradation of PVC.	1 experiment.
8. Determination of carbonyl value of resin.	1 experiment.
9. To determine formaldehyde content in a sample.	2 experiments.

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) Polymer technology – D C Miles and J H Briston

xiii) Introduction to plastic technology – Vishu Shah

xiv) Principles of polymer chemistry – P J Floory

xv) Experiment in Polymer Science – D G Hundiwale, V D Athawale, U R Kapadi, V V Gite.