



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Food Processing Technology)

Semester: IV

Course Code: 202070404

Course Title: Materials and Manufacture of Food Equipment

Course Group: Professional Core Course

Course Objectives: Students of food processing technology will get customized with the manufacturer of food processing equipment and machinery, materials used include carbon steel, aluminium bronze, abrasion-resistant steel, aluminium, stainless steel, cast steel, bronze and various others. Various capabilities include fabrication, assembly, welding, machining, etc. This course gives the idea of different standards like ASME, ANSI and AWS.

Teaching & Examination Scheme:

| Contact hours per week | | | Course Credits | Examination Marks (Maximum / Passing) | | | | |
|------------------------|----------|-----------|----------------|---------------------------------------|----------|----------|----------|--------|
| Lecture | Tutorial | Practical | | Theory | | J/V/P* | | Total |
| | | | | Internal | External | Internal | External | |
| 3 | 0 | 2 | 4 | 50/18 | 50/17 | 25/9 | 25/9 | 150/53 |

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

Detailed Syllabus:

| Sr. | Contents | Hours |
|-----|--|-------|
| 1 | Material Properties: Thermo-physical & mechanical properties of materials like ferrous metals, alloys & polymers. Structural Properties: Properties of materials under load & their suitability for specific applications. | 06 |
| 2 | Polymers: Definition, Mechanism of polymerization. Applications in food industry Plastics, Elastomers & Rubbers: Introduction and applications of composite Materials | 05 |
| 3 | Orthographic Views: Conversion of pictorial views into orthographic views. Sectional views of objects: Principles, Standards & Conventions. | 07 |



| | | |
|---|--|----|
| 4 | Joints & Couplings: Screw threads, Screw fastenings, Pin & Cotter joints, Shaft couplings Production Drawings: Basic concepts and terminologies, Introduction to Assembly Drawings | 08 |
| 5 | Phase Diagrams: Phases and Microstructure, Unary phase diagram, Binary phase diagram, The Gibbs phase rule Basic Sheet Metal Operations: Heat treatment processes, Annealing, Hardening | 08 |
| 6 | Welding: Gas welding, Electric arc welding, Resistance welding, Electro-beam welding, Forge welding, Friction welding, Diffusion welding & Explosion welding. | 06 |
| 7 | Food equipment standard and safety: Introduction, standards of different equipment, and safety | 05 |
| | Total | 45 |

List of Practicals / Tutorials:

| | |
|----|---|
| 1 | Conversion of pictorial views into orthographic views |
| 2 | Conversion of pictorial views into orthographic Sectional views |
| 3 | To draw Screw Threads & Screw Fastenings |
| 4 | To draw Welding symbols & Welded joints |
| 5 | To draw Assembly & Details of valves |
| 6 | To draw Element of Production Drawing |
| 7 | To draw the assembly & production drawing of the specified food processing equipments |
| 8 | To study oxy-acetylene welding and Gas cutting processes |
| 9 | To Study the various Electric Arc welding processes (i) MMAW (ii) TIG & (iii) SAW. |
| 10 | To study Resistance welding process |

Reference Books:

| | |
|---|---|
| 1 | Elements of Material Science, Lawrence H Van Vlack; AddisonWesley. |
| 2 | Mechanics of Structures Vol.-I, Junnarkar & Shah; Charotar PublishingHouse. |
| 3 | Machine Drawing, N.D.Bhatt & V.M.Panchal; Charotar PublishingHouse. |
| 4 | Welding Processes & Technology, Parmar R.S; KhannaPublisher. |
| 5 | Manufacturing Technology: Foundry, Forming & Welding Ltd |
| 6 | Material Science, Narula & Gupta; Tata McGraw Hill PublishingCompany. |
| 7 | Process Equipment Design, M.V. Joshi and V.V. Mahajani, McMillan India |

Supplementary learning Material:

| | |
|---|--|
| 1 | Engineering Drawing-I by Mahesh Chandra Luintel, Heritage Publisher and Distributor PVT. LTD. |
| 2 | S Chand's Engineering Drawing by R.K. Dhawan |
| 3 | Essentials of material science and Engineering, fourth edition by Donald R. Askeland and Wendun J wright |
| 4 | Welding and welding technology, Mc Graw Hill Education, by Richard L Little |
| 5 | An introduction to Thermodynamics, Universities Press by Y V C RAO |



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

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 in % | | | | | | R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating |
|-----------------------------------|-----|-----|-----|-----|----|--|
| R | U | A | N | E | C | |
| 23% | 17% | 22% | 21% | 16% | 0% | |

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 | Understand the selection of materials for different food processing equipments. | 35 |
| CO-2 | Able to apply different machine fabrication operations and its principles during operation and maintenance of food processing equipments. | 35 |
| CO-3 | Able to understand welding process with respect to material of fabrication | 30 |

Curriculum Revision:

| | |
|--------------------------------|-----------|
| Version: | 2 |
| Drafted on (Month-Year): | June-2022 |
| Last Reviewed on (Month-Year): | |
| Next Review on (Month-Year): | June-2025 |