

SOLAPUR UNIVERSITY, SOLAPUR



Faculty of Science
B.Sc. II Entrepreneurship
Semester III & IV
Choice Based Credit System (CBCS) Pattern
Syllabus
With effect from June-2017-18.

Summary of the Structure of B.Sc. Programme as per CBCS pattern

Class	Semester	Marks-Theory	Credits-Theory	Marks-Practical	Credits-Practicals	Total - credits
B.Sc.-I	I	900	24	-	-	24
	II	900	24	400	16	40
B.Sc.-II	III	600	18	-	-	18
	IV	700	22	600	24	46
B.Sc.-III	V	500	16	-	-	16
	VI	500	16	400	20	36
Total		4100	120	1400	60	180

B.Sc. Programme:

- Total Marks : Theory + Practicals = 4100 + 1400 = 5500
- Credits : Theory + Practicals = 120 + 60 = 180
- Numbers of Papers Theory: Ability Enhancement Course(AECC) : 05
Theory: Discipline Specific Elective Paper (DSE) : 02
Theory: Core Course (CC) : 34

Total : Theory Papers: 41

Practical: Core Course (CC): 14

Abbreviations:

- L: Lectures
- T: Tutorials
- P: Practicals
- UA : University Assessment
- CA : College Assessment
- CC: Core Course
- AEC : Ability Enhancement Course
- DSE : Discipline Specific Elective Paper

Important Note:

- Board of Studies in the respective subject may design the curriculum/syllabus of one additional paper of the same Number (Paper –XII) as DSE Paper, so that students can opt. any one of these two papers for semester –V. Similarly, the students can opt for one DSE paper (Paper-XVI) for Semester- VI.
- The Credits for the Practicals are changed as per the number of Hours per week.

- For B.Sc.-I, Sem -I and II. Papers of each subject are divided as per previous pattern to give more weightage and to reduce the stress of the students.
- Combined passing for B. Sc.- II Practicals (Practical – II & III)
- Combined passing for B. Sc-III Pratical (Practical – IV-VIII)
- The 30 marks of College level Assessment (CA) may be distributed as, 15 Marks for Internal Test and 15 Marks for Home Assignment/seminars/Viva/industrial visit/Group discussion etc.

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Faculty of Science Choice Based Credit System (CBCS) (W.e.f.2017-18) Structure for B. Sc-II

Subject/ Core Course	Name and Type of the Paper		No. of papers/ Practical	Hrs/week			Total Marks Per Paper	UA	CA	Credit s
	Type	Name		L	T	P				
Class :→	B.Sc.- II Semester - III									
	Core	Entrepreneur- ship	Paper -V Principles of Business Management & Business Organization	3	--	--	100	70	30	3
			Paper- VI Advanced Accountancy & Auditing	3	--	--	100	70	30	3
	Core	Industrial Chemistry	Paper -V Analytical And Industrial Aspects of Inorganic Chemistry	3	--	--	100	70	30	3
			Paper VI Analytical And Industrial Aspects of Organic Chemistry	3	--	--	100	70	30	3
	Core	Microbial Biotechnology	Paper V Genetics	3	--	--	100	70	30	3
			Paper VI Fermentation Technology	3	--	--	100	70	30	3
Grand Total				18	--	--	600	420	180	18

Class :→		B.Sc.- II Semester - IV								
	Ability Enhancement Course (AECC)	Environmental Science		4			100	70	30	4
	Core	Entrepreneurship	Paper VII Corporate Accounting & Professional Ethics	3	--	--	100	70	30	3
			Paper VIII International Marketing & Marketing Decision	3	--	--	100	70	30	3
	Core	Industrial Chemistry	Paper VII Analytical And Industrial Aspects of Physical Chemistry	3	--	--	100	70	30	3
			Paper VIII Industrial Aspects of Applied Chemistry	3	--	--	100	70	30	3
	Core	Microbial Biotechnology	Paper VII Molecular Biology	3	--	--	100	70	30	3
			Paper VIII Food & Dairy Technology	3	--	--	100	70	30	3
Total (Theory)				22	--	--	700	490	210	22
	Core	Lab Course-I	Pr. II&III	--	--	8	200	140	60	8
	Core	Lab Course-II	Pr. II&III	--	--	8	200	140	60	8
	Core	Lab Course-III	Pr. II&III	--	--	8	200	140	60	8
Total (Practicals)						24	600	420	180	24
Grand Total				22		24	1300	910	390	46

General Guidelines for Choice Based Credit System (CBCS)

B.Sc. II - Details Course structure - w. e. f. 2017-18

1. The University follows Semester system
2. An academic year shall consist of two semesters
3. Each B.Sc. course shall consist of three years i.e. six semesters
4. Environmental Studies paper shall remain compulsory for B. Sc .Part- II students in IVth Sem.
4. B.Sc. Part-II shall consist of two semesters: Semester III and Semester IV.

In semester –III, there will be two theory papers of 100 marks for each subject. There shall be three optional science subjects. Similarly, in semester –IV there will be two theory papers of 100 marks for each subject. There shall be three optional science subjects and Environmental Studies paper compulsory for every student in semester IV.

The scheme of evaluation of performance of candidates shall be based on University assessment as well as College internal assessment as given below. For B.Sc. Part II Sem. III & IV the internal assessment will be based on Unit tests, Home assignment, viva, practicals, Project Work etc as given below. Practical course examination of 200 marks for each subject shall be conducted at the end of IVth semester. The practical examination of 200 marks shall also consist of 140 marks for University practical assessment and 60 marks for college internal assessment.

The process of evaluation for Environmental Studies shall be based on University theory examination of 70 marks and 30 marks internal assessment. The internal assessment for environmental studies shall be based on internal test/ home assignment/tutorial of 10 marks and project work for 20 marks.

For University practical examination out of two examiners, one examiner will be internal and another examiner will be External. Both examiners will be appointed by the University. The internal practical assessment shall be done as per scheme given below.

5. Scheme of evaluation:

As per the norms of the grading system of evaluation, out of 100 Marks, the candidate has to appear for College internal assessment of 30 marks and external evaluation (University Assessment) of 70 marks. The respective B.O.S. may decide the nature of College internal Assessment after referring to the scheme given below or may be used as it is.

Semester - III:

Theory: (100 marks)

University Examination (70 Marks): No. of Theory papers: 2 Papers/Subject (Total 6 Papers)

Internal Continuous Assessment (30 Marks):

Scheme of Marking: 20 Marks: Internal Test

10 Marks: Home assignment/Tutorials/Seminars/ Group discussion/ Viva/Field visit/Industry visit.

Semester - IV: (100 marks)

Theory:

University Examination (70 Marks): No of Theory papers: 2 Papers/Subject (Total 6+1Papers)

Internal Continuous Assessment (30 Marks):

Scheme of Marking: 20 Marks: Internal Test

10 Marks: Home assignment/Tutorials/ Seminars/ Group discussion/ Viva/ Field visit/Industry visit.

Practical Examination:

University Examination (140 Marks): No of Practicals: 1 Practical /Subject (Total 3 Practicals)

Internal Continuous Assessment (60 Marks):

Scheme of Marking: 40 Marks: Internal Test on any four practical's, 20 Marks: Lab Journal/viva, attendance, attitude etc. For Environmental Studies there shall be theory examination of 70 marks (UA) and 30 marks (CA) internal assessment. The internal assessment for environmental studies shall be based on internal test/ home assignment/tutorial of 10 marks and project work and report of 20 marks.

6. Passing Standard

The student has to secure a minimum of 4.0 grade points (Grade C) in each paper. A student who secures less than 4.0 grade point (39% or less marks, Grade FC/FR) will be declared fail in that paper (subject) and shall be required to reappear for respective paper. A student who failed in University Examination (Theory) & passed in internal assessment of a same paper (subject)

shall be given FC Grade. Such student will have to appear for University Examination only. A student who fails in Internal Assessment and passed in University examination (Theory) shall be given FR Grade. Such student will have to appear for both University examination as well as internal assessment. In case of Annual Pattern/Old Semester Pattern Students/candidates from the mark scheme the candidates shall appear for the same 70 marks paper of the external examination and his performance shall be scaled to 100 marks

- **ATKT**

Candidate passed in all the papers except 4 (four) papers combined together of the semester I and Semester II of B.Sc. Part I examination shall be permitted to enter upon the course of Semester III of B.Sc. Part II

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B.Sc.II-Entrepreneurship CBCS PATTERN

w.e.f. 2017-18

Semester-III

Entrepreneurship

Paper-V- Principles of Business Management & Business Organization

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: -Business Management

9

Definition, Nature and Importance, function, Managerial Process and roles of manager
School of management & F.W. Taylor, Henry Fayola, Charles Babej, Peter Ducker, Mary
Parker, Follett, Elton Mayo.

Unit II: -Business Planning & Decision making

9

Meaning & definition, Planning Process, Types of Planning, Features of Planning,
Steps in planning and Benefit of planning.
Meaning & Definition, Decision making Process, Types of Decision, nature of decision and
strategic decision.

Unit III: - Business Organization

9

Meaning & definition, Characteristics and Importance of organization, Types of Organization-
Staff and line organization, Structure of organization – Horizontal and Vertical.

Unit IV: -Direction, staffing & Controlling

9

Meaning & definition, Characteristics and Importance of Direction, Methods of Staffing, Staff
training and appraisal system, Definition of control, types of control steps in control need for
control

Unit V: -Leadership and Motivation

9

Meaning & definition of motivation, Importance of motivation, Theory of motivation, Herzberg
two factor theory, theory X, Y&Z, financial and non financial incentives
Leadership: - Meaning, Importance, Functions and qualities of leader, Managerial grid and
leadership style

Reference Books:-

- Business Management – T. Ramaswamy
- Management – Stephen P. Robbins & Marry Cowler
- Modern management Practices – Dr. A.K.Gavai
- Principles and Practices of Management – Amrita Singh
- Business Organization and Management- B.P.Singh &T.N Chhabr

Entrepreneurship
Paper-VI- Advanced Accountancy & Auditing

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Financial Accounting with Tally: 10

Company creation, Ledger creation, Accounts configuration, Accounts classification, Accounts Master Creation, Voucher Types and Classes, Accounts vouchers
VAT (Value Added Tax) Introduction to VAT, VAT Master, Vouchers and Transactions, VAT on MRP.

Unit II: Final Account & Insurance Claims 08

Bank, Bank reconciliation statement, Loss of Stock and Loss of Profit by Fire.

Unit III: Fund flow & Cash flow Statement 08

Statement of Changes in Financial, Position on Cash Basis and on Working Capital Basis.

Unit IV: Auditing 09

Meaning, nature, scope and objectives, Types of Audit – Internal Audit and External Audit, Internal Check Appointment, Qualifications, Disqualifications, Removal and Remuneration of an Auditor of a Limited Company; Statutory Audit Report.

Unit V: Vouching 10

Meaning, need and importance, vouching of cash and Credit transactions, Verification and Valuation of Assets and Liabilities, Special features in respect of Audit of Co-operative Societies, Bank, and Charitable Trust and Institutions.

Reference Books:

1. Advanced Accountancy – Shukla and Gerewal.
2. Steps in Advanced Accountancy – Maheshwari.
3. Principles of Management Accounting – Manmohan Goyal.
4. Management Accounting – Haneef Mukharji.
5. Financial Accounting - Haneef Mukharji.
6. Tally. ERP 9(Training Guide) Ashok K. Nandani
7. Tally 9 -Vishnu Priya Shing
8. Practical Auditing – B.N. Tandon.
9. Principles of Auditing – De Paula.
10. Principles and practice - Saxena

Industrial Chemistry

Paper-V- Analytical and Industrial Aspects of Inorganic Chemistry

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Theory of Volumetric analysis: 9

1. Introduction, Terminology: - Titrant, Titrand, standard solution, Titration, Indicator, Equivalence point, End point, Primary standard, Secondary standard.
2. Theory of Acid-Base indicator:
 - A .Colour change Interval
 - B.Theories-Ostwald's theory & Quinoid theory,
3. Neutralization curve and choice of indicator for following titrations:
 - A) Strong acid and Strong Base
 - B) Strong Acid and Weak Base
 - C) Weak Acid and Strong Base
4. Complexometric titration:
 - A. General account,
 - B. Types of EDTA Titrations (in detail direct titration) ,
 - C. Metallochromic Indicator w.r.t. Eriochrome Black-T

Unit II: Theory of Gravimetric Analysis: 9

1. Introduction
2. Precipitation – Conditions of Precipitation, Physical nature of Precipitate.
3. Process of precipitation – i) Nucleation ii) Crystal growth iii) Digestion
4. Co precipitation and Post precipitation
5. Role of Organic precipitants in gravimetric analysis –
 - i) DMG
 - ii) Aluminon
 - iii) 8- hydroxy quinoline.

Unit III: Catalysis: 9

1. Introduction
2. Classification of catalytic reactions: Homogeneous & Heterogeneous.
3. Types of catalysis
4. Characteristics of catalytic reactions
5. Mechanism of catalysis: i) Intermediate compound theory ii) Adsorption theory.
6. Industrial applications of catalysis

Unit IV: Manufacture of Industrial Heavy Chemicals: 9

1. Introduction definition of heavy chemicals
2. Physicochemical Principles & manufacture of following:
 - a. Ammonia by Haber process.
 - b. Sulphuric acid by contact process.
 - c. Sodium carbonate by Solvay process.

1. Corrosion:-

- a. Introduction, with types of corrosion.
- b. Electrochemical theory of corrosion.
- c. Factors affecting the corrosion: i) Position of metal in emf series. ii) Purity of metal
iii) Effect of moisture. iv) Effect of oxygen. v) Hydrogen over voltage
- d. Methods of protection of metals from corrosion.

2. Passivity:-a. Definition. b.Types of passivity. c.Oxide film theory. d. Application of passivity.

Reference Books:

1. Advanced Inorganic Chemistry by Satyaprakash, Tuli, Basu (S. Chand and Co.)
2. Inorganic Chemistry by Puri and Sharma (S. Chand & Co.)
3. University General Chemistry by CNR Rao (McMillan)
4. Industrial Chemistry by B.K. Sharma.
5. Environmental Chemistry by S.M. Khopkar (Wiley Eastern Ltd.)
6. Inorganic Chemistry by D.E. Shriver, P.W. Atkins and C.H. Longford, Oxford.
7. Environmental chemistry by B.K. Sharma.
8. Text book of Quantitative Inorganic Analysis by A.I. Vogel.
9. Vogel's Text Book of Quantative Inorganic Analysis – Bassett, Denny, Jefferyy
Mendham.
10. Basic concepts of Analytical Chemistry by S.M. Khopkar.

Industrial Chemistry

Paper-VI- Analytical and Industrial Aspects of Organic Chemistry

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Soaps and Detergents: 9

1. Soap:

- i) Raw materials.
- ii) Types of soaps.
- iii) Manufacture of soap - Hot process.
- iv) Cleansing action of soaps.

2. Detergents:

- i) Raw materials.
- ii) Types of detergents - Cationic, anionic, amphoteric, neutral detergents.
- iii) Preparation of teepol and deriphath.

3. Comparison between soaps and detergents.

Unit II: Sugar and Alcohol Industry: 10

- 1 Manufacture of raw cane sugar.
- 2 Refining of raw sugar.
- 3 White sugar.
- 4 By-products of sugar industry.
 - A Manufacture of ethyl alcohol from molasses
 - B Rectified spirit, denatured spirit absolute alcohol and power alcohol.
 - C By-products of alcohol industry.

Unit III: Textile chemistry: 10

- 1 Introduction, classification of fibers.
- 2 Sizing:
 - i) object of sizing, sizing ingredients and their functions.
 - ii) General idea of properties of starch, softeners, synthetic adhesives.
- 3 Bleaching:
 - i) Brief study of the outline of the process of bleaching cotton and synthetic material.
 - ii) General idea of processes like singeing, desizing, scouring.
- 4 Dyeing: Study of dyeing of cellulosic material and synthetic fibers with dye like direct, vat, reactive and disperse dyes.

Unit IV: Drugs: Synthesis and Applications: 9

- i) Antimalerials - Paludrin.
- ii) Antituberculars - Isoniazide and Ethambutol.
- iii) C. N. S. drugs - Phenobarbitone.
- iv) Antidiabetic - Tolbutamide.
- v) Anti-inflammatory drugs - Ibuprofen.
- vi) Antibiotic - Chloromycetin.

Unit V: Agrochemicals.

7

6.1 General idea of agrochemicals including pyrethroids.

6.2 Synthesis and uses of the following agrochemicals :

i) Indole-3-acetic acid.

ii) Monocrotophos.

iii) Methoxychlor.

iv) Ethopphan.

v) Carbaryl.

Reference Books:

1. Organic Chemistry - R. T. Morrison and R. N. Boyd Prentice Hall of India Private limited New Delhi. 6th Edition.
2. A text book of Organic Chemistry - Arun Bahl and B. S. Bahl S. Chand and Company Ltd. 6th Edition.
3. Chemicals for crop improvement and pest management - Green, Hartly and West.
4. Chemistry of pesticides - K. H. Buchel (T. W.).
5. Medical Chemistry - Burger.
6. Basic Concepts of Analytical Chemistry - S. M. Khopkar, Wiley Eastern Ltd. Bombay.
7. Industrial Chemistry - R. K. Das, Asia Publishing, Mumbai.
8. Quantitative Organic Chemistry - A. I. Vogel, Pearson Edn. Delhi.
9. Medical Chemistry - A. Burger, John Wiley, New York.
10. Biotechnology and Applied Microbiology - Alani and Moo-Young.
11. Green Chemistry: Environment Friendly alternatives - Rashmi Sanghi and M.M. Srivastava (Eds) (c) 2003 Narosa Publishing House, New Delhi, India.
12. Textile science - J. T. Marsh

Microbial Biotechnology

Paper-V- Genetics

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I

08

Mendelian genetic- Introduction, Mendel's experiment, Monohybrid and Dihybrid crosses, Genotypic and phenotypic ratio, Law of Dominance, Law of Independent assortment, Law of Co-dominance and Incomplete dominance.

Unit II

10

Chromosome - Structure of Chromosome and Types of chromosome.
Chromosomal aberration Translocations, inversions, deletions and duplications.
Mutation- definition, mutagenic agent, Induced and Spontaneous mutation.

Unit III

06

Gene transfer method-

Transformation, Conjugation, Transduction, Recombination, Fate of exogenote,

Unit IV

09

Linkage: Introduction, types, phases linkage group detection of linkage significance
Crossing over: features, theories types, factors affecting crossing over.

Unit V

07

Transposable elements: -definition, types.

Gene Interaction and epistasis:-Types of gene interactions.

Unit VI

05

Biostatistics :Introduction, Mean, Mode, Median, Probability, Null hypothesis, Chi-Square test, T test X2 test, Probability level and problems.

REFERENCES:

1. Bergey's Manual of Determinative Bacteriology- Breed and Buchanan
2. General microbiology – Stanier
3. General microbiology – Pawar and Dagainawala Vol I and II
4. Introduction of Biostatics.
5. Molecular Biology of Gene – J.D. Watson
6. Recombinant DNA – J.D. Watson
7. Microbiology - Davis

Microbial Biotechnology

Paper-VI- Fermentation Technology

Total Marks: 100 (70+30)

Credits -3

Contacts hours:45

Unit I **08**

Industrial Production of Antibiotics:-

Classification and Types of Antibiotics, Industrial Production of Penicillin & Streptomycin

Unit II

Industrial production of Alcoholic Beverages: - **09**

Alcohol production from molasses, Beer Production from Barley Malt, Wine Production from grapes.

Unit III:

10

Industrial production of Industrial product (Micro-organisms involved, production media, fermentation conditions, product recovery and applications of):

Enzymes-Amylase, **Organic acid-** Citric Acid **Amino acid-** L-Lysine, **Vitamin-** Vit. B12

Unit IV

10

1. Production - Single Cell Proteins

2. Production of Bioinsecticides: - *Bacillus thuriengiensis*.

3. Biofertilizer production: - *Azotobacter* and *Rhizobium*

Unit V

08

Industrial Useful Product:-Biogas production, Biofuel production

Biopolymer Production- PHB and PHA

REFERENCE BOOKS:

1. Principles of fermentation technology – Stanbury and Whitekar
2. Dairy Technology – Sukumar De
3. Biochemistry – Fox and Nelson
4. Industrial Microbiology – Prescott and Dunn
5. Microbial technology – Pepler
6. Food Microbiology – R.C. Dubey, D.K. Mahashwari
7. Advances in Biotechnology – S.W. Jogdand.
8. Textbook of Biotechnology – R.C. Dubey,
9. Biotechnology – B.D. Singh
10. Industrial Microbiology – Casida

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Semester-IV

Entrepreneurship

Paper-V- Corporate Accounting & Professional Ethics

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Issue and forfeiture of Shares

09

Issue and forfeiture of Shares, Reissue of Forfeited Shares, Valuation of Shares Valuation of Shares – Intrinsic Value Method, Market & Fair Value Method.

Unit II: Final Accounts of Companies & Holding Company

09

Preparation of Final Accounts of Companies in vertical form as per the Provisions of Schedule VI to the Indian Companies Act, 1956 .

Unit III: Corporate Restructure & Liquidation of Companies

08

Amalgamation, Absorption and Mergers, External Reconstruction of Companies
Accounting for liquidation of Companies – Preparation of Liquidator's Final Statement of Account.

Unit IV: Concept and Theories of Ethics & Corporate Governance

10

Meaning & Definition, Personal & Business Ethics, Morality, Etiquette & Professional codes
Meaning & Definition of Corporate Governance, Corporate culture, corporate social responsibility, creating ethical organization, code of conduct.

Unit V: Globalization & Functional Areas of Ethics

09

Global Corporation, Factors Facilitating Globalization, Role of MNC, Marketing Ethics, Ethics in -HRM, Financial management, IT etc.

Reference Books:

- ❖ Business Ethics – A.C.Fernando Pearson
- ❖ Business Ethics – Dr. A.K.Gavai, Himalaya.
- ❖ Advanced Accountancy by M.C. Shukla, T.S. Grewal & S.C. Gupta
- ❖ Corporate Accounting by S. N. Maheshwari
- ❖ Advanced Accounting by H. Chakra borty
- ❖ Advance Accounting by Jain Narang

Entrepreneurship

Paper-VI- International Marketing & Marketing Decision

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: - Designing Product

08

Product Planning & Development, Product Life cycle, Product idea & its process, Product Positioning – Element of positioning, Segmentation & Targeting, Types of Product- commodity product, technology product, customized product, Product line & product mix, Brand Management.

Unit II: -Pricing, Distribution & Communication Decision

12

Definition, price decision and its objectives, Factors influence price decision, Methods of pricing, information needed for pricing, price sensitivity & price war
Types of Distribution Channel, Channel Strategy,
Whole sellers – Types & Function, Retailer – Meaning & Forms- supermarket and hyper market, Physical Distribution, Marketing communication, Sales promotion, sponsorship & Exhibitions, Defining advertising strategy in competitive market, public relation and publicity

Unit III: -Introduction to Global Marketing & Global marketing Environment

09

Market Selection, Emergence of Global Marketing, Use of website in marketing, Global Brand and Multinational Company ,Economic, Social, political and Government, competition environment, Technology Environment.

Unit IV: -Consumer Behavior

08

Meaning of consumer behavior, Determinants of consumer behavior, Need of buyer, Models of behavior, buying process & Customer loyalty.

Unit V: - New Trends in Marketing

08

Foreign Trade – steps involved in import & Export Internet marketing, E- commerce, E- marketing.

Reference Books:-

1. Marketing Management- V S Ramaswamy & S Namakumari
2. Marketing Management- Arun Kumar & N Minakshi
3. Global Marketing – S.A.Sherlekar & V.S.Sherlekar
4. International marketing- Fransis Cherunitam

Industrial Chemistry

Paper-V- Analytical and Industrial Aspects of Physical Chemistry

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Electrochemistry:

10

1. Introduction, conduction of electricity, Types of conductors: electronic and electrolytic.
2. Explanation of terms: Conductance, Specific resistance, specific conductance, Equivalent conductance, Molecular conductance.
3. Variation of specific and equivalent conductance with concentration, Equivalent conductance at infinite dilution (Mention Onsager equation, $\lambda_v = \lambda_\infty - b\sqrt{c}$ graph)
4. Migration of ions, Hittorf's rule, Transport number, Determination of transport number by moving boundary method, factors influencing transport number: Nature of electrolyte, concentration, temperature, complex formation and Degree of hydration.
5. Definition of p^H and p^{OH} , buffer solution, types of buffer, pH of buffers: Henderson's equation for acidic and basic buffers. (Derivation is not expected.)
6. Numerical problems.

Unit II: Potentiometry:

09

1. Introduction.
2. Detail study of calomel, quinhydrone and glass electrodes and their use in determination of pH.
3. Potentiometric titrations: Classical and analytical methods for locating end points, Advantages of potentiometric titrations,
 - i) Acid - Base titrations.
 - ii) Redox - titrations.
 - iii) Precipitation titrations.
4. Basic circuit of direct reading potentiometer.

Unit III: Conductometry:

09

1. Measurement of conductance by Wheatstone bridge, Basic circuit of D.C. Wheatstone Bridge, use of alternating current, conductivity water, Different types of conductivity cells, cell constant and its determination. Experimental determination of specific, equivalent and molecular conductances.
2. Conductometric acid-base titrations
 - i. Strong acid against strong base
 - ii. Strong acid against weak base
 - iii. Weak acid against strong base.
 - iv. Weak acid against weak base.

Unit IV Colourimetry:**08**

1. Introduction.
2. General discussion of theory of colorimetry : Lambert law, Beer's law (Derivation not expected), Terms used in Colorimetry, Application of Beer's law, Deviation from Beer's law.
3. Classification of methods of 'colour' measurement or comparison, Photoelectric photometer method - single cell photo-electric colorimeter.

Unit V: Flame Photometry:**09**

1. General principles.
2. Instrumentation: Block diagram, Burners: Total consumption burner, premix or laminar-flow burner, Lundergraph burner, Mirrors, Slits, Monochromators, Filters and Detectors.
3. Applications in qualitative and quantitative analysis.
4. Limitations of flame photometry

Reference Books:

1. Text book of Quantitative Inorganic Analysis - By A. I. Vogel (ELBS and Longman 3rd Edition).
2. Instrumental methods of Chemical analysis by Willard, Merit and Dean.
 3. Instrumental methods of Chemical analysis by Chatwal and Anand (Himalaya Publication).
4. Principles of electroplating and eletroforming by Blum and Hogaboom, Mac Graw - Hill Book Co. 3rd Edn.
5. Vogel's text book of Quantitative Inorganic Analysis by Bassett and Denny etc. ELBS and Longman 4th Edition.
6. Principles of Physical Chemistry by Puri, Sharma, Pathania, Shobhanlal Naginchand and Company, Jalandar.
7. Text Book of Physical Chemistry by S. Glasstone, Macmillan India Ltd.
8. Elements of Physical Chemistry by D. Lewis and S. Glasstone (Macmillan).
9. An Introduction to Electrochemistry by S. Glasstone.
10. Physical Chemistry by W. J. Moore.

Industrial Chemistry

Paper-VI- Industrial Aspects of Applied Chemistry

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Metallurgy: Iron and Steel. **12**

1 Introduction: - Terms used in Metallurgy, Metallurgy, Mineral, Ore, Gangue, Flux, Slag

2 Occurrence of metals: Types of Ores.

3 Steps Involved in Metallurgical Processes:

A) Concentration of Ores:

i) Physical Methods:-

a) Gravity separation method, b) Magnetic separation method, c) Froth floatation method.

ii) Chemical Methods:

a) Calcinations b) Roasting

B) Reduction: Mention various methods of reduction. Extraction of Iron by blast furnace

C). Types of steel and its alloys.

1. Manufacture of Steel – a) Bessemer process b) L. D. Process

2. Heat treatment on steel.

Unit II: Electroplating: **09**

1. Introduction.

2. Electrolysis, Faraday's laws, Cathode current efficiency.

3. Basic principles of electroplating, cleaning of articles.

4. Electroplating of Nickel and Chromium.

5. Anodizing.

Unit III: Fertilizers: **09**

1. Classification of fertilizers.

2. Qualities of an ideal fertilizer.

3. Manufacture of Common fertilizers such as:

a. Ammonium sulphate

b. Urea

c. Super phosphate and

d. Triple super phosphate

e. Potassium fertilizers

4. Pollution caused by fertilizers.

Unit IV: Glass Materials:**08**

1. Raw materials
2. Manufacturing methods:
 - Pot furnace
 - Tank furnace
3. Types of Glass: a. commercial Glass, b. Special glass and c. Colored glass.

Unit V: Ceramic Materials:**07**

1. Introduction
2. Classification
3. Properties of ceramics
4. Cement : Types of cements and their applications
5. Manufacture of Portland cement by wet process.

Reference Books:

1. Principles of electroplating and electroforming by Blum and Hogaboom, Mac Graw - Hill Book Co. 3rd Edn.
2. Vogel's text book of Quantitative Inorganic Analysis by Bassett and Denny etc. ELBS and Longman 4th Edition.
3. Elements of Physical Chemistry by D. Lewis and S. Glasstone (Macmillan).
4. Principles of Physical Chemistry by Maron and Lando (Amerind).
5. An Introduction to Electrochemistry by S. Glasstone. Advanced Inorganic Chemistry by Satyaprakash, Tuli, Basu (S. Chand and Co.).
6. Inorganic Chemistry by G.S. Manku Tata Mc. Graw Hill.
7. University General Chemistry by CNR Rao (McMillan).
8. Industrial Chemistry by B.K. Sharma.
9. Environmental Chemistry by S.M. Khopkar (Wiley Eastern Ltd.)
10. Industrial Chemistry: R K Das.

Microbial Biotechnology

Paper-V- Molecular Biology

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I

09

Central Dogma

DNA structure; Salient features of double helix; Types of DNA, the Central Dogma, Genetic code – evidences and properties.

Unit II

09

DNA replication- Definition, Enzyme involved in Replication, DNA Polymerases Replication in Prokaryotic Cell & Eukaryotic Cell, Rolling Circle Model

Unit III

10

Transcription- In Prokaryotic Cell & Eukaryotic Cell, RNA Polymerases, Post transcriptional modification

Translation

Unit IV

09

Gene Regulation in Prokaryotes:

Principles of transcriptional regulation; Operon concept; Repression and Induction of genes; Regulation of Operon: Lac Operon and Trp Operon.

Unit V

08

DNA Repair Mechanism-

Direct repair, Excision repair, Mismatch repair, SOS repair

Reference Books:

1. Advances in Biotechnology – S.W. Jogdand.
2. Textbook of Biotechnology – R.C. Dubey.
3. Biotechnology – B.D. Singh.
4. Gene VII; Benjamin Lewin; Pearson Education.
5. Molecular Biology; R. Weaver; 2nd Edition, McGraw Hill.
6. Molecular Cell Biology; Lodish; 6th Edition; W. H. Freeman & Company.

Microbial Biotechnology

Paper-VI- Food & Dairy Technology

Total Marks: 100 (70+30)

Credits -3

Contacts hours: 45

Unit I: Food & Dairy Microbiology

10

Microbiology of Food and milk, Microbial Examination of milk & food. Dye reduction tests- MBRT, Resazurin Test, Pasteurization of milk -Methods of Pasteurization – LTH, HTST, and UHT. Phosphatase test for determination of efficiency of Pasteurization. Chemical and Physical properties of food affecting microbial growth (intrinsic and extrinsic factors).

Unit II Dairy Technology

10

Introduction- Dairy technology, Definition of milk, factors involved in milk contamination, Manufacturing, packaging and storage of pasteurized milk, Homogenized milk, flavored milk, Tanned milk.

Unit III

7

Cream: Definition, composition food & nutritive value, production and uses.

Butter: Introduction, definition, classification, composition, defect of butter uses.

Unit IV

8

Cheese: Introduction, definition, history, composition and types, manufacturer of cheese & its uses.

Ice Cream: Introduction, definition, composition, method of manufacture, packing, hardening, storage, uses.

Unit V Food Technology

10

Food as substrate for microorganism, Microbial Spoilage of meat and meat product, fish & poultry foods, fruits & vegetable, General principles and different method of Preservation of food, Canned food, process of canning of food, microbial food poisoning.

REFERENCE BOOKS:

- 1) Food Microbiology (1995)-Adams M.R.and Moss, M.O., New Age International Limited.
- 2) Food Microbiology –Frazier, W.C., Westhoff, D.C. IVth edition, Tata McGraw Hill Publisher.
- 3) Industrial Microbiology by A. H. Patel, Mac Millan India Pvt. Ltd.
- 4) Modern Food Microbiology VIth edition- James M Jay. An Aspen publication.
- 5) Applied Dairy Microbiology –Elmer Marth and James Steele 2nd edition, publisher Marcel Dekker Inc.
6. Dairy Technology – Sukumar De
7. Industrial Microbiology – Prescott and Dunn
9. Industrial Microbiology – Casida

SYLLABUS FOR LAB COURSES

Entrepreneurship

Pr. II & III

Sem.III & IV

(8 periods, per week / batch)

Total marks 200(140+60)

1. Practical Related to UNIT- I & II in Marketing
2. Collection of Newspaper / Magazine cuttings related to Management.
3. Prepare a Study Plan for academic year.
4. A study of Organization Structure of any Organization.
5. Preparation of a organization chart.
6. Study of selection process of any organization.
7. A study of buying behavior for any organization.
8. Design marketing research plan.
9. A study of product life cycle of any product.
10. A study of marketing channel of any company.
11. A visit to export unit and prepare a report.
12. Share Market study
13. Preparation of Final account of Company & Bank
14. Exercise on holding company
15. Draw a gateway of tally menu
16. Generalized Entries and Display Balance sheet, Cash and Bank Ledger
17. Problem based on Tally practical

Practical (visit report)

- 15) Plant and machineries in organization.
- 16) Working efficiency of organization.
- 17) Quality control & management.

INDUSTRIAL CHEMISTRY

Sem.III & IV

Pr. II & III

(8 periods, per week / batch)

Total marks 200(140+60)

A Volumetric Experiments:

1. Prepare 0.1N Standard solution of $K_2Cr_2O_7$. Standardize the given FAS solution using prepared Potassium dichromate solution.
2. Determine the percentage of Nitrogen in the given sample of nitrogenous fertilizer (Urea or Ammonium Sulphate).
3. To investigate the adsorption of oxalic acid or Acetic acid from aqueous solution by activated charcoal and examine the validity of freundlich and Longmuir isotherms.
4. Estimation of copper from brass by using standard sodium thio sulphate solution.
5. Estimation of zinc in brass solution.
6. Estimation of aspirin (acetyl salicylic acid).
7. Estimation of ethyl benzoate.
8. Estimation of sucrose.
9. Determine the COD of given water sample.
10. Determine the BOD of the given water sample.
11. Analysis of commercial vinegar.

B Preparations:

1. Preparation of benzoic acid from benzamide.
2. Preparation of methyl orange.
3. Laboratory preparation of soap.
4. Preparation of Ferrous ammonium sulphate from ferrous sulphate.
5. Preparation of p-Bromo acetanilide from given acetanilide..
6. Preparation of tetra amine copper (II) sulphate from copper sulphate.
7. Preparation of phthalimide from phthalic anhydride.

C Gravimetric Analysis:

1. Determine the amount of Fe as a Fe_2O_3 from the given solution of FAS and sulphuric acid, gravimetrically.
2. Determine the amount of Ba as a $BaSO_4$ from the given solution of barium chloride and free hydrochloric acid gravimetrically.
3. Estimation of rate of corrosion of aluminium in acidic and basic medium.

D Instrumental Analysis:

1. Verify the Ostwald's dilution law for weak acid conduct metrically.
2. Strong acid strong base Conductometric titration.
3. Determination of pH of the buffer solutions potentiometrically.
4. Determination of dissociation constant of weak acid pHmetrically.
5. Verify the Lambert- Beers law for copper solution and determine the concentration of given copper sample.

MICROBIAL TECHNOLOGY

Pr. II & III
Sem.III & IV

Total marks 200(140+60)

(8 periods, per week / batch)

- 1) Karyotypes analysis
- 2) Isolation of plasmid DNA
- 3) Isolation of Genomic DNA
- 4) Isolation of Plant DNA
- 5) Analysis for chi square test.
- 6) Study of bacterial conjugation.
- 7) Calculate mean, mode and median of the any sample.
- 8) Separation of plasmid DNA
- 9) Problem based on Mendelian genetics
 - Law of dominance
 - Law of Segregation
 - Law of Independent Assortment
- 10) Isolation of Mutants
- 11) Isolation of Bacteriophage
- 12) Determination of fat from the given sample of milk.
- 13) Determination of the casein proteins from the milk sample.
- 14) Determination of sugar from the milk sample.
- 15) Determination of benzoate or sorbet content of food.
- 16) MBRT Test. & Phosphates test
- 17) MPN of milk.
- 18) Isolation and identification of *Salmonella* group of microorganism from milk/food.
- 19) Production of Amylase enzyme by using *Bacillus species*
- 20) Production of beer
- 21) Isolation antibiotic producing microorganism from soil sample.
- 22) Production of Biofertilizer- *Azotobacter* and *Rhizobium*