GUJARAT TECHNOLOGICAL UNIVERSITY

Branch Name: Food Processing & Technology (14)
Subject Name: Food Standards and Quality Assurance

Subject Code: 2171401
BE Semester: 07

1) Type of Course: Food Processing Technology
2) Prerequisite: None
3) Rationale
The increasing need for safe, wholesome and nutritious food by consumers has increased the scientific interest in the comprehensive description of food quality and development of standards and laws that will be used to monitor these. The study of the course is therefore required for the Food engineering and technology students to provide them with a robust and practical knowledge of food quality and the control measures for production of high quality and safe foods. The course inspires students to critically evaluate and update the food quality criteria required by modern food consumers and provide a quality assurance framework appropriate for the needs of public sector food sourcing, production, provision and consumption.

4) Teaching Scheme & Examination Scheme

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

ESE = End Semester Examination
PA = Progressive Assessment
ALA = Active Learning Assisgnments
OEP = Open Ended Problems
CS = Case Studies

5) Learning Objectives
The general objective of the course is to acquaint the student with the basic concepts and tools required in providing quality and safe foods. This course provides an introduction to the concepts and principles of food quality standards and assurance, food legislation, food standards, sensory and objective evaluation of foods and conduct of objective and sensory evaluation tests on foods. The course aims to cover: Concept of quality and standards; sensory analysis: sensory perception, use of sensory and objective evaluation in quality control and product development, statistical quality control techniques, experimental design and analysis, questionnaire design, taste panels, shelf-life assessment; food laws: Indian and International food standards codes, food hygiene regulations, micro-biological standards and codes of practice, the development and underlying principles of food standards, Codex standards, export standards; quality assurance principles and systems, parameters of food quality and its evaluation and control, role of quality assurance, concepts of total quality control (TQC) and total quality management (TQM)

6) Open Ended Problems

1. Describe the quality factors in foods and their influence on food acceptability in terms of Flavour colour and texture.
2. Describe methods of sensory evaluation and develop appropriate questionnaire for the test.
a) Quantitative Tests viz. Grading and Ranking
(b) Profiling- Flavour profile method (FPM), Texture profile method (TPM), Quantitative Description

analysis (QDA), Free choice profiling (FCP)

(c) Preference tests: -paired comparison and Hedonic scale

3. (1) What is food adulteration?

(2) Differentiate between food adulteration and misbranding

(3) When is food considered adulterated?

(4) What makes a food term misbranded?

(5) Can food adulteration and misbranding be prevented? If yes, how?

4. Describe the application of HACCP concept for the production of any named food.
5. Develop a relationship between Food specifications, standards and quality control?
6. Describe the importance of Food Regulatory Process.
7. What is the relationship between microbiological and sensory qualities of food?

7) Course Content

TOPIC	SUB TOPIC	LECTURES	Module Weightage (%)
Introduction	Definition of Quality, Quality in Food Products.	**02**	**8**
Quality Control Laboratory Requirements	Layout and requirements of quality control laboratory.	**02**	**9**
Statutory & Voluntary Food Standards	FPO, PFA, AGMARK, APHA, FDA, BIS, Introduction to FSS Act of India 2006.	**04**	**12**
Quality Concepts	Quality Control, Quality Assurance, Quality Policy, Quality Analysis	**04**	**11**
Total Quality Management (TQM)	Principles of TQM, TQM Transition Model, Integrated TQM Model, Customer Satisfaction, Continuous Improvement Programme, Six Sigma Technique, Kaizen, 5's Concept, Strategic Grid, Customer Window.	**08**	**15**
Quality Management Systems and Auditing	ISO 9000, 22000, 14000, HACCP, SQF**.**	**04**	**10**
Food Plant Hygiene and Sanitation	Good Manufacturing Practices (GMP), Personal Hygiene and Sanitation required in Food Industry, Control measures to prevent rodent and insect infestation.	**04**	**10**
Sampling and Estimation for Quality Evaluation	Sensory evaluation and its need. Criteria for selection of taste panel members, Determination of threshold level. Outline of taste panel methods: Difference tests and Rating tests. Unbiasedness, Consistency, Efficiency, Sufficiency and Completeness of a Statstic. UMVUE, Method of moments and Method of maximum likelihood, Interval estimation procedure.	**14**	**15**
Statistical Quality Control	Probability Theory, Conditional probability and independence, Frequency distribution, Measures of dispersion, Standard Deviation, Normal, Binomial, Poisson & X^2-Distributions, Testing of Hypothesis, Neyman-Pearson Lemma, Degrees of freedom, Null Hypothesis, t-test, Chi-Square test, Linear model Analysis of Variance (ANOVA), Simple Regression, Correlation coefficients.	**14**	**10**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
Remembrance R Level	**Understanding U Level**	**Application A Level**	**Analyze N Level**	**Evaluate E Level**
20	**20**	**18**	**20**	**22**

8) Recommended Reference Books

1. Quality Control for Food Industry. Vol I and II by A. Krammer. AVI Publications.
2. Food Quality Assurance by W.A. Gould. AVI Publications.
3. Handbook of Analysis and Quality Control of fruits & Vegetables Products by Dr. S. Ramgama. Tata Mc Grow Hill Publications.
4. Fundamentals of Statistics by S.C. Gupta. Himalaya Publishing House.
5. Probability and Statistics for Engineers. Miller and Freund's. Prentice Hall of India.
6. Guidelines for sensory analysis in food product development and quality control (2nd ed.). Carpenter, R. P., Lyon, D. H., & Hasdell, T. A. (2000). NY: Springer Publishers.
7. Statistical quality control for the food industry. Hubbard, M. R. (1996). NY: Chapman and Hall

9) Course Outcomes

At the end of the course, the student should be able to:

1. Define and differentiate between quality assurance and quality control of foods.
2. Explain the importance of food quality control systems in satisfying the requirements of both the consumer and legislation.
3. Determine food quality using methods such as instrumentation, microbiological, physical, chemical and Sensory evaluation.
4. Describe and detect food adulteration, detection and prevention.
5. Develop an effective quality plan for a given food production system.
6. Apply a particular sensory test at advanced level for evaluation of quality of food.
7. Recall appropriate food standards code as applicable to a particular food group at the national and international level.
8. Understand and apply latest Food Plant Hygiene and Sanitation practices.

10) List of Practicals

1. Tests for wheat flour to detect chalk powder or $NaHCO_3$, lime powder ($CaCO_3$), sand, grits and mineral additions (bicarbonates, phosphates, tartarates and calcium etc.
2. Test for sterilized milk.
3. Determination of peroxide value of given samples of oils/fats.
4. Sensory Evaluation of 04-samples of food products using Ranking Analysis Method & 09- Point Hedonic Scale Score Analysis.
5. Determination of total residual chlorine in water sample.
6. Evaluation of Butter for AGMARK standards through chemical analysis.
7. To establish difference between two different samples using a Triangle Test of Sensory Evolution.
8. Sensory Evaluation of Food samples by different techniques.
9. To perform test to establish adulteration in Ghee.
10. Tests for common adulterants in food products.
11. To evaluate food labels of market samples as per PFA / FSSAI standards.
12. To determine BAR (Brix acid ratio) in a given beverage sample.
13. To detect presence of sodium benzoate in processed foods.

11) Major Equipments

1. Titration assembly and glassware.
2. Sensory evaluation chambers.
3. Food Quality analysis lab
4. Microbiological testing lab.
5. Texture analyzer
6. Compression testing machine
7. Instruments such as Spectrophotometers, Colorimeters, Chromatography kit, Densimetry instrument Refractometer, Polarimeter.
8. Automatic titrate assembly.
9. Moisture meters.

12) List of Open Source Software/learning websites

a. www.fao.org/activitieshttp://www.foodscience.org/publications.
b. www.**fssai**.gov.in/
c. www.**foodquality**news.com/
d. **foodquality**.wfp.org/
e. www.**foodquality**.com/
f. http://foodqualityandsafety.wfp.org/
g. foodsafetynews.com

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.