

Syllabus for Post Code TA-06

BIOLOGY (10+2+3 level)

Cell Biology: Structure of prokaryotic and eukaryotic cells; Membrane structure and function; Organelles and internal organization of the eukaryotic cell Protein trafficking in a eukaryotic cell; Cell communication – signalling pathways: endocrine and paracrine signalling; Extracellular matrix and apoptosis; Cell cycle – stages of mitosis and meiosis, and control of cell division cycle.

Biochemistry: Structure and function of biological macromolecules; Allostery; Enzymes – basic mechanisms of enzyme catalysis, Michaelis-Menten kinetics, enzyme inhibition, vitamins as coenzymes, and regulation; Bioenergetics – free-energy change, high-energy compounds, biological oxidation-reduction reactions and reduction potential; Metabolism – glycolysis, TCA cycle, oxidative phosphorylation, photosynthesis, nitrogen fixation, urea cycle, and regulation of glycolysis and TCA cycle.

Genetics: Mendel's laws; Inheritance patterns of polygenic traits; Mendelian inheritance patterns of human disorders; Pedigree analysis; Chromosomal basis of inheritance; Genetic recombination; Mapping genes on chromosomes based on linkage analysis; Plant breeding.

Molecular Biology: Landmark experiments that established DNA is the genetic material; DNA replication; Proofreading and repair of DNA; DNA recombination; Transcription; RNA processing; Translation; Regulation of gene expression including operons bacteria and differential gene expression in multicellular eukaryotes.

Evolution: Darwinian view – natural selection, fossil record and descent with modification; Population genetics – sources of genetic variation, gene pools and allele frequencies, Hardy-Weinberg equation, genetic drift, gene flow and adaptive evolution; Different types of speciation; Phylogenetic classification; Origin of life – abiotic synthesis of biological macromolecules, protocell, dating fossils and origin of multicellularity.

Microbiology: Isolation; Cultivation; Structural features of viruses, bacteria, fungi and protozoa; Pathogenic microorganisms; Nutrition-based classification of microbes; Microbial metabolism; Growth kinetics; Submerged fermentation techniques; Microbial genetics.

Plant Biology: Types of tissues and organs; Primary and secondary growth; Morphogenesis; Transport in vascular plants; Plant nutrition; Development of flowering plants – gametophytic and sporophytic generations, different developmental phases, genetic control of flowering, gametogenesis, incompatibility, embryogenesis, dormancy, germination and environmental influence; Plant hormones; Photobiology; Plant response to biotic and abiotic stresses

Animal Biology: Digestive, circulatory, respiratory, excretory, nervous, reproductive and endocrine systems; Basics of immunology – Innate and adaptive immunity, Immune cells and Immunoglobulins; Animal development – Fertilization, embryonic pattern formation, cleavage, gastrulation, cellular differentiation and morphogenesis.

Ecology: Climate patterns; Terrestrial and aquatic biomes; Environmental constraints on species distribution; Factors affecting population density; Interactions among communities; Ecosystems; Ecological remediation.

Biotechnology: Plant tissue culture; Cloning of animals through somatic cell nuclear transfer; Applications of recombinant DNA technology in medicine, agriculture and forensic science.

Methods in Biology:

Cell Biology- Microscopy (light microscopy and electron microscopy); Staining proteins with antibodies; Visualizations using the GFP reporter.

Biochemical techniques- UV spectrophotometry; Biomolecular chromatography; cell fractionation by centrifugation; Electrophoresis; and Western blotting.

Molecular biology techniques- DNA cloning – plasmid vectors, and restriction enzymes; Polymerase Chain Reaction; Expression of cloned eukaryotic genes in bacteria; Hybridization techniques; DNA sequencing.

CHEMISTRY (10+2+3 level)

Structure and properties of Atoms: Bohr's theory; Periodicity in properties.

Bonding in molecules: Chemical bonding; Complex formation; Physical and chemical basis of molecular interactions.

Chemical kinetics, thermodynamics, and equilibrium: Chemical equilibrium; Chemical thermodynamics (first and second law); and Chemical kinetics (zero and first order reactions).

Physical and chemical properties of compounds: Chemical catalysis; Acid-base concepts; Concepts of pH and buffer; Conjugative effects and resonance; Inductive effects; Electromeric effects; Photochemistry; and Electrochemistry.

Chemistry of organic compounds: Hydrocarbons; Alkyl halides; Alcohols; Aldehydes; Ketones; Carboxylic acids; Amines and their derivatives; Aromatic hydrocarbons, halides, nitro and amino compounds, phenols, diazonium salts, carboxylic and sulphonic acids; Soaps and detergents; Stereochemistry of carbon compounds.

Instrumental techniques - Spectroscopy: fundamentals of molecular spectroscopy, emission and absorption spectroscopy, UV-Vis, IR and 1-D proton NMR spectroscopy, basics of mass spectrometry; Basics of calorimetry; Basic concepts of crystallography.

MBA

FINANCE:

ACCOUNTING & FINANCE Introduction: Forms of Organization & Corporate Reporting, Reporting Fundamentals & Financial Reporting. Financial Accounting: Accounting Principles, Accounting Mechanics, Accounting Standards & Financial Statement Analysis. Management Accounting: Cost Volume Profit (CVP) Analysis, Costing Systems Tools &

Techniques, Activity Based Costing (ABC). Corporate finance: The Time Value of Money, Discounted Cashflow Valuation, Introduction to Capital Budgeting

ECONOMIC ANALYSIS FOR MANAGEMENT Introduction - the scope of Economic Analysis; Demand and Supply analysis; Consumer Theory; Producer Theory - Cost Function, Profit Maximization, Perfect Competition, Monopoly, Oligopolistic Competition, Oligopoly, Price Discrimination, Multi Product Decisionmaking, Multiple production facility decisionmaking; Game Theory, Information Economics, Public Economics.

FINANCIAL MANAGEMENT Concept of Time Value of Money, NPV, IRR, MIRR, CBR, Discount Rate, Fund and Cost Flow Analysis, Free Cash Flow to Equity and Firm, Break Even Analysis, Working capital management, Investment Analysis, Cost of Capital, Capital asset pricing models, Leverage, Determination of optimal capital structure, Debt Management, Dividend Policy, Concept of Financial Strategy, Course will be based on case study and journal articles.

MACROECONOMIC ANALYSIS FOR MANAGEMENT Introduction, Nature of Macroeconomics, National Income Accounting, Economy in the short run, Economy in the medium run, Inflation, Open economy Macroeconomics, Macroeconomic Stabilization Policies, Economy in the long run, Special topics.

HUMAN RESOURCE MANAGEMENT

Meaning of Work and Humans as Resource, Human Resource Planning and Selection, Motivation and Compensation Management, Performance Appraisal, Career Management, Training and HRD, Group Dynamics and Leadership, Empowerment and Participation, Technology & HRM, Organizational culture, tech driven HRM, Evolution of HRM, Trends shaping HRM, Strategic Human Resource Management, HRM Models-Harvard Model, Guest Model, Ulrich's HR model, AMO framework, Line and staff aspects of HRM, Job analysis-process and methods, Job description, Job specification, human resource planning and forecasting, Employee Recruitment-Sources, application forms, Employee Selection-Types of Tests, Management assessments Centers, Types of Interviews, Placement, Employee Orientation-Purpose process, Training Process-Analyzing the training need & designing the training programme, implementation and evolution of training programme, Management development Programs, Employer Life Cycle Career Management-Promotion, Transfers, Retirements, Career Planning, Talent Management, Concept of performance managements and appraisals, Techniques for appraising performance, Appraisal Related problems, Appraisal Interview, Succession Planning Factors in determining pay rates, Process of establishing Pay rates- Salary survey, Job Evaluation, Pricing Managerial and professional Jobs, Competency-Based Pay, Variable Pay, Employee Incentives Benefits, Employee Relation: Concepts and types of Employment Relationships, Industrial relations, Collective bargaining, Psychological Contract, Ethical behavior at work, Employee well-being.

PHARMACEUTICALS MANAGEMENT:

Pharma Sector & Management- 1. Overview of the way in which Pharma sector is organized
2. Difference types of organizations and work done by them in the pharma sector
3. Managerial Challenges faced by the Pharma sector managers

Pharma Sector Business Environment-1. Overview of the history of evolution of Pharma Sector in India (from the days of Vedas preparing medicines at home to the current industrial production day), Major forces that impact the development of the sector, 2. Legal guidelines/regulations guiding Pharma sector in India, policy for R&D, Technology Transfer etc. The critical elements of political environment constitution provisions affecting business in India; The preamble, directive principles of state policy and fundamental rights, the economic roles of the government, growth and control of corporate sector in India. Political dimensions of doing business in India, changing dimensions of legal environment in India. 3. Impacts and opportunities from globalization: Multinational Corporation, foreign collaboration and Indian business, nonresident Indian and corporate sector, World Bank, IMF policies and India, trade barriers, foreign trade policies, the technological environment in India, policy for research and development, technology and economic development, appropriate technology and problems of technology transfer. 4. Ethics, consumers right, consumerism and business.

Pharmaceutical Marketing Management-1. Marketing tasks and philosophies: Marketing systems and pharma marketing environment, 2. Consumer Pharmaceutical market and buyer behaviour. 3. Strategic marketing process: market segmentation, market measurement and forecasting. 4. Strategic planning in pharma marketing: Situation analysis, developing marketing objectives; Determining positioning and differential advantage, selecting target markets designing marketing mix for target market. 5. Product decisions: Product classification, product life-cycle strategies, 6. Branding, packaging and labeling. 7. Pricing decisions: Pricing methods and strategies. 8. Distribution decisions: Importance and functions of distribution channels, distribution channel members. 9. Promotional Decisions : Promotion mix elements.

Pharmaceutical Advertising and Sales Promotion Management- Sales promotion objectives, sales promotion in pharma sector; Advertising, personal selling, public relations and sales promotion of pharma products, sales promotion and consumer behaviour, Sales promotion budget, evaluation guidelines Advertising objective, how advertisement works, budget allocation, Developing advertising objectives, Introduction to Integrated Marketing Communication (IMC), Consumer Behaviour & IMC, Media Strategy and Planning: - Media Plan, traditional Media Scheduling, Digital and Social Media Planning, Challenges in Advertising, Ethics of Advertising, creative strategy's Planning development execution and evaluation, Media evaluation

Ethical Issues in Pharmaceutical Management-Social responsibility and managerial ethics, Improving ethical behaviour and ethical leadership, Ethical decision making and decision making process, Corporate social responsibility, Corporate Governance, Whistle blower and Whistle blower policy, managing diversity wrt gender, Sexual preference, race, ethnicity etc.

Regulatory affairs in Pharma-Good manufacturing practice (GMP), Good laboratory practice (GLP), Good Automated laboratory practice (GALP), Good distribution practice (GDP), Quality management Documentation in pharmaceutical industry: EPDB, PDP, PDR. CoA, DMF Filing process: IND, NDA and ANDA Dossier preparation and submission Audits and inspections Product life cycle management Global regulatory strategies for pharmaceuticals

PUBLIC RELATIONS:

Public Relations – concept and scope –historical perspectives- development in India--Public Relations as a management function-Professionalism and job description of Public Relations- Public Relations strategy and tactics- magnitude and power of corporate communication- Difference of Public Relations from advertising, publicity, marketing, sales promotion, propaganda and lobbying- Contemporary scenario of Public Relations practice. International public relations scenario with emphasis on PR development in India-PR professional bodies, Associations, Councils in the world - annual public relations programmes and budgeting- preparing a plan for PR Audit- financial public relations, public relations evaluation for its activities and assessing feedback for the same-PR education: research, training and employment readiness programmes- new trends in PR - challenges and opportunities and preparation for the same.

MASS COMMUNICATIONS:

Introduction to Managerial Communication- Meaning, Importance & objectives, Forms of communication, Significance of Communication, Communication Process, Barriers to effective communication, Techniques of effective communication ,Principles of Effective Communication, Basic Models of communication, Characteristics of successful communication, Choosing Media for Communication,

Means of Communication and Methods- Types of Communication: Intrapersonal and Interpersonal communication, Channels of Communication: Introduction, Classification of Communication Channels, Group Communication: Meetings, Group discussions, Public Communication, Mass Communication, Communication Network: Intranet–Internet–E-mails–SMS– teleconferencing – videoconferencing.

Verbal and Nonverbal communication- Fundamentals of Oral communication Barriers and Gateways in Oral Communication, Feedback, Telephonic Messages, Negotiation Skills, Written communication, Merits and Demerits, Significance of Written communication, Non verbal communication, Body Language ,Facial expressions, Face to Face communication, Listening: Meaning, Importance, Types of listening, Tips for effective listening, Barriers for listening, Conducting Meetings : Procedure –Preparing agenda, Minutes and Resolutions Conducting Seminars & Conferences.

BIOTECHNOLOGY MANAGEMENT

Plant Biotechnology & Entrepreneurship, Business Fundamentals for Biotechnology, Accounting for Managers, Applications of Disruptive Technologies in Business, Managerial Economics, Marketing Management, Organizational Behavior, Statistics for Management, Professional & Business Communication, Consumer Behaviour, Emerging Trends in Life Sciences and Biotechnology Industries, Essentials of Bioinformatics, Business Analytics and Modelling, Business Research Methods, Legal Aspects of Business, Operations Management, Health and Medical Informatics Applications, Strategy, Innovation & Entrepreneurial Development, Cognitive Analytics & Social Skills for Professional Development, Agricultural Marketing System, Emotional Intelligence for Managers, Environmental Hazards, Risk Assessment and Disaster Management, Occupational Risks and Management, Pharma and Industrial Biotechnology enterprise, Product and Brand Management, Regulatory Affairs, Biosafety Regulations, IPR and Technology Transfer, Supply Chain Management, Biochemical and Molecular Diagnostics in Health Care, Creating and Managing Businesses

in Life Sciences and Biotechnology, Environment Management, EPIDEMIOLOGY AND MANAGEMENT OF EPIDEMICS, Hospital Planning, Innovation and Knowledge Management for Biotechnology.