

VUCS13001 : ADVANCED R

Hours: 30

Course Objectives:

- To acquaint students with advanced concepts in Statistics using R.
- To introduce elementary and advanced statistical methods of data analysis using R.

Course Outcomes:

After successful completion of this course, the student will be able to:

- construct various diagram using qualitative and quantitative data.
- calibrate correlation and regression statistical analysis.
- Perform one-way and two-way ANOVA table.
- Integrating data mining techniques.

Unit I: Descriptive and Bivariate Statistical Analysis

10 hrs

Introduction; Graphics with R-Diagrammatic representation of data; Graphical representation of data; Histograms, Barplots, Boxplots; Measures of central tendency- frequency distribution for a discrete variable, frequency distribution for a continuous variable; Measures of skewness- Karl Pearson's measure, Bowley's measure; Correlation; Scatterplots; Regression-Linear regression models.

Unit II: Probability and Inference in R

10 hrs

Probability in R – Distributions, Maximum Likelihood Estimation, Hypothesis Tests in R, Proportion Test, Testing a Mean, Test for the Median, Two Sample t-Test, Paired Differences, Distribution of a Sample Mean, Sampling Distributions, Simulating Sampling Distributions, Confidence Intervals, Hypothesis Testsing.

Unit III: Analysis of variance & Data Mining

10 hrs

One-Way ANOVA, Two-Way ANOVA, Decision Trees, Dendogram, Logistic Regression, Clustering- The K-Means Clustering, The k-Medoids Clustering, Outlier Deduction, Time Series Analysis – Forecasting.

Reference:

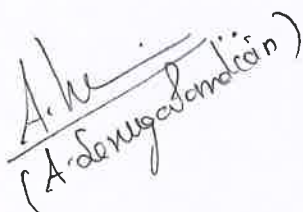
Yanchang Zhao, (2012). *R and Data Mining: Examples and Case Studies*. Published by Elsevier.

Jay Kerns. G, (2010). *Introduction to Probability and Statistics using R*.

Hothorn, Torsten and Brian Everitt. S. (2014). *Handbook of Statistical Analyses Using R*, (3rd ed.), CRC Press.



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Course Objective:

- To make the students to understand and learn to design the frequency-shaping analog circuits.
- To introduce various skills needed to changes in layout, component values, component tolerances and op amp Gain Bandwidth.

Course Outcomes:

After successful completion of the course, the student will be able to:

- Understand the various aspects of file merging and conduction of analog simulation circuits.

Unit 1: Schematica capture:

10hrs

File merging - importing of (registered) Filter Wiz PRO files-rapid component (device) placement
Fast editing of component values - op amp device database provides Gain Bandwidth values for over 600 op amps - full circuit editing capabilities such as copy, cut and paste - annotation with text boxes and markers

Unit 2: Analog circuit simulation:

10hrs

Automatic indication of when circuit is ready to simulate - view two graphs simultaneously -two voltage probes - view both, either, or difference - save previous traces to view up to 13 voltages or currents at once - amplitude response (real, imaginary, dB, volts) - phase and group delay responses - input impedance - component current, impedance and power dissipation - Sensitivity of output voltage to changes in component values - Transient response to impulse, step and "staircase" inputs - "ideal" and "real" op amp models - Monte Carlo analysis - Parameter Sweep analysis - Pole-zero placement

Unit 3: Analog Circuit simulation Experiments

10hrs

Inverting and Non inverting Amplifier - Low pass and High pass filter - Band pass filter - RC Phase shift Oscillator.

References:

Sketchbook PRO 2015: perspective sketching tools Microelectronic Circuits (6th Edition) - Adel S Sedra & Kenneth Carless Smith: Oxford University Press


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VUCS14002 : QUANTITATIVE APTITUDE TRAINING

Hours: 30

Course Objective

- To develop and strengthen the foundation in communication, computer science and basic mathematics.

Course Outcomes

On successful completion of the course, the students should be able to

- Express problems in mathematical language.
- Use mathematical techniques to find solutions to problems.
- Develop skills in communicating results and defining problems.

Unit 1: English

5 hrs

Spotting errors in sentence - General English Elementary Test (Choose the Correct answers) - Ordering of words in a sentence.

Unit 2: Maths

5 hrs

Set functions - Correlation and Progression - Permutations and Combinations.

Unit 3: Computer Science

7 hrs

Computer networks - Operating System - Technical aptitude (briefing about the latest technology)

Unit 4: Logical reasoning

6 hrs

Data interpretation - Logical thinking on basic facts. (Based on UGC NET) - Conceptual Clarity (Based on CAT).

Unit 5: Number System

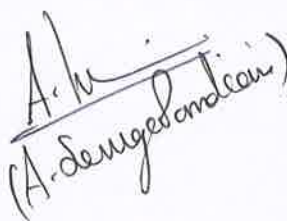
7 hrs

Number Series, Divisibility Test, HCF & LCM of Numbers, Simplifications, Problems on Ages – Problems on trains

References:

- Praveen, R. V. *Quantitative Aptitude and Reasoning*. PHI Learning Pvt. Ltd., 2013.
Sharma, Arun. *Verbal Ability and Reasoning for Cat* Tata McGraw-Hill Education, 2011.
Sinha, Nishit K. *Quantitative Aptitude for the CAT* Pearson Education India, 2016.
Khattar, Dinesh. *The Pearson Guide to Quantitative Aptitude for Competitive Examinations*, 3e. Pearson Education India, 2016


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Course Objectives:

- To expose students to technology of web sites and to introduce various tools and languages required for technical and creative design of state-of-the-art web sites
- To gain knowledge on Servlet, JSP and EJB.

Course Outcomes:

After successful completion of this course, the student will be able to:

- develop distributed web application using RMI, Servlets and JSP.
- apply the concepts to current trends and styles in web design and applications

Unit 1: Integrated Application Development

5 hrs

Introduction to Integrated Application Development – Introduction IDE Tools and use – Eclipse tool installation – working with Eclipse – Client /Server Program – Web Server Versus Application Server

Unit 2: J2EE Understanding Servlets

8 hrs

MVC Architecture – what is HTTP – Introduction to Servlet – Servlet Life Cycle – Web Application Structure – Writing A Simple Hello World Servlet – Understanding web.xml – Distinguish GET and POST.

Unit 3: Understanding JSP Pages

7 hrs

Servlet Interaction, Java Servlet Development Kit, Javax.servlet package, Reading Servlet Parameters, Reading Initialization Parameters, The javax.servlet.http Package, Handling HTTP. Java Server Pages(JSP): JSP, Request string, Cookies, User session, Session object.

Unit 4: Servlets

5 hrs

Servlet and JSP programming: Servlet API-Servlet Life cycle-Html to Servlet Communication-JSP tags.

Unit 5: Networking Basics

5 hrs

Networking Basics, InetAddress, URL Connection, HTTPURLConnection, Cookies, Datagram classes, Introduction To EJB, Types of EJB.

References:

Jim Keogh (2002). *J2EE- The Complete Reference*. Tata McGraw-Hill.

Alur Deepak, Malks Dan and Crupi John (2001). *Core J2EE Patterns: Best Practices and Design Strategies*, Prentice Hall India.

Austin and Pawlan (2004). *Advanced Programming for JAVA 2 Platform*, Pearson Education.

Geary M. David (2007). *Core JSTL Mastering the JSP standard Tag Library*, Pearson Education.


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VUCS15002: PL/SQL WITH DATABASE CONNECTIVITY

Hours: 30

Course Objective:

- To inculcate knowledge in PL/SQL & Database Connectivity.

Course Outcomes:

On successful completion of the course, the students should be able to

- explain the concepts of SQL Environment and DDL Commands
- illustrate data retrieval with PL/SQL Commands
- develop PL/SQL triggers, cursors and functions

Unit 1: Introduction to SQL

5 hrs

SQL Environment – SQL – Logging into SQL - SQL Commands – Errors & Help – Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Unit 2: Working with Table

6 hrs

DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – DEFINE command – CASE structure. Functions and Grouping: Built-in functions – Grouping Data - Join – Set operations.

Unit 3: PL/SQL - A Programming Language

7 hrs

History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements.

Unit 4: PL/SQL Cursors and Exceptions

7 hrs

Cursors – Implicit and Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

Unit 5: PL/SQL Composite Data Types

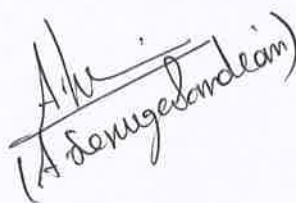
5 hrs

Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages – Triggers – Data Dictionary Views.

References:

- Dr.P.S.Deshpande, *SQL & PL/SQL for Oracle 11g Black Book*, dreamtech
Steven Feuerstein, Bill Pribyl, *Oracle PL/SQL Programming, (6th Edition)*
Steven Feuerstein, *Oracle PL/SQL Best Practices, (2nd Edition)*, O'Reilly






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VPCS13002: LIFE SKILLS FOR COMPUTER PROFESSIONALS

Hours: 30

Course Objectives:

- To explore the vital resources of life.
- To get focused with a definite purpose in life and create a compelling future with clearly defined goals.
- To break limiting patterns of thoughts, beliefs, behaviour and habits.
- To develop personal and interpersonal effectiveness.

Course Outcomes:

After successful completion of the course, the student will be able to:

- apply a techniques of problem solving to overcome life's challenges.
- recognise life values to integrate professional and personal life.
- create a compelling future with clarity defined goals .

Unit 1: Mastering Emotions:

6 hrs

Significance of mastering emotions, reactive and proactive people, ways to deal with emotions, avoiding inner conflicts, analysis of inner traits and negative traits, creating long- term changes.

Unit 2: Life Values

6 hrs

Types of life values- personal values, social values, professional values, spiritual values; Life Vision, beliefs and values, Life goals - personal development goals, family goals, educational goals, career goals, financial, material goals and social goals.

Unit 3: Effective Communication

6 hrs

Types of Communications - Verbal communication, Non- verbal communication, activities related to communications Presentation skills, listening skills. Activities based on Types of talk to get action, to inform, to convince

Unit 4: Problem solving

6 hrs

Defining problems, potential cause of problems, identification of possible solutions, finding the best solution and decision-making.

Unit 5: Successful Relationship


6 hrs

Principles of successful relationship: Ways to make impressive relationship, Methods to make people to like us, think in our way, bringing people to around you, ways to overcome worry and find peace and happiness.

References:

- Covey, S. R., & Covey, S. (2020). *The 7 habits of highly effective people*. Simon & Schuster.
Covey, S. R., Merrill, A. R., & Merrill, R. R. (1995). *First things first*. Simon and Schuster.

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VPCS14002: BASICS OF PYTHON PROGRAMMING

Hours: 30

Unit 1: Introduction

10 hrs

History -Features -Setting up path -Working with Python -Basic Syntax -Variable and Data Types – Operator, Environment Setup, Basic Syntax, The python interface, usage of python, Variable and Data Types, Operators, Decision making, control statements and Loops, String Manipulation.

Unit 2: Lists and Dictionaries

10 hrs

Python Lists-creation of list, different types, select the valid list, list of lists, sub setting lists, slicing and dicing, list manipulation, replace list elements, extend the list elements, deleting the list elements. Tuples, Dictionaries-mkdir(), chdir(), getcwd(), rmdir(), File & Directory Related Methods.

Unit 3: Functions and File Handling

10 hrs

Functions-Defining a Function, The Anonymous Functions, Scope of Variables, The import Statement, The PYTHONPATH Variable, Built-in functions-dir(),reload(), globals, locals(),packages, Printing to the Screen-Reading Keyboard Input, Opening and Closing Files, Renaming and Deleting Files, Modules, Input-Output, Exception Handling.

References:

Guido van Rossum and Fred L. Drake Jr, “An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.

Lutz, M. and Ascher, D. (1999) *Learning Python*, O'Reilly Media.

Gries, P., Campbell, J., and Montojo, J. (2013) *Practical Programming: An Introduction to Computer Science Using Python*, Pragmatic Programmers

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VPCS15001: ASP.NET

Hours: 30

Course Objective

- To provide basic knowledge in ASP.NET framework and MVC.

Course Outcomes:

- explain .NET framework, ASP.NET programming structure
- illustrate ASP.NET objects and Components
- connect web forms, events in VS.NET using MVC controller

Unit 1: ASP.NET: Introduction

5 hrs

.NET Framework –ASP Operating Systems –Servers –ASP Objects –ADO and ADO.NET objects – ASP Components – RDBMS and other data sources – Developing the Distributed online applications –Client Server or Tiered Applications.

Unit 2: Programming ASP.NET

5 hrs

Programming Language Structures – Built in ASP.NET objects and interactivity – Using the Response Object – ASP Server Object.

Unit 3: Web Forms and ASP.Net

8 hrs

Programming web forms –Web forms capabilities – Web forms processing – Web forms and Events – Creating Web Forms Event Handlers – Building interactive application with VS.Net –Solutions and project in VS.NET – Solutions Explorer – Creating a Web Form.

Unit 4: MVC

7 hrs

Developing MVC Models and Controllers - Exploring ways to create MVC Models - Implementing MVC Controllers - Creating Action Methods - Implementing MVC View

Unit 5: ASP.Net Objects and Components


5 hrs

The Scripting Object Model – Active Server Components and Controls – More Active Server Components.

References:

- Mathew Macdonald, (2002), *ASP.NET: The Complete Reference*, McGraw Hill Education.
John Ciliberti, (2017), *ASP.NET Core Recipes: A Problem – Solution Approach*, Apress.
Kogent Learning Solutions, *.NET 3.5 Programming*, Wiley India Pvt Ltd.
Mugilan T.S Ragupathi, *Learning ASP.NET Core MVC Programming*, Packt.

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VLSC13002 : LIFE SKILLS FOR LIFE SCIENCE PROFESSIONALS

Hours: 30

Course Objectives:

- To develop communication competence in students and to enable them in conveying thoughts and ideas with clarity and focus with good writing skills.
- To equip them to face interview & Group Discussion.
- To inculcate critical thinking process and to prepare them on problem solving skills.

Course Outcomes:

After successful completion of the course, the student will be able to:

- Provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- Understand team dynamics & effectiveness.
- Instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.
- Learn leadership qualities and practice them.

Unit 1: Writing and Reporting Skills

6 hrs

Technical Writing: Differences between technical and literary style, Elements of style; Common Errors, Letter Writing: Formal, informal and demi-official letters; business letters, Job Application: Cover letter, Differences between bio-data, CV and Resume, Report Writing: Basics of Report Writing; Structure of a report; Types of reports.

Unit 2: Communication and Presentation Skills

8 hrs

Interview Skills: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, Group Discussion: Differences between group discussion and debate; Ensuring success in group discussions, Presentation Skills: Oral presentation and public speaking skills; business presentations, Technology-based Communication: Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.

Unit 3: Group Problem Solving, Achieving Group Consensus

8 hrs

Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections. Problem Solving strategies. Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams. Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.

Unit 4: Morals, Values and Ethics

8hrs

Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character Spirituality, Senses of 'Engineering Ethics', variety of moral issues, Types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, Consensus and controversy, Models of Professional Roles, Theories about right action, Self-interest, customs and religion, application of ethical theories.

References:

Life Skills for Engineers, Compiled by ICT Academy of Kerala, McGraw Hill Education(India) Private Ltd., 2016.

Barun K. Mitra; (2011), "*Personality Development & Soft Skills*", First Edition; Oxford Publishers.

Larry James (2016); "*The First Book of Life Skills*"; 1st Edition; Embassy Books.

Shalini Verma (2014); "*Development of Life Skills and Professional Practice*"; 1st Edition; Sultan Chand (G/L) & Company.

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VLSC14001: FOOD TECHNOLOGY

Hours: 30

Course Objectives:

- Understand the nutritive value of different foods
- Understand Food Spoilage and preservation
- Understand Food borne diseases and adulteration

Course Outcomes:

After successful completion of the course, the student will be able to:

- Gain basic knowledge of the different nutrients.
- Get insight into the role of nutrients in maintaining health of the individual and community.
- Understand the interrelationship of the various nutrients.

Unit 1: Nutritive value of food

8 hrs

Carbohydrates: types and sources, functions, digestion, absorption, metabolism, deficiency; Proteins: biological value, types of proteins, energy, regulatory functions, digestion, absorption, metabolism, dietary sources, effect of protein deficiency and excess; Fats - types, sources, Nutritive value, biological importance; Vitamins: -fat soluble vitamins and water soluble vitamins (B-Complex vitamins), Vitamin deficiencies and importance of minerals.

Unit 2: Food Contamination and Spoilage

6 hrs

Introduction, types of contaminants in food: Biological- naturally occurring toxicants in plants, myco-toxins, sea food toxins, toxic metals. Chemicals- pesticide residue, presence of extraneous material, residue from processing and packing material; Reasons for food spoilage, food spoilage conditions, signs of spoilage.

Unit 3: Food Borne Diseases

6 hrs

Types of food borne diseases, Mode of transmission of diseases: direct, indirect, cross contamination; Food poisoning, food infections leading to typhoid, cholera, dysentery, allergies, jaundice; Prevention and control of food borne illness.

Unit 4: Food Preservation

6 hrs

Basic principles of preservation, methods of food preservation: Low temperature -refrigeration, Cook -chill, freezing, High temperature -wet heat, blanching and pasteurization, dry heat, removal of moisture; use of preservatives, controlled atmospheric storage, fermentative preservation, radiation and food additives (antioxidants, emulsifiers, food colours, flavouring agents, nutrient supplements, anti-caking agents, non - nutritive sweeteners, sequestrants, bleaching agents

Unit 5: Food adulteration

4 hrs

Definition of food adulterants, types of adulterants, Common examples of food adulteration and the tests used for their detection.

References:

- Deb, A. C. (1989), *Fundamentals of Biochemistry* (3rd Ed.), New Central Agency Publishers, Calcutta.
Jain, J. L. (2005), *Fundamentals of Biochemistry* (6th Ed.). S Chand Publication, New Delhi.
Ranganatha Rao, (2002), *Text Book of Biochemistry* (3rd Ed.). Prentice Hall publishers, New Delhi.

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Course Objective:

- To give knowledge and understanding of the essentials of research
- To comprehend on interpretation and research writing

Course Outcomes:

After completing the course students will be able to:

- learn about designing of experiments for research
- get to know the systematic way of interpreting results
- acquire knowledge on report writing and paper publication

Unit 1: Research Methodology

10 hrs

Meaning, Basic and applied research, Essential steps in research, Defining the research problem, Research/Experimental design, Research and Scientific Methods; Literature collection, Significance of research.

Unit 2: Interpretation and Report Writing

10 hrs

Meaning of interpretation; Techniques of interpretation; Precautions in Interpretation; Synopsis/ Dissertation/Thesis/Report/Abstract/Manuscript/Review/Project/writing: Meaning, concept, objectives and scope, components, format, types, layout, different steps involved, Significance and Bibliography

Unit 3: Publications and Statistical Analysis

10 hrs

Publishing research articles in Journals, Books, Proceedings. Citation Index, Impact factor, Abstract Index, Oral and Poster presentation. Statistical Methods: Collection and presentation of Data (Tables, Graphs, Diagrams). Standard deviation and standard error.

References:

- Kumar K. L.' (1997), *Educational Technology*, New Age International (P) Ltd., New Delhi.
Kothari, C.R; II ed. (2004), *Research Methodology*, Methods and techniques; New Age International (p) Ltd., Publishers, New Delhi.
Jerrald H. Zar (1999), *Biostatistical analysis of Prentice Hall International*, Inc. Press, London
Tony Bates A.W. Technology, (2005), *e-Learning and Distance Education*, New York, Routledge.

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VLSC16003: FOOD AND NUTRITION

Hours: 30

Course Objectives:

- Understand the nutritive value of different foods
- Understand Food Spoilage and preservation
- Understand Food borne diseases and adulteration

Course Outcomes:

After successful completion of the course, the student will be able to:

- Gain basic knowledge of the different nutrients.
- Get insight into the role of nutrients in maintaining health of the individual and community.
- Understand the interrelationship of the various nutrients.

Unit 1: Nutritive value of food

8 hrs

Carbohydrates: types and sources, functions, digestion, absorption, metabolism, deficiency; Proteins: biological value, types of proteins, energy, regulatory functions, digestion, absorption, metabolism, dietary sources, effect of protein deficiency and excess; Fats - types, sources, Nutritive value, biological importance; Vitamins: –fat soluble vitamins and water soluble vitamins (B-Complex vitamins), Vitamin deficiencies and importance of minerals.

Unit 2: Food Contamination and Spoilage

6 hrs

Introduction, types of contaminants in food: Biological– naturally occurring toxicants in plants, myco-toxins, sea food toxins, toxic metals. Chemicals- pesticide residue, presence of extraneous material, residue from processing and packing material; Reasons for food spoilage, food spoilage conditions, signs of spoilage.

Unit 3: Food Borne Diseases

6 hrs

Types of food borne diseases, Mode of transmission of diseases: direct, indirect, cross contamination; Food poisoning, food infections leading to typhoid, cholera, dysentery, allergies, jaundice; Prevention and control of food borne illness.

Unit 4: Food Preservation

6 hrs

Basic principles of preservation, methods of food preservation: Low temperature –refrigeration, Cook -chill, freezing, High temperature –wet heat, blanching and pasteurization, dry heat, removal of moisture; use of preservatives, controlled atmospheric storage, fermentative preservation, radiation and food additives (antioxidants, emulsifiers, food colours, flavouring agents, nutrient supplements, anti-caking agents, non - nutritive sweeteners, sequestrants, bleaching agents

Unit 5: Food adulteration

4 hrs

Definition of food adulterants, types of adulterants, Common examples of food adulteration and the tests used for their detection.

References:

- Deb, A. C. (1989), *Fundamentals of Biochemistry* (3rd Ed.), New Central Agency Publishers, Calcutta.
Jain, J. L. (2005), *Fundamentals of Biochemistry* (6th Ed.). S Chand Publication, New Delhi.
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