

**Solapur University,
Solapur**

**B.Sc. I
(Entrepreneurship Science)
(Semester I&II)
Syllabus w.e.f. 2014-2015**

SOLAPUR UNIVERSITY, SOLAPUR
Semester Pattern Syllabus
B.Sc. I. Entrepreneurship
(W.e.f. June 2014)
Sem- I

Course Code	Title of the Course	Theory / Practical	Marks	Lecture / Practical Period
Ent-101	Entrepreneurship Paper-I Section-I (Entrepreneurship & The World of Business)	Theory	50Marks	40L
	Entrepreneurship Paper-I Section-II (Economics for Manager & Managerial Accounting)	Theory	50Marks	40L
Ent-102	Industrial Chemistry-Paper-I Section-I (Fundamentals of Inorganic Chemistry)	Theory	50Marks	40L
	Industrial Chemistry-Paper-I Section-II (Fundamentals of Organic Chemistry)	Theory	50Marks	40L
Ent-103	Industrial Microbiology Paper-I Section-I (Fundamental of microbiology)	Theory	50Marks	40L
	Industrial Microbiology Paper-I Section-II (Basic techniques in Microbiology)	Theory	50Marks	40L
Ent-104	Industrial Biotechnology Paper-I Section-I (Cell biology)	Theory	50Marks	40L
	Industrial Biotechnology Paper-I Section-II (Animal & plant physiology)	Theory	50Marks	40L
	English.	Theory	100Marks	75L

SOLAPUR UNIVERSITY, SOLAPUR
Semester Pattern Syllabus (w. e. f. June 2014)

- N.B. (i) Figures shown at the Right indicate the total number of lectures required for the respective topics.**
- (ii) The question paper should cover the entire syllabus. Marks allotted to questions should be in proportion to the number of lectures allotted to respective topics.**
- (iii) All topics should be dealt with S.I. units.**
- (iv) Industrial tour is prescribed.**
- (v) Use of scientific calculator is allowed.**

Sem- I

Ent-101. (Entrepreneurship- paper- I)

Section-I

(Entrepreneurship & the World of Business)

Marks-50	Period-40L
Unit I i. Introduction to Entrepreneurship	12L
Meaning, concept, Definition of an entrepreneurship and Characteristics of an entrepreneur. Entrepreneurship as Process. Scope of Entrepreneurship in India. Entrepreneur v/s Entrepreneurship. Entrepreneur v/s Manager.	
ii. Motivation, Type & Barriers to Entrepreneurship	
Entrepreneur Motivation. Factors responsible For Emergence of Entrepreneurship. Type of Entrepreneur. Barriers to entrepreneurship.	
Unit II.i Behavioral orientation of the entrepreneurs	08L
Location of Business, Choice of Business Line. Innovativeness of product & Profit Margin, Management of Business Growth. Influence of Background Factor on Behavioral Orientation.	
ii. Women Entrepreneurship	
Introduction & Scope of the Introduction & among Woman. Program Supporting Women Entrepreneurship. Problem Faced by Women Entrepreneurs.	

Unit III: The World of Business.	
i. Introduction to business :	10L
Meaning & Definition, Characteristics or Features of Business.	
Objective & Scope of Business. Classification of Business Activity.	
ii Business Ethics: Meaning & definition of Business ethics, Nature & scope of business ethics, Importance of business ethics.	
Unit IV Types of Business Organization	06L
Sole trader, HUF, Co-operative society, Partnership	
Private limited company and Public limited company	
Joint sector & Public sector	
Multinational & Transactional	
Unit V Introduction to commerce & aid to Commerce.	04L

Sem I

Ent-101: Entrepreneurship- Paper- I Section-II

(Economics for Manager & Managerial Accounting)

Marks-50 **Period-40L**

Unit I i. Introduction to Economics	10L
Definition of economics	
Basic Concepts of economics	
Managerial economics – Meaning, Definition, Nature & Scope.	
ii. Economics of scale: Internal & external, Returns of scale. Production function	
Unit II. i. Types of firms	09L
Monopoly, Oligopoly and Perfect competition	
ii. Demand and demand analysis	
Demand analysis & its objective	
Elasticity of demand	
Demand schedule	
Unit III: Managerial Accounting	06L
Basic Accounting concepts	
Meaning, Definition. Nature & scope of accounting.	
Different types of accounts. Passing of journal entries.	
Unit IVi: Business Finance	08L
Meaning, Definition, Scope & function of business finance	
Sources of financial information	
ii Sources of finance: Internal & external source	
Unit V: Statement of financial information	07L
Income statement, Profit & loss account	

Balance sheet, Preparation of final account
Users of final statement.

Semester Pattern Syllabus
B.Sc. PART-I Entrepreneurship
(w. e. f. June 2014)
SEMESTER – I

B. Sc. I. Entrepreneurship Ent. -102,
(Industrial Chemistry- Paper-I)
Section – I

(Fundamentals of Inorganic Chemistry)

Total Marks: 50

Periods:40

Unit I. Nature of Chemical Bonding

08

1. Types of Chemical bonds.
Covalent, Ionic, Coordinate, Metallic, Hydrogen, Van der Waals forces.
2. Valence Bond Theory
Hybridisation, Need of Hybridisation, Types of Hybridisation.
Formation of molecules with sp sp^2 sp^3 hybrid orbitals such as $BeCl_2$, BF_3 , CH_4
3. Valence Shell Electron Pair Repulsion (VSEPR) Theory w.r.t. NH_3 , H_2O .

Unit II Molecular orbital Theory

08

- (a) Atomic and Molecular orbitals.
- (b) L.C.A.O. Principle
- (c) Bonding, Antibonding and Nonbonding Molecular orbitals.
- (d) Conditions for successful overlap
- (e) Different types of overlap.
 $s-s$, $s-p_x$, $p_x - p_x$ and $p_y - p_y$ or $p_z - p_z$
- (f) Energy level sequence of molecular orbitals for $n = 1$ and $n = 2$
- (g) M. O. Diagrams for -
 - i) Homonuclear diatomic molecule. H_2 , Be_2 , C_2 , N_2 and O_2
 - ii) Heteronuclear diatomic molecules CO and NO w. r. t. bond order stability and magnetic properties

Unit III Ionic Solids

10

1. Ionic Bonding
 - (a) Formation of ionic bond, Energetics of ionic bonding : Ionisation potential, Electron affinity and Lattice energy.
 - (b) Characteristics of ionic compounds.
 - (c) Born-Haber Cycle for Alkali metal halide ($NaCl$). (Numerical Problems are expected)
 - (d) Fajans Rule
2. Radius ratio and crystal structure.

(a) Definition : Radius ratio $\left(\frac{r^+}{r^-}\right)$, Coordination number, Stoichiometry and unit cell.

(b) Concept and calculation of radius ratio $\left(\frac{r^+}{r^-}\right)$ for ionic solid with octahedral geometry.

(c) Radius ratio effect on geometry.

(d) Crystal structure of NaCl and CsCl w.r.t. unit cell, radius ratio, coordination number and stoichiometry.

Unit IV Water Pollution

10

- 1) Types of pollutant, causes of water pollution
- 2) Analysis of water pollution
- 3) Monitoring techniques and methodology
- 4) T.D.S. (Total dissolved solid)
- 5) D.O. (Dissolved oxygen)
- 6) B.O.D. (Biological Oxygen Demand)
- 7) C.O.D. (Chemical Oxygen Demand)
- 8) T.O.C. (Total organic carbon)
- 9) Hardness, chloride, alkalinity
- 10) Sulfide, nitrite, iron Mg.
- 11) Sodium potassium, pesticides, surfactants etc.

Unit V. Air Pollution

04

- 1) Types of pollutant
- 2) Sources of pollution
- 3) Air quality standards
- 4) Sampling of Air
- 5) Toxic effect of carbon monoxide, nitrogen oxide, sox, nox
- 6) Acid rain

Reference Books :

- 1) Advanced Inorganic Chemistry - Cotton and Wilkinson
- 2) Inorganic Chemistry - J. E. Huheey
- 3) Concepts and models of Inorganic Chemistry - Douglas & Mc-Daniel
- 4) Principles of Inorganic Chemistry - Puri, Sharma
- 5) New Concise Inorganic Chemistry - (ELBS) - J. D. Lee
- 6) Text book of Inorganic Chemistry - P. L. Soni
- 7) Advanced Inorganic Chemistry - Satyaprakash, Tuli, Basu
- 8) Theoretical Principles of Inorganic Chemistry - G. S. Manku
- 9) Principles of Inorganic Chemistry - Puri, Sharma & Kalia
- 10) Environmental pollution analysis - S.M. Khopkar
- 11) Environmental Chemistry - A.K. De
- 12) Environmental Chemistry - Harry W. Vanloon, Stephen J. Duffy, Oxford University Press.
- 13) Environmental Chemistry - S.S. Dara

B. Sc. I. Entrepreneurship
Ent. -102 Industrial Chemistry- Paper –I
Section-II
(Fundamentals of Organic Chemistry)

Total Marks : 50

Periods:40L

Unit I Chemistry of Hydrocarbon

10

A) Alkanes : - 1. Methods of formation with special reference to Wurtz reaction, Kolbe reaction and decarboxylation of carboxylic acid.
2 Mechanism of free radical halogenation of alkanes.
3 Cycloalkanes - Nomenclature methods of formation (a) Internal Wurtz reaction (b) Distillation of calcium or barium salt of dicarboxylic acid.
4 Chemical properties of cyclopropane (i) Free radical substitution of chlorine in presence of light. (ii) Action of HBr and conc. H_2SO_4 (iii) Catalytic reduction by H_2/Ni

B) Alkenes: 1 Nomenclature of alkenes.
2 Methods of formation of alkenes with mechanism
i) By dehydration of lower alcohols.
ii) By dehydrohalogenation of lower alkyl halides.
3 Chemical reactions of alkenes - Hydrogenation, Electrophilic and free radical additions, Hydroboration, Oxidation, Epoxidation, Ozonolysis, Hydration, Hydroxylation, Oxidation with $KMnO_4$, Polymerisation of alkenes - ethylene and propylene

Chemistry of Hydrocarbon

C) Dienes : 1. Nomenclature and classification of dienes.
2. Isolated, Conjugated and cumulated dienes.
3. Butadiene - Methods of formation, polymerisation, 1 : 2 & 1 : 4 additions and Diels-Alder reaction.

D) Alkynes : - Nomenclature, Acidity of alkynes.
2. Electrophilic and Nucleophilic addition reactions, Hydroboration, Oxidation, 3. Oxidation and polymerisation.

Unit II Chemistry of Aromatic compounds

06

1 Meaning of the terms - Aromatic, non-aromatic, antiaromatic and pseudoaromatic compounds.
2 a) Kekule structure of benzene b) Resonance structures of benzene.
c) Molecular orbital picture of benzene. d) Representation of benzene ring.
3. Modern theory of aromaticity. Fundamental Concepts - delocalisation of electrons, coplanarity and Huckel's $(4n + 2) \pi$ rule. Applications of Huckel's rule to naphthalene, anthracene, pyrrole, furan, thiophene and pyridine.

4 Mechanism of electrophilic aromatic substitution in benzene w.r.t. nitration, sulphonation, halogenation and Friedel - Craft's reaction-alkylation and acylation.

Unit III. Qualitative and Quantitative elemental analysis **09**

- 1 Qualitative analysis of Carbon, Hydrogen, Nitrogen & Sulphur
- 2 Quantitative analysis of -
 - i) Carbon & hydrogen by Combustion method
 - ii) Nitrogen by Kjeldahl's method
 - iii) Halogen and sulphur by Carius method.
- 3 Determination of molecular weight of an acid by titration method & Base platinichloride method.
- 4 Empirical formula and molecular formula determination.
(Numerical Problems Expected)

Unit IV. Pharmaceuticals **05**

1. Introduction
2. Qualities of ideal drugs
3. Methods of classification of drugs
4. Classification based on therapeutical action

Unit V. Synthetic Dyes **05**

1. Introduction, Chromophore, auxochrome
2. Qualities of good dye
3. Classification based on constitution & methods of applications.
4. Witt's theory, colour & constitution.

Reference books:

- 1) Organic Chemistry : Hendrickson, Cram, Hammond.
- 2) Organic Chemistry : Morrison & Boyd
- 3) Organic Chemistry : Volume I & II I.L. Finar
- 4) Organic Chemistry : Pine
- 5) Advanced Organic Chemistry : Sachinkumar Ghosh
- 6) Advanced Organic Chemistry : B.S. Bahl and Arun Bahl
- 7) A Guide book to Mechanism in organic Chemistry : Peter Sykes
- 8) Text book of Organic Chemistry : P. L. Sony
- 9) Practical Organic Chemistry : By A. I. Vogel
- 10) Advanced Organic Chemistry - Reactions, Mechanism & Structure : Jerry March
- 11) Organic Chemistry : M.R. Jain
- 12) Organic Chemistry : J. M. Shaigel

Semester Pattern Syllabus
B.Sc. PART-I Entrepreneurship
(w. e. f. June 2014)
SEMESTER – I Ent- 103,
Industrial Microbiology- Paper-I
Section-I
(Fundamental of microbiology)

Total Marks – 50

Periods - 40L

Unit I.i.Milestones in Microbiology

08

Important Contribution of

- 1) Antony Van Leeuwenhoek
- 2) Louis Pasteur
- 3) Robert Koch
- 4) Alexander Fleming
- 5) John Tyndall
- 6) Winogradsky

ii. Applied areas of Microbiology

Industrial Microbiology, Agricultural Microbiology, Dairy Microbiology, Food Microbiology, Medical Microbiology, Environmental Microbiology.

Unit II. General Characteristics of Microorganisms:

14

- 1) Types of Microorganisms - Bacteria, Algae, Fungi, Protozoa, Actinomycetes & Viruses
- 2) Difference between Prokaryotic & Eukaryotic Cell
- 3) Structure, Chemical composition & function of
 - a. Cell wall
 - b. Cell membrane
 - c. Capsule & Slime layer
 - d. Flagella
 - e. Pili
 - f. nuclear material
 - g. Mesosome
 - h. Ribosome
 - i. Reserve Food Material
 - j. Cytoplasmic inclusions.

Unit III. Bacterial Taxonomy

06

- 1) General Principles of Nomenclature
- 2) Bacterial Classification based on -
 - a. Morphological characters-Size, shape, arrangement etc.,
 - b. Cultural characters
 - c. Biochemical characters
 - d. Serological characters

Unit IV. Sterilization & Disinfection **07**
 Control of micro-organisms Definition of sterilization, disinfectant, antiseptic, germicide, antimicrobial agents.
 Physical agent of sterilization– Temperature (Dry heat, moist heat, incineration & boiling), Dessication, Filtration, Radiation
 Chemical agents of Sterilization – Alcohols, Phenols, Halogens, gaseous agents (ethylene oxide, formaldehyde, Nitrous oxide, Ozone.

Unit V. Microbial Nutrition and Growth **05**
 1) Basic nutritional requirements of microorganisms.
 2) Nutritional classification based on Carbon & Energy source.
 3) Growth – definition, Growth phases, Growth measurement, Continuous growth, Synchronous growth, chemostat, Turbidostat, Diauxic growth.

ENT 103, Industrial microbiology- Paper I
Section-II
(Basic Techniques in Microbiology)

Total Marks – 50 **Periods -40L**

Unit I. Microscopic Techniques **10**
 Construction, Working, Principles & Application of
 a. Bright field
 b. Dark field
 c. Phase contrast
 d. Fluorescent
 e. Electron - SEM, TEM

Unit II. Cultivation and Isolation Techniques **10**
 Components of Culture Media- Peptone, Meat extract, Glucose, Lactose, Dextrose & their Types.
 Types of Culture Media
 a. Living b. Non-Living
 c. Natural d. Synthetic
 e. Semi-synthetic f. Enrichment
 g. Enriched h. Selective
 i. Differential

Unit III. Cultivation and Isolation Techniques **Isolation Techniques** **03**
 a. Serial dilution b. Streak plate
 c. Pour plate d. Spread plate

Unit IV. Stains and staining procedures: **10**
 Definition of dye and stain. Classification of stains – acidic, basic and neutral. Theories,

Procedures and mechanisms of – Simple staining, Differential staining, Gram staining, Acid fast staining, Negative staining.

Unit V. Cell Enumeration Techniques

07

Direct Methods

- a. DMC
- b. Neubaurs chamber

Indirect Methods

- a. SPC/ TVC
- b. Membrane filter technique

Recommended Books

1. Brock, Biology of microorganism
2. Text book of microbiology by C.H. Pelzar.
3. Text book of Microbiology By T.Bapat Phadake Publication.
4. Text book of General Microbiology By Powar & Dagainawala
5. Principles of Fermentation Technology by Whithakar.
6. Bergey's Manual of systematic bacteriology Vol-IV
7. Text book of Microbiology By Anantnarayan.

Semester Pattern Syllabus
B.Sc. PART-I Entrepreneurship
(w. e. f. June 2014)
SEMESTER – I Ent- 104
Industrial biotechnology-Paper I
Section-I
(Cell Biology)

Marks-50	40 Lectures
Unit I. 1 Introduction	(08)
Cell theory, History, Significant event in Cell Biology	
Types of Cell- Prokaryotic & Eukaryotic cell, Ultrastructure of Prokaryotic (Eg. Bacteria, BGA) & Eukaryotic cell-(Plant & Animal cell.)	
Cell as a basic unit of living system, Biochemical composition of cell	
Unit II. Cell Wall & Cell Membrane:	(12)
Cell wall- Structure, Chemical composition, & function	
Cell Membrane- Types, Structure, Composition, The lipid Bilayer membrane.	
A summary of membrane functions - simple diffusion, Facilitated transports, Active transport, Endocytosis, Pinocytosis, Phagocytosis, Exocytosis.	
Cell senescence and death, cell differentiation.	
Unit III. Cell Organelles	(10)
Structure and Function of the Endoplasmic reticulum, Golgi complex, Lysosome, Ribosome, Mitochondria and Chloroplast.	
Unit IV. Chemical nature & Structure of Genetic material	(05)
Unit V. Cell Division and Growth	(05L)
Introduction Mitosis & Meiosis- Definition, stages, function & Characteristic	
Chromosomes- Definition, morphology, function & Types	
Euchromatin & Heterochromatin	

Ent.104 Industrial biotechnology-Paper I

Section-II

Animal and Plant Physiology

Marks-50	40 L
Unit I. Animal Physiology	08
Basic element for Growth: Carbon, Nitrogen, Hydrogen, Oxygen, Sources, Vitamins, Enzymes, Water & CO ₂	
Unit II. Tissue :Origin, location, structure, & function	08
-Epithelium	
-Connective	
-Muscular	
-Nervous	
Unit III. Physiology of Human Being	08
1. Skin (V.S.)	2.Tooth (V.S.)
3. Tounge	4.Salivary gland
5. Oesophagous	6. Stomach
7. Rectum	8. Liver
9. Pancreas	10. Testies
11. Ovary	12. Kidney
Unit IV. Plant Physiology	
Photosynthesis –	10
Introduction and significance of photosynthesis apparatus, Photosynthetic Pigments, accessory pigments, light reaction, photo systems, reaction center Complex, photo chemical reaction, Emerson enhancement effect, Electron transfer Pathway, Photophosphorylation Dark reaction, Calvin cycle, C4 plant, CAM.	
Unit V. Introduction to Tissue culture	06
Plant & Animal tissue culture	
Recommended Books	
1. De Robertis, E.D.P. & De. Robertes, E.M.F.2001 Biology, Cell and Molecular Biology Lea & Febiger.	
2. Bruce Albert, A. Bray, D.Lewis, J.Raff, M.Robers, K. Watson, J.D. 2000, Molecular Biology of Cell, 4th Edition, Garland.	
3. Lodish H.199, Molecular Cell Biology, W.H. Freeman & Co. 4th Edition.	
4. Drnell, J.E. 2000, Molecular Cell Biology, W.H. Freeman & Co.	
5. Physiology by Ghyton	
6. Physiology by Berry Berry.	
7. Cell biology by C.B. Pawar.	
8. Gene VIII By Benjamin and Lewins.	

SOLAPUR UNIVERSITY, SOLAPUR
Semester Pattern Syllabus (w. e. f. June 2014)
SEM-II

CourseCode	Title of the Course	Theory	Marks	Period
Ent-201	Entrepreneurship- Paper- II Section-I (Principles of marketing & Management accounting)	Theory	50Marks	40L
	Entrepreneurship -Paper-II Section-II (Cost accounting and Project managaement)	Theory	50Marks	40L
Ent-202	Industrial Chemistry- Paper-II Section-I (Fundamentals of Physical Chemistry)	Theory	50Marks	40L
	Industrial Chemistry-Paper-II Section-II (Fundamentals of Analytical Chemistry)	Theory	50Marks	40L
Ent-203	Industrial Microbiology- Paper-II Section-I (Fundamental of microbiology)	Theory	50Marks	40L
	Industrial Microbiology- Paper-II Section-II (Basic techniques in Microbiology)	Theory	50Marks	40L
Ent-204	Industrial Biotechnology- Paper-II Section-I (Basic Biomolecules)	Theory	50Marks	40L
	Industrial Biotechnology- Paper-II Section-II (Basics of Metabolism)	Theory	50Marks	40L
	English.	Theory	100Marks	75L

B.Sc.I Entrepreneurship-I .Lab Course

Practical	Titles of the Lab course(practical)	Marks
Ent Lab-101	Practicals in Entrepreneurship	100
Ent Lab -102	Practicals in Industrial Chemistry	100
Ent Lab -103	Practicals in Industrial Microbiology	100
Ent Lab -104	Practicals in Industrial Biotechnology	100

B.Sc. PART-I Entrepreneurship

(w. e. f. June 2014)

SEMESTER – II

Ent-201 (Entrepreneurship- paper-II)

Section-I

Principles of Marketing & Management accounting

Marks-50

Period-40L

Unit I: Overview of marketing & Marketing environment	10
Definition of market & types of marketing,Marketing, origin of marketing Nature & scope of marketing.Selling Vs marketing .Nature of marketing environment,Need & importance of environment analysis,External uncontrollable forces,Internal forces	
Unit II: Market segmentation & Marketing research	12
Meaning & criteria for market segmentation,Selecting the market segmentation,Advantages of segmentation.,Benefits of market segmentation. Marketing research: Importance of marketing research,Scope & limitations of marketing research,Advantages & limitations of marketing research,Marketing research process.	
Unit III Introduction to management account	10
Meaning ,concept,Nature & Scope Accounting :concepts & conventions	
Unit IV: Working capital (theory & problems)	04

Unit V: Analysis & interpretation of financial statements (Ratio analysis) 04
Current ratio, Liquid ratio, Inventory turnover ratio, Debtors turnover ratio, Creditors turnover ratio, Gross profit ratio, Net profit ratio

Ent. 201 Entrepreneurship- Paper-II
Section-II
(Cost accounting and Project management)

Marks-50

Period-40L

Unit-I Basic Terms in Cost Accounting financial accounting and Management Accounting: 08

Def. of Cost, Price Value, Types of Cost - by nature of elements, by function, by controllability, by changes in Activity or volume definition and examples each. and Definition, Characteristics and difference. Object of Cost Accounting.

Unit-II 12

Classification of Elements of cost as material, labour and expense
Direct and Indirect Examples of each. Preparation of cost sheet. Job Cost Sheet - Definition, Features, Advantages and limitations, cases on job cost sheet.

Classification of costing methods - Job costing, Contract costing, Batch costing, Pre costing, One Operation Costing, Service Costing Form costing (Explanation and where to use only)

Unit-III: Smart up and Project Management

Small Enterprises as introductory frame work 08

Definition Characteristics, Relationship between small & large unit. Objective & Scope of Small business, Problems of SSI Role of Small Entrepreneurship in Economic Development

Unit-IV Project Management & Project formulation: 06

Definition and meaning of project. Types of project. Project identification, selection, Meaning of project report, Significance of project report. Contents of project report.

Unit-V Process of project development 06

General information, Project description, Market potential, Capital cost and sources of finance, Assessment of working capital requirement, Other financial aspects, Economic and social variables, Project implementation.

B. Sc. I. Entrepreneurship
Ent. -202, Industrial Chemistry- Paper – II
Section-I
(Fundamentals of Physical Chemistry)

Total Marks: 50

Periods:40

Unit I :Dimensions and Units

08

- 1) Atomic weight molecular weight, equivalent weight, mode
- 2) Composition of liquid mix and gaseous mixture, stoichiometry
- 3) Calculations of percentage (W/W), (W/V), (V/V)
- 4) Different methods of determination of concentration
- 5) Mole of fraction and atomic fraction.
(Simple numerical problems are expected)

Unit II:Reaction Kinetics

08

1. Chemical Kinetics and it's scope, Rate of reaction, Definition and units of rate constant.
2. Factors affecting rate of reaction. Concentration, pressure, temperature and catalyst.
3. Order and Molecularity of reaction, Zero order reaction and its example :Photochemical union of H₂ and Cl₂

Unit III: First order reaction:

08

1. Derivation of Rate constant. Characteristics of first order reaction. Examples:
i) Decomposition of oxalic acid
2. Second order reaction: Derivation of rate constant for equal and unequal concentration of the reactants. Characteristics of Second order reaction. Examples : i) Reaction between K₂S₂O₈ and KI
3. Pseudounimolecular reactions such as Hydrolysis of methyl acetate in presence of Acid
4. Methods to determine the order of reaction: a) Integration method b) Graphical method c) Half change method, d) Ostwald's isolation method (Numerical Problems Expected)
5. Energy of Activation

Unit IV. Study of Gaseous State

08

1. a) Ideal and Non ideal gases
b) Deviation from ideal behavior. (Only Boyle's law)
c) Causes of deviation, van der Waal's equation, explanation of real gas behavior by van der Waal's equation.
2. Critical Phenomena : PV-Isotherms of real gases (Andrew's isotherms), continuity of state, Relationship between critical constants and van der Waal's constants.
3. Liquification of gases, Joule-Thomson effect.
(Numerical Problems expected)

Unit.V Properties of Liquid

08

1. Introduction, additive & constitutive properties.
2. Viscosity, coefficient of viscosity, determination of viscosity by Ostwald's Viscometer.

3. Surface tension:- Determination of surface tension by Drop –Weight method
4. Parachor:-Macleod equation & its modification by Sugden, applications of parachor in the determination of molecular structures as benzene, quinone, NO₂ group & PC15 (Numerical problems not expected).

Reference Books:

- 1) Mathematical preparation of Physical Chemistry : F. Daniel Mc-Graw Hill Book Com.
- 2) Elements of Physical Chemistry : S. Glasstone and D.Lewis (D.Van Nostrand Co.Inc)
- 3) Physical Chemistry : W. J. Moore (Orient Longman)
- 4) Principles of Physical Chemistry : Maron Prutton
- 5) University Chemistry : B. H. Mahan (Addision - Weseley Publ. Co.)
- 6) Chemistry Principle & Applications : P.W. Atkins, M. J. Clugsto, M.J. Fiazer, R. A. Y. Jone (Longman)
- 7) Physical Chemistry : G. M. Barrow (Tata Mc-Graw Hill)
- 8) Essentials of Physical Chemistry : B. S. Bahl & G.D. Tuli (S. Chand)
- 9) Physical Chemistry : A. J. Mee.
- 10) Physical Chemistry : Daniels - Alberty.
- 11) Principles of Physical Chemistry : Puri - Sharma (S. Nagin)
- 12) Text Book of Physical Chemistry : Soni Dharmarha
- 13) University General Chemistry : CNR. Rao (McMillan)
- 14) Chemistry : Sienko - Plane (Recent Edn.,)
- 15) Physical Chemistry Through problems :Dogra and Dogra (Wiley Eastern Ltd.,)
- 16) Physical Chemistry : S. Glasstone.
- 17) Basic Chemical Thermodynamics : V. V. Rao.

B. Sc. I. Entrepreneurship
Ent. -202 Industrial Chemistry- Papers – II
Section-II
(Fundamentals of Analytical Chemistry)

Total Marks: 50

Periods: 40L

- I. Fuels** **08**
- 1) Types of fuels, testing of fuels i.e. calorific value, heating value.
 - 2) Octane number, flash point, fire point & applications.
 - 3) Introduction of petroleum
 - 4) Constituents and refining of petroleum i.e. fractionation of crude oil.
 - 5) Natural gas, (C1 to C4) strain run, gasoline (C5 to C12), kerosene.
 - 6) Diesel & Residual oil.
 - 7) Cracking
 - 8) Reforming, hydro forming, isomerisation.
- II. Industrial Polymer** **08**
- 1) General idea of polymers
 - 2) Types of polymers, homogeneous & heterogeneous polymers, classification based on a) origin b) composition c) method of vulcanization d) physical properties e) elastomers f) thermoplastic g) thermo settings.
 - 3) Linear, branched & cross linked polymers
 - 4) Addition polymers, polyethylene, polypropylene, pvc, orlon, teflon, polystyrene
 - 5) Condensation polymers, terylene, nylon-66, resin, bakelite & melamine
 - 6) Synthetic elastomers - styrene, butadiene, nitrilerubber, Buna-s, Buna-N, rubbers vulcanization.
- III. Thermodynamics** **08**
- 1) Enthalpy, heat capacity
 - 2) Spontaneous process, non spontaneous process
 - 3) Second law of thermodynamics, Carnot theorem (Numerical problems are expected from heat engine, head of reaction cycle)
- IV. Thermochemistry** **08**
- 1) Heat of mixing Hess' Law, Heat of decomposition.
 - 2) Carnot's cycle & its efficiency, Kirchhoff's equation, Joule Thompson effect. (Simple numerical problems are expected)
- V. Chemistry in day to day life** **08**
- 1 Types of water, desalination, Fresh water, Dissolved Oxygen and water quality.
 - 2 Milk : Definition, Chemical composition of milk of different species such as cow, buffalo and goat. **Adulteration in milk** like Sugar, Urea, Starch.
 - 4 Essential nutrients for plants, Classification, Major, minor & trace their sources and forms.
 - 5 Importance of Inorganic Compounds as Medicine- Antacid products Na_2CO_3 , $\text{Al}(\text{OH})_3$, AlPO_4 , $\text{Mg}(\text{OH})_2$, Cis-plat

Reference Books

- 1) Chemistry - Central Science, Brown, Lemay, Bursten 8th Edition.
- 2) Outline of Dairy Technology - Sukumar De Oxford university Press.
- 3) Introduction to Agronomy & soil water management - V. G. Vaidya, N.R. Sahastrabudhye.
- 4) Principles of Soil Science - M. M. Raj, Millian Co. of India, Bombay 1977
- 5) Inorganic Medicinal & Pharmaceutical Chemistry- Block, Roche, Soine –
Wilson, Varghese Publishing House.
6. Industrial Chemistry - B.K. Sharma
7. Engineering Chemistry - Paradkar
8. Physical Chemistry - G.M. Barrow, International Student Edition,
9. Polymer Chemistry - Govarikar
10. Polymer Chemistry - Bill Meyer
11. Text Book of Physical Chemistry - Puri & Sharma
12. Thermodynamics for Chemist - S.Glasstone
13. Thermodynamics - Rastogi & Mishra

**B.Sc. I (Sem.II) Entrepreneurship
Ent.203 Industrial Microbiology- Paper –II
Section-I
Fundamentals of Industrial Microbiology**

Mark-50	40 L
Unit I. History & scope of Industrial microbiology	03L
Unit II. Screening Techniques-	05L
Primary screening & Secondary screening	
Unit III. Basic concepts of Fermenter-	10L
Introduction	
Factors involved in fermenter design	
Types, Design, Construction, Working & Application of fermenter	
Factors affecting on fermentation process	
Unit IV. Preservation & Maintenance:	
Industrially Important Microorganisms	07L
Serial subculture	
Preservation by overlaying cultures with mineral oil	
Lyophilization	
Other methods	
Unit V. 1.Fermentation Media	10L
a. Raw material	
b. C & N sources	
c. Alternative sources	
d. Buffers	
e. Antifoam agents	
f. Precursors	
2. Sterilization of fermentation media & Fermenter	05L

Ent. 203 Industrial Microbiology- Paper-II

Section-I

(Basic techniques in Industrial Microbiology)

Marks-50	Period-40L
Unit I. Strain Improvement:	10
a. Mutagenesis (Chemical and UV)	
b. Site directed mutagenesis	
c. Gene Manipulation	
Unit II. Scale up of fermentation process & Development of inoculum	04
Unit III. Microbial Assays	08
a. Microbial assay	
b. Chemical assay	
c. Enzymatic assay	
Unit IV.	08
Development of Inoculums and Scale up of fermentation & Computer control of fermentation process	
Unit V down stream processing	10
a. Precipitation	
b. Crystallization	
c. Solvent Extraction	
d. Distillation	
e. Filtration	
f. Centrifugation.	
Recommended Books:	
1. Brock, Biology of microorganism	
2. Text book of microbiology by C.H. Pelzar.	
3. Text book of Microbiology By T.Bapat Phadake Publication.	
4. Text book of Industrial Microbiology By L.E. Casida.	
5. Principles of Fermentation Technology by Whithakar.	
6. Bergey's Manual of systematic bacteriology Vol-IV	
7. Text book of Industrial microbiology By A.H. Patel.	

SEM-II
B.Sc. I (Sem.II) Entrepreneurship
Ent. - 204 Industrial Biotechnology- Paper II
Section-I
(Basic Biomolecules)

Marks-50	Period-40L
Unit I. Carbohydrates	10L
Monosaccharides: classification, configuration, conformation and derivatives, Common disaccharides, structure and occurrence of storage and structural Polysaccharides, glycosaminoglycans, Glycoprotein: structure & function.	
Unit II . Lipids	08L
Fatty acids, Triacylglycerol, Glycerophospholipids, Sphingolipids: Sphingomyelins, Cerebrosides & gangliosides, Cholesterol, Micelles, Bilayers, Liposomes, Lipoprotein structure & function.	
Unit III . Proteins	10L
Amino acids: structure, nomenclature and general properties, peptide bond, Primary structure of proteins, amino acid composition, Specific peptide cleavage And sequence determination, Secondary structure: peptide group, Ramachandran diagram, helical structure: alpha-helix & other polypeptide helices, Beta-pleated sheets, Protein stability: Electrostatic interactions, hydrogen bond & hydrophobic forces, disulphide bond, General idea of tertiary and quaternary structure of proteins.	
Unit IV. Vitamins & Hormones:	07L
Vitamins of B-group: their coenzyme forms, recommended dietary allowance (RDA), source and biochemical function. Fat soluble vitamins: RDA sources And function. Hormones- Introduction Physiology of Hormone, Chemical classes, Functions	
Unit V Enzymes:	05L
Classification, Nomenclature, Endoenzyme, Exoenzyme Induced enzyme and constitutive enzyme Coenzymes, Isoenzymes specificity & stereospecificity, Mechanism of enzyme action, Factors affecting on enzyme activity., Immobilization of enzyme.	

SEM-II
B.Sc. I (Sem.II) Entrepreneurship
Ent. - 204 Industrial Biotechnology- Paper II
Section-II
(Basics of Metabolism)

Marks-50

Period-40

Unit I. Introduction	03
Basics of the Energy source, Concept of Autotrophs, Heterotrophs, Phototrophs, Chemotrophs	
Unit II. Metabolism	07
Anabolism, Catabolism, Glycolysis (EMP), TCA, HMP, Glyoxilate cycle and Energetics. High energy phosphate compounds- introduction, phosphate group transfer.	
Unit III. Modes of ATP Generation	12
ATP as the biochemical energy currency. Biological oxidation- reduction reactions- introduction, redox potential, Structure of mitochondria, Oxidative Phosphorylation: sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation (basic concepts). Inhibitors of oxidative phosphorylation. Photophosphorylation: Energy transfer between photosystems, cyclic & noncyclic electron transport.	
Unit IV. Transport Mechanism	08
Structure of biological membrane, Active transport, Passive transport, Transporters & pumps, Classification of transporters, Ionic gradients across membrane, Transmembrane channels – Voltage gated & ligand gated channels with examples.	
Unit V. Biotransformation	10L
Introduction Role of enzymes in biotransformation, Biotransformation of Xenobiotics, Phase I & Phase II reactions, Cytochrome p-450 system, Toxicity: acute, chronic, LC50, LD50, model organisms used in environmental monitoring.	

Recommended Books

1. Voet & Voet, 2000 Biochemistry, John Wiley, New York
2. Zubay, 1995, Biochemistry, Brown Publishers.
3. Lehninger, 2000, Principles of Biochemistry, CBBS Publishers.
4. I.Stryer, 2002. Biochemistry, W.H.Freeman

**B.Sc. - I Entrepreneurship
Lab Course - I(Practicals)
Ent Lab -101 Entrepreneurship**

Entrepreneurship Practical

(100 marks)

1. Understanding creative process.
2. Preparation of cost sheets.
3. Exercise of job cost sheets.
4. Exercise on job cost sheets.
5. To pass a journal entries.
6. To explain the given balance sheet of the proprietor.
7. Exercise on internal sources of finance.
8. Exercise on external sources of finance.
9. To study sources of fixed capital.
10. To study sources of working capital.
11. Exercise on cost volume profit analysis.
12. Exercise on demand forecasting.
13. Exercise on elasticity of demand.
14. To study problems of small scale industry.
15. To prepare project report on market analysis.
16. To prepare project report on technical analysis.
17. To prepare project report on financial analysis.
18. Exercise on market survey.

Industrial visits:

- 1 (one) visits in first term,
- 1 (one) visits in second term

Visit to Institutions:

- 1 (one) visit in semester-I
- 1 (one) visit in Semester-II

During visit following observations must be done.

1. To see plant or factory. Interaction with concerned officers, supervisor and workers.
2. Questioners should be supplied to students about manufacturing process, accounting section, administration section or any other department

Reference books

Entrepreneurship

1. Entrepreneurial Development - S.S. Khanka
2. Entrepreneurial Development - Satish Taneja & Dr.S.L. Gupta
3. Entrepreneurial Development - P.C. Shejwalkar
4. Dynamics of Entrepreneurial Development - Vasant Desai.

The world of business

1. General Commercial Knowledge - P.K. Ghosh & Y.K. Bhushan
2. Modern Business Organization & Management - S.A. Sherlekar

Cost Accounting

1. Cost Accounting - Jain & Narang
2. Cost Accounting - Bhar
3. Cost Accounting – Jawahar

Financial Management

1. Marketing Management Analysis, Planning, Implementation And Control - Philip Kotlar
2. Marketing Management - Philip Kotlar
3. Fundamental Marketing - W.J.Stanton
4. Fundamental Marketing - M.J. Etzes.
5. Fundamental Marketing - B.J. Walker
6. Fundamental Marketing - S.A. Sherlekar

Management Accounting

1. Management Accounting - J. Made Gowda
2. Principles of Management Accounting - S.N. Maheshwari
3. Management Accounting - Guru Prasad Murthy
4. Practical Problems in Management Accounting - RS Kulshreshta,SC Gupta
5. Management Accounting Practical Problem - Dorai Raj S.N.

Managerial Economics

1. Managerial Economics in a Global Economy - Dominick Salvotole.
2. Introduction to Economics - Samulson & Nordhams
3. Managerial Economics – Mahajan

Small Scale Industries

1. Small Scale Industries - Vasant Desai
 2. Project Management - Nagarajan
 3. Project Management: A Development Perspective - B.B. Goel
 4. Dynamics of Entrepreneurship Development - Vasant Desai
- Entrepreneurship - Madhurima Lall
Entrepreneurship - Shikha Sahai
Entrepreneurship Development - S.S. Khanka
Srivastaba S.B.A. Practical Guide to Industrial Entrepreneurship Sultan Chand and Sons, New Delhi.
Prasanna Chandra: Project Preparation, Appraisal, Implementation, Tata McGraw Hill, New Delhi.
Holt : Entrepreneurship - New Venture Creation : Prentice hall of India.

**B.Sc. - I Entrepreneurship
Ent Lab:102 Lab Course - I**

Industrial Chemistry Practical

100 marks

1. Calibration of burette, pipette and beryl pipette
2. Preparation of 100 ml of 0.1 N KMnO_4 and its standardization.
3. Preparation of 0.1 N HCl by density calculation & its standardization.
4. Study of flash point & fire point of given solvent fuel.
5. Determining molecular weight polyvinyl alcohol by Viscometer.
6. Study of melt flow index.
7. Study of soaping point.
8. Preparation of M-dinitrobenzene
9. Preparation of nitro derivative of salicylic acid.
10. Separation of amino acids by thin layer chromatography
11. Determination of hardness of water.
12. Determination of D.O.
13. Determination of acidity, alkalinity of water
14. Determination of saponification value of oil
15. Determination of acid value in bleaching powder
16. Determination of available chlorine in bleaching powder
17. Determination of chloride in water by Mohr's method.
18. Determination of heat solution of CuSO_4
19. Estimation of iron from the cement (Volumetrically)
20. Separation of metal ions (Cu^{+2} , Co^{+2} , Ni^{+2}) by paper chromatography.
21. Kinetics of 1st and 2nd Order reaction.
23. Density of given liquid by Pyknometer.

Reference Books:

- 1) Practical book of Physical Chemistry : Nadkarni, Kothari & Lawande.
- 2) Experimental Physical Chemistry : A. Findlay.
- 3) Systematic Experimental Physical Chemistry : S.W. Rajbhoj, Chondhekar (Anjali Pub.)
- 4) Experiments in Physical Chemistry : R.C.Das and B. Behra. (Tata Mc. GrawHill)
- 5) Advanced Practical Physical Chemistry : J. B. Yadav (Goel Publishing House)
- 6) Practical Physical Chemistry : B. D. Khosala (R. Chand & Sons.)
- 7) Experiments in Chemistry : D. V. Jahagirdar
- 8) Vogel's Text Book of Quantitative Chemical Analysis, (Longman) ELBS. Edition
- 9) Vogel's Text Book of Qualitative Chemical Analysis, (Longman) ELBS. Edition
- 10) Comprehensive Practical Organic Chemistry - Quantitative Analysis by V.K. Ahluwalia, Sunita Dhingra, University Press. Distributor - Orient Longman Ltd.,
- 11) Comprehensive Practical Organic Chemistry preparation and Quantitative Analysis. V.K. Ahluwalia, Renu Agarwal, University Press. Distributor - Orient Longman Ltd.,
- 12) A laboratory Hand-Book of organic Qualitative Analysis and separation :V. S. Kulkarni, Dastane Ramchandra and Co. Pune

B.Sc. - I Entrepreneurship
Lab Course – I (100marks)
Ent Lab -103 Industrial Microbiology

Lab Course based on Industrial Microbiology

- 1) Microscopy
- 2) Demonstration of Laboratory Equipments:
Incubator, Autoclave, Hot Air Oven, Centrifuge, Laminar Air flow, Colony counter.
- 3) Staining of Bacteria By-Monochrome Staining & Gram Staining, Motility by Hanging drop technique.
- 4) Mounting & Identification of Fungi
- 5) Preparation of Culture Media:
Peptone Water, Nutrient Broth, Nutrient Agar, MacConkey's Broth, MacConkey's Agar, Sabouraud's Agar
- 6) Isolation of microorganisms by:
 - Streak plate technique
 - Pour plate technique
 - Spread plate technique
- 7) Enumeration of microorganisms from Soil by SPC
- 8) Screening of Antibiotic & Enzyme producing microorganisms by suitable Technique.
- 9) Microbial Assay of Penicillin antibiotic by diffusion method
- 10) To study the Growth Curve

B.Sc. - I Entrepreneurship
Lab Course – I (100 marks)
Ent Lab -104 Industrial Biotechnology

Lab Course based on Industrial Biotechnology

1. Spot test for carbohydrates
2. Estimation of reducing sugars by Benedict's method
3. Spot test for Amino acids
4. Protein estimation by Biuret method
5. Quantitative determination of amino acid with Ninhydrin reagent.
6. Saponification of Fats
7. Estimation of Cholesterol
8. Study of acid Phosphatase from liver
9. Study of Alkaline Phosphatase from Liver
10. To study estimation of Titrable Acid Number (TAN)
11. Enzyme assays
12. To study Prokaryotic organisms
13. To study Eukaryotic organism
14. Study of Sub cellular organelles
15. Staining of mitochondria
16. Demonstration of digestive system of rat
17. Demonstration of reproductive system of rat
18. To study rate of photosynthesis or Oxygen evolved in Photosynthesis
19. To study comparative rate of stomatal and cuticular transpiration.
20. To extract and separate chloroplast pigment by ascending paper chromatography.
21. Study of different phases of Mitosis
22. Study of different phases of Meiosis
23. To study histology of mammalian organ.

**B.Sc. I (Entrepreneurship Science) Semester Pattern
Nature of Practical Question paper**

- 1. All Laboratory courses Ent.Lab: 101, Ent. Lab: 102, Ent. Lab :103, and Ent. Lab: 104 based on (Subjects: Ent. 101 to Ent. 104. Which includes Paper No. I to IV of each subject) Nature of Practical question paper is as per prescribed by science faculty.**

- 2. Practical examination is at the end of semester II for Each subject is for 100marks and practical exam is for 06hours.**

- 3. For Ent. Lab: 103 Practicals in Industrial Microbiology and ENT. Lab: 104 Practicals in Industrial Biotechnology practical exam is for Two successive days, for three hours 11.00am to 1.00pm and 02.00pm to 5.00pm for one batch of twenty students.**