**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**

**CIRCULAR NO.ACAD/NP/B.Sc.-Ist Yr./SEM.-I & II/157/2013**

It is hereby notified for information of all concerned that, on the recommendations of the Boards of Studies, Ad-hoc Boards, and Faculty of Science, the Academic Council at its meeting held on 25-03-2013 has accepted the following revised syllabi for B.Sc. First Year progressively under the Faculty of Science :-

| Sr. No. | Revised Syllabus | |
|---|---|---|
| [1] | B.Sc. [Physics] | Semester- I & II, |
| [2] | B.Sc. [Dairy Science & Technology] | Semester- I & II, |
| [3] | B.Sc. [Industrial Chemistry] | Semester- I & II, |
| [4] | B.Sc. [Geology] | Semester- I & II, |
| [5] | B.Sc. [Chemistry] | Semester- I & II, |
| [6] | B.Sc. [Botany] | Semester- I & II, |
| [7] | B.Sc. [Electronics] Science | Semester- I & II, |
| [8] | B.Sc. [Fisheries] | Semester- I & II, |
| [9] | B.Sc. [Microbiology] | Semester- I & II, |
| [10] | B.A. [Statistics] | Semester- I & II, |
| [11] | B.Sc. [Statistics] | Semester- I & II, |
| [12] | B.Sc. [Zoology] | Semester- I & II, |
| [13] | B.Sc. [Textile and Interior Decoration] | Semester- I & II, |
| [14] | B.Sc. [Home Science] | Semester- I & II, |
| [15] | B.A. / B.Sc. [Mathematics] | Semester- I & II. |

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/2013/5132-541
**A.C.S.A.I.No.327[9].**

Date:- 08-05-2013.

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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, [B.A. 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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# DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

## Revised Syllabus of

## B.Sc. Ist Year

## Industrial Chemistry

## Semester- I & II

***[ Effective from 2013-14 & onwards ]***

# Industrial Chemistry Revised Syllabus w.e.f 2013-2014

## Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Revised Syllabus of B.Sc. I Year Industrial Chemistry
(Effective from the Academic Year **2013-2014**)
June 2013 & onward.

### B.Sc. I Year Industrial Chemistry

(Three Year Degree Course)

| Year | Paper | Course Name | Hours | Marks |
|---|---|---|---|---|
| **B.Sc. I Year Semester–I** | I | **Theory:** Fluid Mechanics & Unit Operations-I | 45 (5 Credits) | 50 |
| | II | **Theory:** Material Balance & Process Calculations (Stoichiometry) | 45 (5 Credits) | 50 |
| | III | **Practical:** | 45 (5 Credits) | 50 |
| | IV | **Practical:** | 45 (5 Credits) | 50 |
| **B.Sc. I Year Semester–II** | III | **Theory:** Aspects of Industrial Chemistry and Heat transfer | 45 (5 Credits) | 50 |
| | IV | **Theory:** Energy Balances & Process Calculations | 45 (5 Credits) | 50 |
| | V | Practical | 45 (10 Credits) | 100 |

# B.Sc. I Year Industrial Chemistry

## Semeseter I – Paper I

## Paper – I: Fluid Mechanics & Unit Operations-I

**45 hours** **Marks : 50**

### 1. Flow of Fluids:

Definitions of fluids, Classification of fluids, Properties of fluids, Fluid Pressure, Pressure Head, Hydrostatic equilibrium for compressible and incompressible fluids. (08)

### 1.1 Appliction of fluid statics :

Mamometers, U-tube manometer, Inclined Manometer, Differntial Manometer, Continuous gravity decanter. (07)

### 1.2 Fluid Flow Phenomena:

Types of flow, Laminar flow, Shear Rate and Shear Stress, Turbulence-Reynolds Number & Transition from laminar to turbulent flow, Reynolds experiments Boundary layers, Flow in boundary layers, Laminar and Turbulent flow in bondary layers. (10)

### 2. Basic Equations of fluid flow:

Equation of Continuty, Bernoulli's equation, Pump work in Bernoulli's equation and its application. (05)

### 3. Transportation and Metering of fluids:

Transportation of fluids: Pipe, Tubing, Fittings & valves. Pumps: Classification of Pump, Developed head, Power requirement, Suction lift and cavitations, Positive-displacement pumps, Reciprocating pumps, Rotary pumps,Centrifugal pumps, Centrifugal pump theory, Ideal pump, Actual pump performance, Power consumption, Efficiency, Air Binding and Pump Priming, Losses in Centrifugal Pump, Centrifugal Pump troubles & Remedies, Pump fails to start pumping, Pump is working but not up to the capacity and pressure, Pump starts and then stop pumping Pump takes too much power. (15)

Metering of fluids: Full bore meters – Principle, Construction and Working , Advantages and Disadvantages of Venturimeter, Orificemeter, Pilot Tube, Rotameter.

## Semester I - Paper II

## Paper – II Material Balance & Process Calculations (Stoichiometry)

**45 hours** **Marks : 50**

1. **Units and Dimensions:**
   Introductin, Dimensions & Systems of Units, Fundamental quantities, Derived Quantities, Conversions & Problems.
2. **Basic Chemical Calcuations:**
   Introduction, Mole Atomic Mass & Equivalent Mass, Solids, Liquids & Solutions, Important Physical Properties of Solutins, Gases and Problems
3. **Material Balances without chemical reactions :**
   Classification of Material Balance Problems, Material balances without chemical reactions, Outline Procedure for Material Balance calculations Distillation, Evaporation, Absorption, Extraction, Drying, Filtration, Mixing, Crystallization and problems on Material Balance.
4. **Material balences with Chemical Reactiions:**
   Stoichiometry, Stoichiometric eqquatins, Stoichiometric Coefficients, Stoichometric ratio, Limiting reactant , Excess reactant , Conversion, Yield and Selectivity and Problems on Material Balances with Chemical Reactions.

## Semeseter II – Paper V

## Paper – V: Aspects of Industrial Chemistry and Heat transfer

**45 hours** **Marks : 50**

**1 Heat Transfer :** **(20 Hours)**

**1.1 Conduction :**

Basic law of Conduction, Thermal conductivity, Compound resistances in series, Heat flow through a Cylinder.

**1.2 Convection :**

Classification of convection with mechanism

**1.3 Radiation :**

Abosrptivity, Reflectivity and Transmissivity, Krichhoff's law, Laws of black body radiation, Steafan-Boltsmann law, Heat Transfer by radiation.

**2 Heat Exchange Equipments:**

Single pass tubular condenser, Double pipe heat exchanger, Counter Current and Parallel flow, Energy Balances, Enthalpy balances in heat exchangersm, Enthalpy balances in total condencsers, Overall Heat Transer coefficients, LMTD . Individual Heat Transfer Coefficient, Calculation of Overall Coefficients from individual coefficeints, flouling factors.

**( 25 Hours)**

**3 Fuels:**

Introduction , Calorific Value, Classification & Properties of Fuels.

**3.1 Solid Fuels :** Properties,Composition & Analysis of Coal

**3.2 Gaseous Fuels** : Classification, Natural Gas, LPG

**3.3 Liquid Fuels** : Petroleum, Composition & Classification, Definition of Flash Point & Fire Point, Knocking, Octane Number, aniline Point, Refining of Petroleum Cracking , Thermal & Catalytic Vracking, Reforming , thermal & Catalytic Reforming.

**4 Water Analysis:**

Chemical & Physical Examinatin of Water, Chemical substances affecting potability, colour, Turbidity, Odour, Taste, Temperature PH Conductivity , Suspended Solid, Acidity, Alkalinity, Free chlorine, Calcium & Magnesium , Dissolved Oxygen Biochemical Oxygen Demand , Chemical Oxygen Demand and Dissolved Solids.

**5 Glass :**

Introductin, Physical & Chemical Properties of Glass , Characteristics, raw Mateirals , Chemical Reactions, Methods of Manufacture of Glass & Uses.

**6 Ceramics:**

Intruduction , Classification and General Properties of Ceramics, Basic raw materials, Manufacturing Process, Manufacture of Porelain and China , Refractories, Classification, Properties, Manufacture of refractories, Manufacture of Fire Clay Bricks.

**7 Cement:**

Introduction, Composition , Types of cement, raw Materials, manufacture of Cement by wet & Dry process, Reaction in the Kiln, setting of cement, Testing & Uses of cement.

**Reference Books:**

1. Unit Operatin of Chemical Engineering – Mc Cabe Smith
2. Unit Operation –I (Fluid Flow & Mechanical Operations) – K.A.Ga vhane
3. Unit Operation –II (Heat & Mass Transfer)- K.A. Gavhane
4. Heat Transfer- K.A. Gavhane
5. Principles of Heat Transfer & Mass Transfer – S.D. Dawande
6. Industrial Chemistry – B.K. Sharma.
7. Heat Transfer – Domkundwar
8. Fluid Mechanics – Jagdish Lal
9. Process Control – Eckman
10. Environmental Chemistry – A.K. De

## Semester – I & II Practicals

**45 hours** **Marks : 50**

## Semester – I & II
## List of Experiments to be taken

### Paper III

1. To Determine the Co-efficient of Venutrimeter.
2. To Determine the Co-efficient of Orifice meter.
3. To Study the Characteristics of Centrifugal Pump.
4. To Verify Hagen-Poisellue's Equation.
5. To Study the Pipe Fittings Test Rig.
6. Determination of PH, Turbidity, Conductivity , Temperature, TDS, of given water sample by water Quality Analyzer Elico-PE-138
7. Determination of Hardness of water by Complex metric method using EDTA

**45 hours** **Marks : 50**

### Paper VII

8. Determination of Calcium & Magnesium Hardness Using EDTA
9. Determination of Dissolved Oxygen in a water sample
10. Determination of Chemical Oxygen Demand
11. Determination of BOD of a Waste Water Sample
12. Experiment of Proximate Analysis of Coal: Determine 1. Moisture 2. Volatile Matter 3. Ash 4. Fixed Carbon
13. Calculate Material Balance Rate of Evaporation for the given sample.
14. Perform Material Balance Calculation & Rate of drying of the given sample (Chalk / Sawdust)

**Reference Books:-**

1. Practicals and Calculation in Engineering Chemistry – S.S. Dara,
2. Material Science – Soni
3. Water Analysis Hand Book - NEERI

## Semester – I & II

## List of Experiments to be taken

**45 hours** **Marks : 50**

## Paper IV

1. To prepare various standard solution using ( $^{w}/_{w}$ , $^{w}/_{v}$ , $^{v}/_{v}$ ) methods.
2. Determination of available Chlorine in Bleaching Powder
3. Estimation of Iron from Cement Volumetrically
4. Estimation of Calcium from lime stone
5. Determine Energy of Activation of the reaction between potassium persulphate and potassium Iodide
6. Preparation of CUS04 from Cu and its Material Balance
7. Calculate Material Balance rate of Evaporation for the given
8. Perform Material Balance calculations and rate of drying of the sample (Chalk/Sawdust)

**45 hours** **Marks : 50**

## Paper VIII

9. To Study the Thermal Conductivity of Bad Conductor.
10. Determination of Acid Value of Lubricating Oil.
11. Determination of Saponification Value of Lubricating Oil.
12. Determination of Iodine Value of an Oil (Wij's Method)
13. Determination of Aniline Point of a Lubrication Oil.
14. Determination of Viscosity of Lubricant by Red Wood Viscometer.
15. Determination of Flash & Fire Point of Lubricating Oil by
    a) Cleveland's Apparatus (Open Cup)
    b) Abel's Apparatus (Closed Cup)
    c) Pensky-Marten's Apparatus (Closed Cup).

**Reference Books:-**

4. Practicals and Calculation in Engineering Chemistry – S.S. Dara,
5. Material Science – Soni
6. Water Analysis Hand Book - NEERI