

ADIKAVI NANNAYA UNIVERSITY
CBCS/SEMESTER SYSTEM
VI SEMESTER
B.SC FOOD TECHNOLOGY
W.E.FROM 2015-16AB

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours**	Credits
1	INTRODUCTION TO COMPUTERS AND STATISTICS – II	100	25	75	3	3
2	Lab Practical	50	0	50	2	2
3	FOOD PROCESSING EQUIPMENT - II	100	25	75	3	3
4	Lab Practical	50	0	50	2	2
5	FOOD PACKAGING - II	100	25	75	3	3
6	Lab Practical	50	0	50	2	2
7	FOOD QUALITY AND CERTIFICATION - 2	100	25	75	3	3
8	Lab Practical	50	0	50	2	2
9	FOOD ADDITIVES - II	100	25	75	3	3
10	Lab Practical	50	0	50	2	2
11	FOOD TRADE AND BUSINESS MANAGEMENT - 2	100	25	75	6	5
	Total	850	-	-	31	30

ADIKAVI NANNAYA UNIVERSITY

CBCS CLUSTER SYSTEM

B.Sc FOOD TECHNOLOGY

VI SEMESTER: W.E.FROM 2015-16 ADMITED BATCH

INTRODUCTION TO COMPUTERS AND STATISTICS - 2

Theory:

Unit I:

Introduction to statistics – Meaning and various definitions of statistics – Importance of statistics in science – Classification and summarization of data – Frequency distribution – Graphical methods.

Unit II:

Methods of central tendency – Measures of dispersion – Coefficient of variation(C.V) – Standard error(S.E) – Simple correlation and Simple regression.

Unit III:

Normal curve and its properties – Chi-Square distribution – Testing of Hypothesis – SMD test – T-test – F-test – Chi-Square test.

Unit IV:

Analysis of variance – Experimental design and planning – RBD-Randomized Block Design –CRD-Complete Randomized Design – LSD-Latin Square Design.

Unit V:

Introduction to sampling – Limitations and uses of sampling – Types of sampling – Applications of sampling in different fields.

Practicals:

1. Computation of mean for grouped data and SD for ungrouped data.
2. SD for grouped data and CV, SND test for single sample.
3. SND test for single and two samples.
4. t-test for single and two sample.
5. Paired t-test and Chi-square test.
6. Correlation coefficient and its testing.
7. Fitting of linear regression equation.
8. Analysis of CRD with equal and unequal number of observations.
9. Analysis of RBD.
10. Analysis of LSD.
11. Missing plot technique in RBD and LSD.
12. 2^3 Factorial experiments.
13. Simple random sample.

14. Stratified random sample with random allocation.

Books for Reference:

1. R. Rangaswamy, *A Text Book of Agriculture Statistics*.
2. Nageswara Rao, *Statistics for Agricultural Sciences*.
3. V.Rajaraman and N Adabala, *Fundamentals of Computers*.
4. MS DOS Published by Microsoft Corporation.
5. MS Office Published by Microsoft Corporation.
6. S.C.Gupta, *Fundamentals of Statistics*.
7. S.J. Amdekar, *Statistical Methods: For Agricultural and Biological Sciences*.

FOOD PROCESSING EQUIPMENT - 2

Theory:

Unit I:

Heat Processing - Blanching, Pasteurization and Sterilization – principles, different methods and equipments. Processing in containers, process time, T-evaluation, Design of batch and continuous sterilization.

Unit II:

Mechanical Separations: Screening and Screening equipment, Centrifugation-principle, equipment involved in centrifugation, liquid-liquid centrifugation, liquid-solid centrifugation, clarifiers, desludging and decanting machines. Filtration: Principles involved in filtration, membrane separation, Pressure and vacuum filtration. Expression: batch and continuous type.

Unit III:

Baking, principles of baking, different types of ovens Roasting and Frying equipment-principles, different types of equipments involved in roasting, different types of fryers. Extraction and Leaching, extraction equipment, supercritical fluid extraction, Leaching equipment. Crystallization and Distillation: Basic principles involved.

Unit IV:

Freezing of Foods: Types of freezers including ice cream freezers, Freeze concentration and freeze drying. Freezing curves, phase diagrams, methods of freeze concentration, design problems.

Unit V:

Food processing equipment and it's applications in food industry. Permeability-theoretical considerations, permeability of gasses and vapors, permeability of multilayer materials, permeability in relation to packaging requirement of food.

Practicals:

Semester - II

1. Determination of gas transmission rate.
2. Shelf life calculations for food products.
3. Material balances over screen and screen effectiveness.
4. Study of freezers.
5. Study of CIP treatment in dairy plant.
6. Study of CIP treatment in Fruits & Vegetables processing plant.

Books for Reference:

1. C.P. Arora, *Refrigeration and Air Conditioning*, Tata McGraw Hill Company, New Delhi, 2000.
2. P. Fellows, *Food Processing Technology, Principles and Practice*, CRC Press. 2000.
3. Nuri N. Mohsenin, *Physical Properties of Plant and Animal Materials*, Ed.2009
4. Earle R.L, *Unit Operations in Food Processing*. Pergamon Press, 1983.

5. K.M. Sahay and K.K Singh, *Unit Operations of Agricultural Processing*, Vikash Publication House, New Delhi.

FOOD PACKAGING - 2

Theory:

Unit-I:

Packaging applications in Food Industry – Product-package compatibility - Food hazards in packaging - Shelf-life testing - Risk management.

Unit-II:

Controlled Atmospheric Packaging Technology (CAP) - Modified Atmospheric Packaging, Technology (MAP) - Advantages of CAP and MAP - Effect of gases on MAP foods using N₂, O₂ and CO₂

Unit-III:

Paper as packaging material – Paper manufacture - Pulp - Mechanical pulp - Chemical pulping – Alkaline processes – Soda process - Sulfate process - Sulfite process - Semi chemical pulping – Digestion - Bleaching - Beating and Refining - Paper making - Converting - Calendaring – Strength - additives - Sizing agents.

Unit-IV:

Glass as Package material - Composition of Glass - Basic parts of Glass container – Closures - Parts of Closures - Types of Closures - Properties of glass - Internal pressure resistance - Vertical load strength.

Unit-V:

Aseptic Packaging - Need for Aseptic Packaging - Materials used in Aseptic Packaging Process - Comparison of Conventional and Aseptic Packaging - Aseptic Packaging System – Advantages, applications in food industry.

Practicals:

Semester - II

1. Determination of coating on Package material.
2. Identification of plastic films.
3. Finding chemical resistance of films.
4. Visit to Marine Industry.
5. Visit to Fruit Industry

Books for Reference:

1. Gordon I Robertson, *Food Packaging Principles and Practice*, CRC Press, London.
2. Ranganna S, *Handbook of Analysis and Quality Control, Fruits and Vegetables Products*, Tata Mc Graw Hill, New Delhi, 1986.

FOOD QUALITY AND CERTIFICATION - 2

Theory:

Unit-I:

Comparison of laboratory panels with consumer panels. Limitations of consumer survey. Fundamentals of food regulations – Additives, Contaminants, Food regulations pertaining to aspects of hygiene, Novel foods and aspects of labeling,

Unit-II:

Different existing food legislations - norms in implementation. Food grade and standards - International food regulations and certifications - Indian food regulations and certifications. Major differences between Indian and International standards.

Unit-III:

Food laws and standards (BIS) - IPR patents - HACCP- Principles of HACCP and its role in Food Industry - The Concept and process of implementation of HACCP in food industry

Unit-IV:

Concept of Codex Alimentarius - USFDA - the cause of its existence - its role in safeguarding food quality - ISO 9000 series - significance.

Unit-V:

Food adulteration and safety - Fundamentals of Food regulations pertaining to Additives and Contaminants - Different existing Food legislations-norms in implementation.

Practicals:

Semester - II

1. Testing of different foods for adulterants.
- 2-4. Determination of threshold value for basic tastes and odours.
- 5-7. Judging and grading of canned food products.
8. Visit to a certification agency.
9. Visit to fruits and vegetables market for quality assessment.

Books for Reference:

1. Imteaz Ali, *Food Quality Assurance, Principles and Practices*, CHIPS, Texas.
2. J.L.Multon, *Quality Control for Food and Agricultural Products*, CHIPS, Texas.
3. Amerine, M.A.Pangborn, R.M and Rosseler, *Principles of Sensory Evaluation of Food*, Academic Press, New York, 1965.
4. Birk, G.G.Berman, J.G and Parker, K.J, *Sensory Properties of Foods*, Applied Science, London, 1977.
5. Pattee, H.E, *Evaluation of Quality of Fruits and Vegetables*, AVI, Westport. 1985.
6. Ranganna S, *Handbook of Analysis and Quality Control-Fruits and Vegetables Products*, Tata Mc Graw Hill, New Delhi, 1986.
7. BIS Standards on Sensory Evaluation.

FOOD ADDITIVES - 2

Theory:

Unit-I:

Food Colors – sources, types with reference to natural & synthetic. Properties, reactions with reference to processing, food applications. Non-permitted colors – risks, health hazards.

Unit-II:

Emulsifiers (natural & synthetic), stabilizers – examples, functions & mechanism, HLB scale. Sweeteners – Natural, artificial – risks & benefits of Sweeteners.

Unit-III:

Starch modifiers – Chemical nature, their role in food processing. Buffers – acids and alkalies, types and examples, importance in food processing. Applications of antioxidants in food industry.

Unit-IV:

Clarifying agents – definition and their role in food processing, anti caking agents and their role in food processing, Humectants - definition and their role in food processing, stabilizers and thickeners - examples and their role in food processing.

Unit-V:

Surface active agents, examples and their mode of action in foods, Bleaching and maturing agents - examples and their role in food processing, Methods of estimating dietary intake of food additives. Food additives and hygiene sensitivity.

Practicals:

Semester - II

1. Estimation of NaCl in processed foods.
2. Estimation of sulfated ash.
3. Estimation of SO₂.
4. Estimation of Benzoate.
5. Estimation of Gums from Fruits and Vegetables.
6. Determination of Lycopene content in foods.

Books for Reference:

1. AL Branen, Davidson and S. Salminen, *Food Additives*. Marcel Dekker Inc NY 1990.
2. Swaminathan, *Food Science, Chemistry & Experimental Foods*. Bappco Publishers, Bangalore.
3. Mahindra S.N., *Food additives – Characteristics detection and estimation*. Tata Mc Graw Hill Publication Company, New Delhi.
4. Srivastav, R.P. and Sanjeev Kumar, *Fruit and Vegetable Preservation, Principles and Practice*. International Book Distribution Company, New Delhi.

FOOD TRADE AND BUSINESS MANAGEMENT - 2

Theory:

Unit-I:

Marketing strategy, Packaging, Advertising, label intervention, pricing after sales services. Legislations, Licensing, Registration, Municipal laws, business ethics and income law, labour law application. Consumer complaint redressal.

Unit-II:

Management of export – import organization, Registration, Documentation, Case studies, Export – Import policies related to Horticultural sector. Functions of management, planning, kinds of enterprise plans, forecasting, steps in forecasting.

Unit-III:

Staffing and directing, principles of direction, communication, motivation. Controlling, requirements of good control system, co-ordination - features and techniques of Co-ordination.

Unit-IV:

Different process of marketing - market segmentation, methods of market segmentation, market positioning, market penetration, target marketing. Product life cycle, personnel marketing, scope and importance of personnel marketing.

Unit-V:

Scale of operations of food industry in India. Training methods and techniques, learning process, fixed capital- factors determining fixed capital requirements, sources of fixed capital, working capital. Distinction between home trade and International trade.

Books for Reference:

1. D. David and S. Ericson, *Principles of Agri. Business Management*. Tata Mc Graw Hill Book Co., New Delhi.
2. P.K. Srivastava, *Marketing Management*. Himalaya Publishing House, New Delhi.
3. G.S. Batra and Narinder Kumar, *GATT implications of Denkel proposal*. Azmol Publications, New Delhi.