

# **CURRICULUM ENRICHMENT 2020 - 2021**

**PART V**

**II YEAR – III SEMESTER  
COURSE CODE: 4BEA3**

**PART – V – EXTENSION ACTIVITIES**

**Field Work**


Extension Activities will be organized for 2 days in the Third Semester. The programme may be organized in any Saturday and Sunday.

A meeting of all the staff of the College (Teaching, Administrative and Technical Staff) be conducted before departing to the camp in which each and every aspect like Programmes to be carried out, accommodation, food, medical aid, transport facilities, etc., should be thoroughly discussed.

One credit will be allotted for this Extension Activities. The marks allotted for each camp will be 100. Each student participating in the camp will be evaluated internally for 100 marks. The criteria for evaluation of Extension Activities will be as follows:

S. No.	Criteria	Maximum Marks
1.	Interaction with villagers	10
2.	Participation / Attitude towards work	10
3.	Participation in interaction and discussion	10
4.	Knowledge of problems / issues	10
5.	Organising & decision making ability	20
6.	Expression: a) Cultural programmes	10
	b) Report Writing	20
7.	Ability to adjust and work in a team	10
<b>Total</b>		<b>100</b>

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**GROUP II – SET I**

**II YEAR – IV SEMESTER  
COURSE CODE: 4SBS4B2**

**COURSE II – EMERGENCY AND MEDICAL LAB SKILLS**

**FIELD WORK**

**Unit I**

First Aid – Fracture and Fire  
First Aid – Drowning and Snake animal, rodent bites.  
First Aid – Diarrhoea, Dysentery and Heat Stroke

**Unit II**

Traffic Rules  
Road accidents: precautions, preventions & emergency steps to be taken on the spot  
advantages of 108 ambulance.

**Unit III**

Basic Clinical lab Tests  
Blood, Urine, saliva, stool Tests

**Unit IV**

Awareness Programmes on the importance of locally available herbal plants and Vegetables.  
Skin lashes poor eye-sight anemia

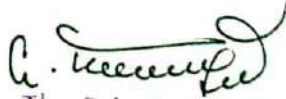
**Unit V**

Project on Locally available native treatments for various Health Problems (Project Report 15  
to 25 Pages)

**References**

1. Era.Su.Muthu and Meera Ravishankar, "First Aid", aug-2013 published by Sura Books (PVT) Ltd., 1620, 'J' Block, 16<sup>th</sup> Main Road, Anna Nagar, Chennai – 600 040.
2. Dr.Rama Rao, "Handbook of First Aid", Chennai.

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**III YEAR – V SEMESTER  
COURSE CODE: 1SBS5A4**

**COURSE II – HERITAGE AND TOURISM  
FIELD WORK**

**Unit I**

Tourism – Introduction – Concepts – Significance – Forms of Tourism – Effects of Tourism – Social, Economic and Environmental aspects – Human Rights

**Unit II**

Importance of preserving heritage – Heritage Spots in India – In Tamil Nadu – Brief history of the heritage spots – The role of heritage spots in promoting tourism – UNESCO guidelines on Heritage

**Unit III**

Role of Government in promoting tourism – Public Private Partnership in tourism – Travel industry service network – Land (rail and road) Air – Water – Travel Agency – Hospitality – Industry and Tourism

**Unit IV**

Travel Guide – Features – requirements – One's role as a guide – Income and Employability – Qualities and skills of a professional travel or tourist guide

**Unit V**

Project work – Field visit to heritage and tourism spots in Sivagangai and Ramanathapuram Districts and submission of a report (15 to 25 pages)

**References**

- Bhatia, A. K – Tourism Development Principles and Practices,  
(Sterling Publishers (P) Ltd., New Delhi)  
Ananand M. M – Tourism and Hotel Industry in India  
(Sterling Publishers (P) Ltd., New Delhi)  
Acharya Ram – Tourism and Cultural Heritage  
(Rosa Publications: Jaipur, 1986)  
Jha, S.M – Tourism Marketing (Himalaya Publishing House)

**Theory – 60 Marks  
Project – 40 Marks**



**GROUP II – SET II**

**III YEAR – VI SEMESTER  
COURSE CODE: 1SBS6B4**

**COURSE II – FRUIT, VEGETABLE PRESERVATION SKILLS**

**FIELD WORK**

**Unit I**

Principles, Methods, types of Preservation.  
Preservation media and mode of action of preservation. Traditional & Modern methods.

**Unit II**

Study of various types of equipments – care & precautions and usage.  
Study of various types of containers.

**Unit III**

Vegetables & their product preservation Methods  
Importance of personal hygiene and sanitary standards

**Unit IV**

Fruits & their preservation

**Unit V**

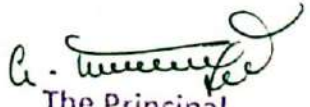
Project:

1. Mapping of preservation practices & centres  
(or)
2. Preservation practices specific to fruits & Vegetables in your area (Project Report 15 to 25 Pages)

**References**

1. Srivastava R.P. and Kumar.S “Fruit and Vegetable Preservation: Principles”
2. Ranjit Singh “Fruits” National Book Trust.
3. Girdhari Lal Tandon et al “Preservation of Fruit and Vegetable Products”.

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**I YEAR – I SEMESTER  
COURSE CODE: 4BBA1C1**

**CORE COURSE- I - ENVIRONMENT OF BUSINESS**

**FIELD WORK**

**Unit I**

**Meaning and Introduction:** Concept of Business Environment – Significance and need for the study – Internal and External factors – Impact of social, Economic, Political and Technological environments on business decisions.

**Unit II**

**Socio-Cultural Environment:** Social Attitudes – Religious, caste and lingual groups – Joint family system – Social Responsibilities of Business – Business Ethics – Importance of Values in Business – Nature of Culture – Cultural Heritage – Impact of Foreign Culture.

**Unit III**

**Political Environment:** Role of Government policies in business development in India – State control on Business and Liberal Policies. **Technological Environment:** Concept and Types of Technology – Import of technology: Merits and Demerits – Appropriate technology– Impact of technology on Business, Economy and Society.

**Unit IV**

**Economic Environment:** Economic Systems and their impact on Business – Population – Per capita income – Standard of living – Role of Public sector units in Indian economy – FDI– Globalisation – Multi National Corporations – Merits and demerits – Fiscal Policy.

**Unit V**

**Legal Environment:** Industries (Development and Regulations) Act, 1951 – Consumer Protection Act, 1986 – Foreign Exchange Management Act, 1951 – Patents Act, 1970 – Trade Marks Act, 1999 – Right to Information Act.

**Text Books**

1. Business Environment – C.B.Gupta
2. Business Environment – Francis Cherunilam
3. Business Environment – K.Chidambaram & V.Alagappan
4. Indian Economy – Ruddar Dutt & K.P.M.Sundaram
5. Government of India Guidelines & Industries Annual.

I YEAR – II SEMESTER  
COURSE CODE: 4BBA2C1

CORE COURSE – III - PRINCIPLES OF MANAGEMENT

INTERNSHIP/ INDUSTRIAL VISIT

Unit I

Nature and evolution of management – Meaning and definition of management – Contributions of Taylor, Fayol, Mayo and Drucker – Functions of management – management: Art, Science and Profession – Administration Vs management – Functional areas of management – Managerial skills: Technical, Human, Conceptual and decision making – Levels of management.

Unit II

**Planning:** Definition, importance and characteristics – Planning process – types of plans – Merits and demerits of planning – concept of MBO – **Business Forecasting:** Definition and methods of forecasting – **Decision Making:** Nature, importance and steps in Decision making– Decision making techniques.

Unit III

**Organising:** Meaning, definition and Principles, Formal and Informal Organisation – Organisation structure – Line and staff organization – Types of Groups – Formal and Informal Groups – Merits and Demerits of the groups

Unit IV

**Directing:** Definition and principles of Directing – **Motivation:** Meaning, nature and importance – Maslow, Mc Gregor, Herzberg Mc Cleland, and Alderfer theories of motivation– Delegation of Authority – Centralization and decentralization – Merits and Demerits. **Staffing:** meaning and importance of staffing – Recruitment, selection, training of staff.

Unit V

**Controlling :** Meaning, definition and need – Principles of controlling – Controlling techniques. **Co-ordination:** Meaning, need and features – Techniques – Problems in coordination.

Text and Reference Books

1. Principles of Management – L.M.Prasad
2. Principles of Management – Dr.G.Venkatesan, R.K.Sharma & Shashi K.Gupta
3. Management: Theory and practice – C.B.Gupta.



II YEAR – III SEMESTER  
COURSE CODE: 4BBA3C1

CORE COURSE - V - ORGANIZATIONAL BEHAVIOUR  
INTERNSHIP/ INDUSTRIAL VISIT

**Unit I:**

**Organisational Behaviour:** Meaning and Scope of Organisational Behaviour – Features of Organisational Behaviour – Individual behaviour and Group behaviour.

**Unit II:**

**Personality:** Meaning – Determinants – Personality Traits – Personality attributes influencing OB. **Perception:** Meaning and Importance – Factors influencing perception – Perception in individual decision making – Meaning and techniques of Group Decision Making.

**Unit III:**

**Communication:** Meaning, functions and process of Communication – Barriers to effective communication and methods of overcoming – **Leadership:** Meaning and types – Importance– Trait theories – Behavioural theories – Managerial Grid.

**Unit IV:**

**Conflict:** Meaning and types of conflict – Negotiation process. **Stress:** Stress and behavior – Sources of stress – General Stress syndrome – Effects of job stress – Individual and Organisational strategies in managing stress.

**Unit V:**

**Organisational Change:** Meaning, need and significance – External and internal forces – Resistance to change – Steps in managing change. **Organisational Development:** Objectives of OD program – Basic OD assumptions – OD interventions.

**Text Books**

Organisational Behaviour – Stephen P. Robbins: Pearson Education  
Organisational Behaviour – Jit.S. Chandan: Vikas Publishing House  
Organisational Behaviour – L.M. Prasad: Sultan Chand & Sons

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II YEAR – III SEMESTER  
COURSE CODE: 4BBA3C3

CORE COURSE - VII - COMPUTER APPLICATIONS IN BUSINESS – I

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I:**

Introduction to Computers – Computers Software Languages – flow charting – Programming concepts – Assembly language – High level language – Operating system – Compilers – Assemblers – Packages.

**Unit II:**

MS Word – Introduction to Word – Creating Word Document – Formatting – Spell check – Grammar check – Working with Tables – Saving, Opening and closing Document – Mail Merge.

**Unit III:**

MS PowerPoint – Creation – Insert Picture – Animation – Creating Multimedia Presentations– Insert tables and Graphs

**Unit IV:**

MS Excel – Introduction – Spread sheet – Entering data in Working Sheets – Editing and Formatting Work sheets – Charts – Functions like Saving, Opening and closing Work book.

**Unit V:**

Introduction to internet – Browsers – Search Engine – WWW – Internet Protocols – FTP – TELNET – HTTP – Email – How to create Email – Internet Vs Intranet – Webpage – URL.

**Reference Books**

Complete Reference on MS Office – Deitel & Deitel



**II YEAR- IV SEMESTER  
COURSE CODE: 4BBA4C1**

**CORE COURSE -VIII - OPERATIONS MANAGEMENT**

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

Operations management – definition, objectives and functions – Plant location – factors influencing plant location – urban and rural plant sites – multiple location. Plant layout – objectives, principles, different types of layout – their merits and demerits and suitability.

**Unit II**

Work study: Definition, meaning Advantages of work study- Method study, objectives of method study. Work measurement- meaning and objectives-Time study and Motion study.

**Unit III**

Production planning and control – need, functions – planning, routing, scheduling. Material handlings – Functions and principles – various types of material handling equipments.

**Unit IV**

Quality control: Need for Quality control, Objectives. – Inspection- Methods of inspection- Samples- sampling techniques.Steps in quality control,benefits of quality control.


**Unit V**

Materials management – meaning – need – functions of materials management – Integrated materials management. Functions of store keeper – types of material – Material issue procedure – Inventory control – importance, objectives – Stock levels – EOQ, ABC analysis.

**Books Recommended**

1. Production / operation management – Elwood Buffa
2. Production / operation management – S.N.Chary
3. Materails management – an integrated approach – P.Gopalakrishnan and M.Sunderesan
4. Purchasing and material Management – Text and cases – Lamar Lee Jr. and Doanald W.Dobler.
5. Materials Management – M.M.Varma.

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**II YEAR- IV SEMESTER  
COURSE CODE: 4BBA4C4**

**CORE COURSE -XI - BUSINESS MATHEMATICS**

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I:**

Analytical geometry – distance between two points in a plane – slope of a straight line – equation of straight line – point of intersection – demand and supply curves (linear) – market equilibrium – break even analysis.

**Unit II:**

Set theory – definition – types – union, intersection, difference, and complement of sets – De Morgan's Law – Venn diagram – simple set applications – Cartesian product

**Unit III:**

Differential calculus – derivative of a function – differentiation – standard forms – sum, product, quotient rule – differential coefficients of simple functions (**trigonometric functions excluded**) – function of a function rule – simple application to economics using marginal concept (**Elasticity of demand – Excluded**)

**Unit IV:**

Higher order derivatives – maxima and minima – simple marketing models using profit maximization, fencing and container problems only – Integral calculus – standard forms – rules of integration – integration by substitution (**Trigonometric functions, integration by parts, method of partial fractions are Excluded**) – Definite integral – simple applications – finding total and average cost function – producer surplus and consumer surplus.

**Unit V:**

Matrices – definition – types – addition, subtraction, multiplication of matrices – inverse matrix – solving a system of simultaneous linear equations using matrix inversion technique – rank of a matrix.

**Text Books:**

Business Mathematics – V.Sundaresan and S.D.Jeyaseelan.



**III YEAR - V SEMESTER  
COURSE CODE: 4BBA5C1**

**CORE COURSE XII - MARKETING RESEARCH  
INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

Marketing Research – Definition – Nature, scope and importance of Marketing Research – Applications, uses and limitations – Position of Marketing Research in India – Role of Marketing Research Agencies.

**Unit II**

Marketing Research procedure – Scientific methods in Marketing Research – Difficulties in applying scientific methods – Research Design – Exploratory and Conclusive research – methods such as descriptive research and experimental research.

**Unit III**

Collection of data – Primary data – methods of collection – observation and interview – Methods of interview – merits and demerits – Secondary data – advantages and limitations – evaluating secondary data – sources of secondary data – Questionnaire – steps in drafting questionnaire – Types of errors in information from respondents.

**Unit IV**

Census Vs. Sampling – Reasons for sampling – Types of sampling – Probability sampling and non-probability sampling – sampling methods – merits and demerits – Attitude measurement– Scaling Techniques – Classification and tabulation of data – presentation of data – Report writing.

**Unit V**

Motivation Research – techniques and limitations – Product Research – Test Marketing – Advertising Research – Sales analysis research – Consumer Research.

**Reference Books**

1. Marketing Research: Principles, Applications and cases – D.D.Sharma
2. Marketing Research – Harper Boyd & Ralph Westfall
3. Marketing Research –Taylor
4. Modern Marketing Research – Kulkarni
5. Modern Marketing Research – M.N.Mishra



I YEAR – II SEMESTER  
COURSE CODE: 4BBA2C2

CORE COURSE - IV - COST ACCOUNTING

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

Cost Accounting – Meaning – Objectives – Functions – Importance – Advantages and Limitations – Cost Accounting Vs Financial Accounting – Cost Analysis – Cost Elements – Classification and Methods – Cost Unit and Cost Centre.

**Unit II**

Materials control – Objectives and advantages – Purchasing – Centralized and decentralised purchasing – Merits and Demerits – Stock Levels – EOQ, BIN card – ABC analysis – Stores ledger– Material Issues – FIFO, LIFO, Simple Average and Weighted Average Methods.

**Unit III**

Labour – Direct and Indirect Labour – Labour Turn over – Methods of Wage payment – Incentive plans.

**Unit IV**

Overheads – meaning – classification of Overheads – allocation and Absorption of overheads– Reconciliation of Cost and financial Accounts.

**Unit V**

Preparation of Cost Sheet – Unit or Output costing – Meaning – Tenders and Quotation.

**Text Books**

- |                    |   |  |
|--------------------|---|--|
| 1. Cost Accounting | – | S.P.Jain and K.L.Narang                    |
| 2. Cost Accounting | – | RSN Pillai and Mrs.Bhagavathi              |
| 3. Cost Accounting | – | SP.Iyengar                                 |
| 4. Cost Accounting | – | T.S.Reddy and A.Murthy Margham Publishers. |

(Note: Questions must be 60% on problems and 40% on theory parts)

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**III YEAR – V SEMESTER  
COURSE CODE: 1BBA5C2**

**CORE COURSE XI – MANAGEMENT ACCOUNTING**

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

Management Accounting – Meaning – Nature, scope, functions, advantages and disadvantages – Management Accounting Vs Financial Accounting and Cost Accounting – Financial statement analysis – comparative, common size and trend analysis.

**Unit II**

Ratio analysis – merits and demerits – classification of ratios – Dupont control chart.

**Unit III**

Fund flow statement and cash flow statement – meaning, merits and demerits – preparation of fund flow and cash flow statements.

**Unit IV**

Marginal costing – meaning, merits and demerits – cost volume profit analysis – break even analysis – application of marginal costing – make or buy decision, shut down or continue decision and selection of sales mix.

**Unit V**


Standard costing and variance analysis – meaning, advantages and disadvantages – steps involved in standard costing – variance – material variances – labour variances.

**(Note: Questions must be 60% on problems and 40% on theory parts)**

**Text Books**

Management Accounting – S.P.Gupta  
Management Accounting – RSN Pillai and Mrs Bagavathi  
Management Accounting – Dr.S.N.Maheswari  
Management Accounting – T.S.Reddy and A.Murthy

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**III YEAR – V SEMESTER  
COURSE CODE: 1BBAE2A**

**ELECTIVE COURSE II (A) – TOURISM MANAGEMENT**

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

History of travel and tourism – ancient, medieval and contemporary periods – Tourism – definition – forms – Motivation for travel – barriers to travel – tourism product – travel industry network.

**Unit II**

International tourism – top tourism promoting countries – major destinations – spending and earnings by different countries and other details – Domestic tourism – Indian tourism – Tourist attractions – preferred places – historical past – culture – seasonality – foreign exchange earnings – profile of visitors – factors influencing tourism development – Social, Economic and Environmental impact on tourism.

**Unit III**

Tourism and the State – National Tourism Administration (NTA) – Comparative study of NTAs of various countries – activities of Department of Tourism – India Tourism Development Corporation (ITDC) – State Tourism Development Corporations (STDCs) – Tourism planning – need for planning – process of planning,

**Unit IV**

Surface transport – Airline industry – Travel Agents – functions – automation in travel industry – Computerised Reservation System – Importance of CRS for travel agents – World Tourism Organisation – International Air Transport Association.

**Unit V**

Hotel Industry – types of tourist accommodation – management system of hotels – franchise, management contracts, referral systems – hotel industry in India – finance, concessions and incentives given by government – major hotel chains of India – Tourism promotion – role and importance – advertising and publicity.

**Books Recommended**

1. Successful Tourism Management (Vol.: I) – Fundamentals of Tourism – Pran Seth
2. Successful Tourism Management (Vol.: II) – Tourism Practices – Pran Seth
3. International Tourism Management – A.K.Bhatia

**III YEAR – V SEMESTER  
COURSE CODE: 1BBA5C1**

**CORE COURSE X – MARKETING RESEARCH**

**INTERNSHIP/ INDUSTRIAL VISIT**

**Unit I**

Marketing Research – Definition – Nature, scope and importance of Marketing Research – Applications, uses and limitations – Position of Marketing Research in India – Role of Marketing Research Agencies.

**Unit II**

Marketing Research procedure – Scientific methods in Marketing Research – Difficulties in applying scientific methods – Research Design – Exploratory and Conclusive research – methods such as descriptive research and experimental research.

**Unit III**

Collection of data – Primary data – methods of collection – observation and interview – Methods of interview – merits and demerits – Secondary data – advantages and limitations – evaluating secondary data – sources of secondary data – Questionnaire – steps in drafting questionnaire – Types of errors in information from respondents.

**Unit IV**

Census Vs. Sampling – Reasons for sampling – Types of sampling – Probability sampling and non-probability sampling – sampling methods – merits and demerits – Attitude measurement – Scaling Techniques – Classification and tabulation of data – presentation of data – Report writing.

**Unit V**

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2. Marketing Research – Harper Boyd & Ralph Westfall
3. Marketing Research – Kinnear & Taylor
4. Modern Marketing Research – Kulkarni
5. Modern Marketing Research – M.N.Mishra

**III YEAR – VI SEMESTER  
COURSE CODE: 1BBA6PR**

**CORE COURSE XV – PROJECT WORK**

**(REPORT AND VIVA-VOCE)  
PROJECT/ PRACTICAL WORK**

**Maximum Marks – 100**

**60% for Report Evaluation**

**40% for Viva-Voce**

**(Note: Both are jointly evaluated by External and Internal Examiners)**

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I YEAR – I SEMESTER  
COURSE CODE: 4BBC1C1

CORE COURSE I – BIOMOLECULES

**PROJECT/ PRACTICAL WORK**

**Unit I GENERAL INTRODUCTION**

Structure of atoms and molecules - chemical bonds such as Van der Waals, electrostatic, hydrogen and covalent bond. Properties of water- its importance for living organisms. Acid and bases-Lewis concept of acid and bases, titrable acidity, pH, pOH, buffer, pH of body fluids, buffer in body fluids, Red blood cells, white blood cells, tissues and its role. Measurement of pH by indicator and glass electrode.

**Unit II CARBOHYDRATES**

**Monosaccharides:** Definition, Classification, Structure of Open – Chain, Haworth and Fischer formula, Stereoisomerism, Optical isomerism, Reactions of functional groups of sugars: Aldehyde, Keto and Hydroxyl groups.

**Di, Tri, and Oligosaccharides:** Occurrence, Composition, Structure and Biological role of Sucrose, Lactose, Maltose, Raffinose, etc.,

**Polysaccharides:** Occurrence, Composition, Structure and Biological role of Cellulose, Chitin, Inulin, Starch, Glycogen.,

**Unit III PROTEINS**

Chemistry of monomeric units of proteins: Classification of Amino acids based on its side chains, Structure of Amino acids, Zwitterion, pKa and Optical properties of aminoacids. Essential aminoacids. Isoelectric pH , acid base properties of amino acids. Formation of peptide bond

Structure: Hierarchical structure of proteins: Primary structure – peptide bond and its characteristics, Secondary structure – examples of secondary structure:  $\alpha$ -helix and  $\beta$ -pleated sheets, Tertiary structure: influence of side chains, Quaternary structure – forces stabilizing the structure of protein.

**Unit IV LIPIDS**

Lipids: Definition and classification. Fatty acids: introduction, classification, nomenclature, structure and properties of saturated and unsaturated fatty acids. Essential fatty acids. Triacylglycerols: nomenclature, physical properties, chemical properties and characterization of fats - hydrolysis, saponification value, acid value, rancidity of fats, Reichert-Meissel number and reaction of glycerol. Glycerolipids, glycerophospholipids, sphingolipids, sterol lipids, prenol lipids

**Unit V NUCLEIC ACIDS, VITAMINS AND HORMONES**

**Nucleic acids:** Bases, nucleosides and nucleotides, polynucleotide. Structure, types and biological role of DNA and RNA

**Vitamins:** Structure and biochemical properties of water soluble and fat soluble vitamins


and their coenzyme activity.

**Hormones** : Mechanism of hormone action and its regulation.

**References**

- Biochemistry (4<sup>th</sup> Edition) – Geoffrey Zubay
- Biochemistry – Stryer
- Principles of Biochemistry – Lehninger
- Harper's Biochemistry
- Fundamentals of Biochemistry – Voet & Voet
- Fundamentals of Biochemistry – J.L. Jain
- Biochemistry (2<sup>nd</sup> Edition) – Ian D.K. Halkerston
- Nucleic acids: Structure, Properties and Functions – Victor A. Bloomfield

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II YEAR – III SEMESTER  
COURSE CODE: 4BBC3C1

CORE COURSE IV – ENZYMOLOGY

**PROJECT/ PRACTICAL WORK**

**Unit I INTRODUCTION**

History, general characteristics, nomenclature, IUB enzyme classification with examples, significance of numbering system. Definitions with examples of holoenzymes, oligomeric enzymes and multienzyme complexes. Enzyme specificity.

**Unit II ENZYME CATALYSIS**

Role of co-factors in enzyme catalysis: NAD/NADP<sup>+</sup>, FMN/FAD, CoA, biotin, lipoamide, TPP, pyridoxal phosphate, THF and metal ions with special emphasis on co-enzyme functions. Acid-base catalysis, covalent catalysis, proximity and orientation effects, strain and distortion theory. Mechanism of actions of chymotrypsin, carboxypeptidase, Ribonuclease and lysozyme.

**Unit III ENZYME KINETICS**

Enzyme kinetics – MM equation, LB plot, Eadie and Hofstee plot, Factors affecting enzyme activity, Enzyme catalysis – covalent catalysis, acid base catalysis, Mechanism of Ribonuclease, Multienzyme complex and reactions. Bisubstrate reactions. Enzyme inhibition. Allosteric regulation.

**Unit IV ENZYME PURIFICATION**

Importance of Enzyme purification. Strategies for purification- yield, catalytic activity and purity. Homogenization in enzyme purification; Techniques for separation- size based methods (centrifugation, size exclusion chromatography, dialysis, ultrafiltration), polarity based method (Ion-exchange chromatography), solubility based precipitation methods (change in pH, ionic strength, dielectric constant), ligand based method (ligand affinity chromatography)


**Unit V INDUSTRIAL AND CLINICAL APPLICATION OF ENZYMES**

Immobilization of enzymes and their industrial applications. Production of glucose from starch, cellulose and dextrin; use of lactase in dairy industry; production of glucose – fructose syrup from sucrose; use of proteases in food, detergent, leather and textile industry; medical application of enzymes; use of glucose oxidase in enzyme electrodes.

**References**

- Enzymes – Malcolm Dixon
- Understanding of Enzymes – Trevor Palmer
- Biochemistry – Geoffrey Zubay
- Biochemistry – Lubert Stryer
- Principles of Biochemistry – Lehninger

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**II YEAR – III SEMESTER  
COURSE CODE: 4BBC3C2**

**CORE COURSE V – INTERMEDIARY METABOLISM**

**PROJECT/ PRACTICAL WORK**

**Unit I CARBOHYDRATE METABOLISM**

Conversion of simple sugars into glucose. Glycolysis – aerobic and anaerobic, energetic of glycolysis. TCA cycle – amphibolic nature, energetics of TCA cycle. Glyoxalate cycle. Pentose phosphate pathway. Glycogenesis. Glycogenolysis. Gluconeogenesis and cori cycle (in liver) – Importance of pathways in carbohydrate metabolisms

**Unit II BIOENERGETICS**

Introduction to bioenergetics. High energy compounds (ATP, phosphocreatinine, phosphoenol pyruvate, glucose-6-phosphate). Exergonic and endergonic reactions. Role of ATP/ADP cycle in transfer of high-energy phosphate. Substrate-level phosphorylation Mitochondrion: Structure of mitochondrial membranes, Mitochondrial enzymes. Electron transport and oxidative phosphorylation. Uncouplers of oxidative phosphorylation. Reduction potential. ATP formation under anaerobic conditions and in anaerobic microorganisms.

**Unit III AMINO ACID METABLISM**

A brief account of amino acid metabolism: Glucogenic and ketogenic amino acids. Metabolism of glucogenic (glycine, cysteine, proline); ketogenic (leucine, lysine) and both glucogenic and ketogenic amino acids (phenylalanine) , , (other amino acids excluded). Reactions of Urea cycle and its disorders.

**Unit IV LIPID METABOLISM**

Oxidation of fatty acids: Odd and even number carbon atoms,  $\alpha$ ,  $\beta$  and  $\omega$  – oxidation, energetic of  $\beta$ -oxidation – ketone body metabolism, glycerol metabolism – biosynthesis of fatty acids, Triglycerides and Phospholipids. Cholesterol metabolism.

**Unit V NUCLEIC ACID METABLISM**

Structures of purines and pyrimidines. Biosynthesis and catabolism of nucleotides – Biosynthesis of nucleotide coenzymes – inhibitors of nucleotide biosynthesis

**References**

- |  |   |             |
|--|---|-------------|
| • Fundamentals of Biochemistry                     | – | Voet & Voet |
| • Principles of Biochemistry                       | – | Lehninger   |
| • Biochemistry                                     | – | Stryer      |
| • Biochemistry                                     | – | Zubay       |
| • Herper's Biochemistry (25 <sup>th</sup> Edition) |   |             |
| • Textbook of Biochemistry                         | – | Devlin      |