CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

**FACULTY OF ENGINEERING & TECHNOLOGY**

**Effective from Academic Batch: 2022-23**

**Programme:** **Master of Technology (Food Technology)**

**Semester:** **2**

**Course Code:** **202380211**

**Course Title:** **Food Ingredients and Flavor Technology**

**Course Group:** **Program Elective IV**

**Course Objectives:**

1. To demonstrate skills in application of suitable food ingredients/additives in food products preservation and wider product varieties development.
2. To understand regulatory affairs of food ingredients / additives

**Teaching & Examination Scheme:**

| Contact hours per week | | | Course Credits | Examination Marks (Maximum / Passing) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | J/V/P* | | Total |
| Lecture | Tutorial | Practical | | Internal | External | Internal | External | |
| 3 | 0 | 2 | 4 | 50/20 | 50/20 | 25/10 | 25/10 | 150/60 |

* **J**: Jury; **V**: Viva; **P**: Practical

**Detailed Syllabus**

| Sr. | Contents | Hour |
|---|---|---|
| 1 | Introduction to Food Ingredients and Additives: Types, classes and applications with examples (Class I, Class II), Mode of action, Industrial uses and applications of Acidulants (Citric acid, acetic acid, malic acid, phosphoric acid) Antioxidants (BHA, BHT, Natural antioxidants in foods), Food Preservatives (Sodium Benzoate, Sorbates, Potassium metabisulphite, Nitrite and Nitrates), Food Emulsifiers and stabilizers | 8 |
| 2 | Marketing and Regulatory affairs related with food additives Statutory requirements for addition and labeling (FDA and FSSAI) of additives, Material Safety and health issues | 3 |
| 3 | Food Flavor Basics: Olfactory perception of flavor and taste – Theories of olfaction - Molecular structure and activity relationships of taste – Sweet, bitter, acid and salt, Chemicals causing pungency, astringency, cooling effect – properties. | 3 |

| | | |
|---|---|---|
| **4** | Food Flavors: Classification of food flavor, flavor profile, factors affecting flavors, bio-flavor and reconstituted flavor, flavor release from foods, interaction of flavor compounds with foods, Classification of flavors – Natural, Nature identical and synthetic Flavor potentiators. | **4** |
| **5** | Spice Essential oils and oleoresins: Extraction: Super critical fluid extraction - Continuous and semi-continuous methods- Effect of types of solvents used. Liquid and dry flavor production - Staling of flavours | **4** |
| **6** | Flavor Precursors: Flavor Compounds from Carbohydrates and Proteins, Lipid oxidation, Alliaceous flavours – Bittering agents, Coffee and Cocoa, Fruit flavors | **4** |
| **7** | Process Flavors: Effect of processing on flavor compounds, Non enzymatic browning, heat reaction flavors | **4** |
| **8** | Flavor encapsulation and stabilization: Principles and techniques of flavor encapsulation, types of encapsulation, factors affecting stabilization of encapsulated flavor and their applications in food industry, Packaging and flavor | **5** |

**List of Practicals / Tutorials:**

| | |
|---|---|
| **1** | Determination of salt content in butter sample |
| **2** | Qualitative analysis of natural food colors |
| **3** | Qualitative and Quantitative analysis of benzoic acid in food product |
| **4** | Determination of menthol in medicated candy by gas chromatography |
| **5** | Quantitative analysis of color in different food products |
| **6** | Determination of moisture content by using Karl fisher titration method |
| **7** | Estimation of potassium meta-bisulphite in food product |
| **8** | Studies on stabilizers and emulsifiers used in food products |
| **9** | Determination of caffeine content in coffee sample |
| **10** | Flavor encapsulation by freeze drying |

**Reference Books:**



| | |
|---|---|
| **1** | Source Book of Flavors by Reineccius Gary Publisher Springer |
| **2** | Food Flavor by Morton I.D. and Macleod A.J. Publisher Elsevier |
| **3** | Flavour chemistry and technology by Reineccius Gary Publisher CRC Press |
| **4** | Bioprocess Production of Flavor, Fragrance, and Color Ingredients by Alan Gabelman |

**Supplementary learning Material:**

| | |
|---|---|
| **1** | www.fssai.gov.in |
| **2** | Codex Alimentarius commission on website www.who.int |
| **3** | Food Additives toxicity studies on European union on web site *efsa.www.europa.eu* |

**Pedagogy:**

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits
- Course Projects

**Internal Evaluation:**

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

**Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):**

| Distribution of Theory Marks | | | | | | **R**: Remembering; **U**: Understanding; **A**: Application, **N**: Analyze; **E**: Evaluate; **C**: Create |
|---|---|---|---|---|---|---|
| **R** | **U** | **A** | **N** | **E** | **C** | |
| 15 | 30 | 20 | 15 | 15 | 5 | |

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Course Outcomes (CO):**

| Sr. | Course Outcome Statements | %weightage |
|---|---|---|
| **CO-1** | Understanding classification of ingredients/additives, functions and mode of action, selection criteria of food additives | **35** |
| **CO-2** | Understanding mechanisms of flavour perception in human being, classification of | **35** |
| **CO-3** | Understanding the flavour development through processing in food products | **20** |
| **CO-4** | Understanding legal and regulatory requirements of food additives, ingredients and flavouring substances in food product | **10** |

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| **Curriculum Revision:** | |
|---|---|
| Version: | 2.0 |
| Drafted on (Month-Year): | June-2022 |
| Last Reviewed on (Month-Year): | - |
| Next Review on (Month-Year): | June-2025 |