

TA-01 (Nutrition/ Food Science/ Dietetics)

Balanced diet, RDA, Food groups, Food Pyramid, Food exchange list, Nutritional requirements for different age groups. Disorders of malnutrition, GUT disorders, Obesity, hypertension, renal diseases, cardiovascular diseases, Diabetes, Cancer & Inborn errors of metabolism- Etiology, symptoms and dietary management, functional food and Nutraceutical.

TA-02 (Chemistry with Biochemistry or Chemistry with Bio-Technology)

Biomolecules and their conformation; Weak inter-molecular interactions in biomacromolecules; Chemical and functional nature of enzymes; Kinetics of single substrate and bisubstrate enzyme catalyzed reactions; Bioenergetics; Metabolism (Glycolysis, TCA and Oxidative phosphorylation); Membrane transport and pumps; Cell cycle and cell growth control; Cell signalling and signal transduction; Molecular structure of genes and chromosomes; DNA replication and control; Transcription and its control; Translational processes; Regulatory controls in prokaryotes and eukaryotes; Mendelian inheritance; Gene interaction; Complementation; Linkage, recombination and chromosome mapping; Extra chromosomal inheritance; Chromosomal variation; Population genetics; Transposable elements, Molecular basis of genetic diseases and applications.

Chromatographic and membrane based bio separation methods; Immobilization of enzymes and cells and their application for bioconversion processes. Aerobic and anaerobic biological processes for stabilization of solid/liquid wastes; Bioremediation.

Inorganic Chemistry: Atomic Structure, Catalysis by Organometallic Compounds, Lanthanoids and Actinoids, Noble Gases, Transition Elements, Chemistry of s and p Block Elements, Periodicity of Elements, Inorganic Polymers, General Principles of Metallurgy, Oxidation-Reduction and Organometallic Compounds.

Organic Chemistry: Carbohydrates, Dyes, and Polymers, Polynuclear Hydrocarbons, Stereochemistry, Heterocyclic Compounds, Carboxylic Acids and their Derivatives Concept of Energy in Biosystems, Nucleic Acids, Amino Acids, Peptides and Proteins Chemistry of Halogenated Hydrocarbons, Organic Spectroscopy, Chemistry of Aliphatic Hydrocarbons, Aromatic Hydrocarbons, Enzymes and Lipids, Alkaloids and Terpenes.

Physical chemistry: Solid State Ionic and Phase Equilibria, Molecular Spectroscopy Chemical Thermodynamics, Gaseous State Solutions and Colligative Properties Conductance, Liquid State, Electrical and Magnetic Properties of Atom and Molecules, Chemical Kinetics and Quantum Chemistry.

Analytical Chemistry: Introduction Analysis of Soil Analysis, Water Analysis of Food Products, optical Methods of Analysis, Qualitative and Quantitative Aspects of Analysis and Chromatography.

TA-03 (DATA ENGINEERING)

Section1: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Section2:Computer Organization and Architecture

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Section3:Programming and Data Structures

Programming in C,C++, Java, Python. Concepts of OOPs, recursion, arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Section4:Computer Networks

Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit-switching; Data link layer: framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP,DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols.

Section5:Operating System

System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

Section 6: Databases

ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing, Transactions and concurrency control, NoSQL Databases, Backup and Recovery Strategies for databases, Performance Tuning and Optimization, Database Auditing and Logging, Clustering and Failover Solutions, DisasterRecovery Planning, Data Archiving and Purging Strategies, Troubleshooting Common Database Errors.

Section7:Algorithms

Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths.

Section 8: web programming and web technologies

Client-Server Architecture, Web Standards and Protocols, Basic Structure of HTML Documents, HTML Tags, HTML5 Features and Enhancements, CSS Syntax and Selectors, Styling HTML Elements, Layout Techniques, JavaScript: Variables, Data Types, and Operators, Control Flow and Loops, Functions and Scope. DOM, Manipulating HTML Elements with JavaScript, Event Handling, Principles of Responsive Design, Overview of Popular Frontend Frameworks, Component-Based Architecture, RESTful APIs and CRUD Operations, AJAX, Git (CVS), Secure Coding Practices.

Section9: Probability and Statistics

Counting (permutation and combinations), probability axioms, Sample space, events, independent events, mutually exclusive events, marginal, conditional and joint probability, Bayes Theorem, conditional expectation and variance, mean, median, mode and standard deviation, correlation, and covariance, random variables, discrete random variables and probability mass functions, uniform, Bernoulli, binomial distribution, Continuous random variables and probability, distribution function, uniform, exponential, Poisson, normal, standard normal, t-distribution, chi-squared distributions, cumulative distribution function, Conditional PDF, Central limit theorem, confidence interval, z-test, t-test, chi-squared test.

Section 10: Data Engineering

Data Engineering Lifecycle, Data Streaming Platforms, Conceptual, Logical, and Physical Data Models, Dimensional Modeling, Data Warehousing Design Principles, Data Ingestion, Data Transformation (ETL - Extract, Transform, Load), Batch Processing and Real-time/Stream Processing, Designing Data Pipelines, Ensuring Data Quality and Reliability, Data Governance Policies and Procedures, Data Security and Compliance, Performance Tuning of Data Pipelines and Databases, Monitoring Tools and Techniques, Troubleshooting and Debugging Data Engineering Workflows.

Data Engineering Fundamentals

- Data Lifecycle Management: Understanding data from ingestion to consumption
- Data Storage Technologies: Relational Databases (SQL, NoSQL), Data Warehouses, Data Lakes (HDFS, Cloud Storage)
- Data Processing Techniques: Batch processing, Stream processing, Real-time analytics

Data Integration and ETL/ELT

- Concepts of ETL, ELT, and Reverse ETL
- Designing and Building Scalable Data Pipelines
- Data Ingestion Techniques from various sources (Databases, APIs, Logs)
- Common ETL/ELT Tools and Technologies (Apache Airflow, Luigi, Spark)

Data Modeling and Warehousing

- Data Modeling Fundamentals (Entity-Relationship Diagrams, Dimensional Modeling)
- Designing Data Models for Data Warehouses and Data Lakes
- Data Normalization Techniques
- Data Warehouse Architecture and Design

Big Data Technologies

- Introduction to Big Data Processing Frameworks (Apache Spark, Hadoop)
- Distributed Data Storage (HDFS)
- Data Processing with Spark (RDDs, DataFrames)
- Big Data Analytics Techniques

Cloud Platforms

- Introduction to Cloud Computing for Data Engineering (AWS, Azure, GCP)
- Cloud Storage Services (S3, Blob Storage)
- Cloud-based Data Processing Services (EMR, Dataproc)
- Serverless Computing for Data Processing (AWS Lambda, Azure Functions)

Data Quality and Governance

- Data Quality Checks and Cleaning Techniques
- Data Validation and Error Handling
- Data Monitoring and Alerting Systems
- Data Governance Principles and Security

Programming Languages and Scripting

- Scripting for Data Manipulation (Python, Java, Scala)
- Working with APIs for Data Access
- Familiarity with languages for distributed computing (if applicable)

Data Pipelines and Orchestration

- Designing and Building Scalable Data Pipelines (ETL, ELT)
- Scheduling and Orchestration tools (Airflow, Luigi)
- Monitoring and Debugging Data Pipelines

Additional Skills

- Version Control Systems (Git)
- Data Security and Privacy Regulations (GDPR, CCPA)
- Communication and Collaboration Skills
- Problem-solving and Analytical Skills
- Familiarity with Cloud Deployment Tools (CI/CD)

Tech-01 (Physiotherapy)

Anatomy - Physiology-Clinical Biochemistry -General Psychology-Basic Nursing and First Aid

Biomechanics &Kinesiology-Exercise therapy - Electrotherapy-Medical Microbiology - Pathology - Pharmacology - Orthopedics-General medicine (including Pediatrics and Psychiatry)-General Surgery-Community Medicine-Research methodology and statistics-Physiotherapy in Orthopedic conditions

Physiotherapy in Neurological Conditions-Physiotherapy in Cardio Respiratory and General Conditions-Physiotherapy in Sports-Rehabilitation Medicine-Orthotics and Prosthetics

Tech-02 (Dietetics)

Balanced diet, RDA, Food groups, Food Pyramid, Food exchange list, Nutritional requirements for different age groups. Disorders of malnutrition, GIT disorders, Obesity, hypertension, renal diseases, cardiovascular diseases, Diabetes, Cancer & Inborn errors of metabolism- Etiology, symptoms and dietary management, functional food and Nutraceutical(Pre degree + Diploma level)

Tech-03 DMLT

Fundamentals of MLT: Students through MLT learn the application of basic techniques and instruments used in all areas of medical laboratories.

Basics of Clinical Biochemistry: Clinical biochemistry is a branch of laboratory medicine in which chemical, as well as biochemical methods, are applied.

Basic pathology: Study of disease is known as pathology. It is a study through the examination of surgically removed organs, tissues, bodily fluids, and in some cases the whole body.

Microbial Instrumentation: Instrumentation is a powerful tool which is used to explore the internal structure of Microorganisms.

Clinical Hematology: Hematology is the study of the numbers and morphology of the cellular elements of the blood.

Clinical Microbiology: The definition of clinical microbiology deals with the interrelation of macro and microorganisms under normal and pathological conditions.

Clinical Pathology: Clinical pathology is a medical specialty concerned with the diagnosis of disease based on bodily fluids, such as blood, urine, and tissue homogenates.

Histopathology - A branch of Pathology which deals with the study of disease in a tissue section

Bio waste - Any material that contains or has been contaminated by a biohazard agent That includes Petri dishes, syringes, needles, blood waste etc.,

Blood banking - A place where blood is collected & stored before it is used for transfusions.

Tech-04 INSTRUMENTATION

	Topics
1	Basic Control System
2	Digital Electronics
3	IC
4	Transducers and Telemetry
5	Control System Components
6	Microprocessor and Assembly Language Programming
7	Process Technology

8	Analytical Instrumentation
9	Electronic & Pneumatic Instrumentation
10	Microprocessor Interfacing & Applications
11	Process Instrumentation
12	Applied Instrumentation
13	Industrial Electronics and Control
14	Biomedical Instrumentation
15	Micro Controllers
16	Advance Process Control

Tech-05 Electrical

Electrical Circuit Theory
Electrical Machines-I
Electronic Devices and Circuits
Computer Applications
Electric Machines-II
Measurements and Instruments
Digital Electronics
Transducers and Signal Conditioners
Communication and Life Skills Practice
Power System-I
Microcontroller
Special Electrical Machines
Programmable Logic Controller
Electrical Machine Controller
Power System-II
Electrical Estimation and Energy Auditing
Computer Hardware and Networks

LA-01 -Laboratory Attendant

Total Syllabus of Xth standard and questions related to Laboratory maintenance

LA-02 -Laboratory Attendant

Total Syllabus of Xth standard and questions related to Animal Facility maintenance