

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

Total Credits= 21

| Semester 3 rd | | Contact Hours | | | Max Marks | | Total Marks | Credits |
|---|--|---------------|----------|-----------|------------|------------|-------------|-----------|
| Subject Code | Subject Name | | | | | | | |
| | | L | T | P | Int. | Ext. | | |
| BFOTS1-301 | Dairy Technology | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-302 | Technology of Fruits & Vegetables | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-303 | Food Microbiology and Food Safety | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-304 | Dairy Technology Lab IV | - | - | 4 | 60 | 40 | 100 | 2 |
| BFOTS1-305 | Technology of Fruits & Vegetables Lab V | - | - | 4 | 60 | 40 | 100 | 2 |
| BFOTS1-306 | Food Microbiology and Food Safety Lab VI | - | - | 4 | 60 | 40 | 100 | 2 |
| Departmental Elective (Select any one)-I | | | | | | | | |
| BFOTD1-311 | Entrepreneurship Development | 3 | - | - | 40 | 60 | 100 | 3 |
| BFOTD1-312 | Food Fermentation technology | | | | | | | |
| BFOTD1-313 | Food Additives | | | | | | | |
| BMNCC0-004 | Drug Abuse | 2 | - | - | 100 | - | 100 | 0 |
| Total | | 14 | 3 | 12 | 440 | 360 | 800 | 21 |

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

Total Credits= 24

| Semester 4 th | | Contact Hours | | | Max Marks | | Total Marks | Credits |
|---------------------------------|--|---------------|----------|-----------|------------|------------|-------------|-----------|
| Subject Code | Subject Name | | | | | | | |
| | | L | T | P | Int. | Ext. | | |
| BFOTS1-401 | Technology of Cereals, Pulses and Oilseeds | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-402 | Egg, Poultry & Meat Technology | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-403 | Food Plant Hygiene and Sanitation | 3 | 1 | - | 40 | 60 | 100 | 4 |
| BFOTS1-404 | Technology of Cereals, Pulses and Oilseeds Lab VII | - | - | 4 | 60 | 40 | 100 | 2 |
| BFOTS1-405 | Egg, Poultry & Meat Technology Lab VIII | - | - | 4 | 60 | 40 | 100 | 2 |
| BFOTS1-406 | Food Plant Hygiene and Sanitation Lab IX | - | - | 4 | 60 | 40 | 100 | 2 |
| Departmental Elective-II | | | | | | | | |
| BFOTD1-411 | Nutraceutical and Functional Foods | 4 | - | - | 40 | 60 | 100 | 4 |
| BFOTD1-412 | Nutraceutical and Functional Foods Lab X | - | - | 4 | 60 | 40 | 100 | 2 |
| OR | | | | | | | | |
| BFOTD1-413 | Bakery Technology | 4 | - | - | 40 | 60 | 100 | 4 |
| BFOTD1-414 | Bakery Technology Lab XI | - | - | 4 | 60 | 40 | 100 | 2 |
| Total | | 13 | 3 | 16 | 400 | 400 | 800 | 24 |

Note:

- All the students are required to undergo 'In Plant Training' for 4 weeks in a Food Processing unit after IVth semester's final examinations. Final degree to the students will be awarded subject to their successfully completing the 'In Plant Training' as per university norms.

Overall Marks / Credits

| Semester | Marks | Credits |
|-----------------|-------------|-----------|
| 3 rd | 800 | 21 |
| 4 th | 800 | 24 |
| Total | 1600 | 45 |

DAIRY TECHNOLOGY

Subject Code: BFOTS1-301

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

1. To understand physico-chemical properties, microbiology, and nutritive value of milk.
2. To impart knowledge regarding various steps involved in the production of market milk as per specified legal standards.
3. To summarize process of manufacturing of cream, ghee, butter, milk powders, ice cream, and cheese and identify associated defects.
4. To develop fermented milk and other indigenous milk products.
5. To create awareness regarding selection of equipment's for the processing and quality assessment of milk and milk products.

Course Outcomes:

1. Understanding the physico-chemical properties, microbiology, and nutritive value of milk.
2. Imparting knowledge regarding various steps involved in the production of market milk as per specified legal standards.
3. Summarizing the process of manufacturing of cream, ghee, butter, milk powders, ice cream, and cheese and identifying the associated defects.
4. Development of fermented milk and other indigenous milk products.
5. Creating awareness regarding selection of equipment's for the processing and quality assessment of milk and milk products.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | | | | | 3 | | | | | | |
| CO3 | | 2 | | | | | | | | | | |
| CO4 | | | 3 | | | | | | | | | |
| CO5 | | | | | | | | | | 3 | | |

UNIT-I (15 Hours)

Definition of milk, Market milk, Composition, Physicochemical properties and nutritive value of milk, microbiology of milk, Factors affecting composition of milk.

UNIT-II (15 Hours)

Liquid milk processing: Collection of milk, Reception, Platform testing.

| |
|--|
| Various stages of processing: Filtration, Clarification, Homogenization and Pasteurization. Description and working of clarifier, cream separator, homogenizer and plate heat exchanger. |
| UNIT-III 15 Hours) |
| Cream: Types, manufacturing and defects. Butter: Types, preparation, theories of churning, defects. Preparation and defects of Ghee, flavored milk, condensed milk and milk powder. |
| UNIT-IV (15 Hours) |
| Manufacturing and defects of Ice-cream and cheese. Fermented milk and milk products: Yoghurt, dahi and shrikhand. Indigenous milk products. |
| Recommended Text Books / Reference Books: |
| <ol style="list-style-type: none"> 1. De Sukumar, Outlines of Dairy Technology, Oxford University Press, Oxford, UK, 2007. 2. Webb and Johnson, Fundamentals of Dairy Chemistry, 3rd ed., CBS Publishers, New Delhi, 1988. 3. Eckles, Combs, Henery C, and Willes C, Milk & Milk Products, Tata McGraw Hill Publishers, USA, 1997. |

| TECHNOLOGY OF FRUITS AND VEGETABLES | | | | |
|--|----------|----------|----------|----------|
| Subject Code: BFOTS1-302 | L | T | P | C |
| | 3 | 1 | 0 | 4 |
| Duration: 60 (Hrs.) | | | | |
| Course Objectives: | | | | |
| <ol style="list-style-type: none"> 1. To understand nutritional profile, methods of preservations and indices of fruits and vegetables maturity. 2. To impart knowledge regarding process of canning of fruits and vegetables. 3. To summarize various quality characteristics of fruits and vegetables involved in their processing. 4. To develop value added products from fruits and vegetables using appropriate processing techniques and equipments. 5. To create awareness regarding utilization of fruits and vegetable industry wastes. | | | | |
| Course Outcomes: | | | | |
| <ol style="list-style-type: none"> 1. Understanding nutritional profile, methods of preservations and indices of fruits and vegetables maturity. 2. Imparting knowledge regarding process of canning of fruits and vegetables. 3. Summarizing various quality characteristics of fruits and vegetables involved in their processing. | | | | |

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

4. Developing value added products from fruits and vegetables using appropriate processing techniques and equipments.
5. Creating awareness regarding utilization of fruits and vegetable industry wastes.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | | | | | | | | | | | 2 |
| CO3 | | | | | | 3 | | | | | | |
| CO4 | | | 3 | | | | | | | | | |
| CO5 | | | | | | | 3 | | | | | |

UNIT-I (10 Hours)

Classification and nutritive value of fruits and vegetables, methods of preservation (short & long term), Physical and chemical indices of fruit maturity.

UNIT-II (10 Hours)

Quality characteristics of fruits and vegetables for processing.

Canning of fruits and vegetables: Selection of fruits and vegetables, process of canning, factors affecting the process- time and temperature, syrups and brines for canning.

UNIT-III (20 Hours)

Squashes, cordials, nectars, RTS, Syrups and blending of juices.

Jam: Constituents, selection of fruits, processing & technology, defects.

Jelly: Essential Constituents, Role of pectin, Theory of jelly formation, Processing & technology, defects.

UNIT-IV (20 Hours)

Pickles and sauces: Processing, Types, Causes of spoilage in pickling.

Processing of Tomato puree, paste, ketchup and sauce.

Dehydration of fruits and vegetables: Sun drying & mechanical dehydration.

Refrigeration of fruits and vegetable (Air blast freezing, immersion freezing, plate freezing, cryogenic freezing and IQF).

Utilization of fruits and vegetable industry wastes.

Recommended Text Books / Reference Books:

1. Khurdia DS, Preservation of fruits and vegetables. Indian Council of Agriculture Research, New Delhi 1995.
2. Potter N, Hotchkiss JH, Food Science. CBS Publishers, Delhi 2006.
3. Siddhapa GS, Lal G and Tandon, Preservation of fruits and vegetables, Indian Council of Agriculture Research, New Delhi, 1986.
4. Srivastava RS, Kumar S. Fruit and Vegetable Preservation; Principles and Practices, International Book Distributing Company, Lucknow, 2005.
5. Srivastava SS, Phal Parirakshan, Kitab Mahal, Lucknow, 2006.
6. Subbalakshmi G, Udipi SA, Food Processing and Preservation, New Age International Publishers, Delhi, 2007.

FOOD MICROBIOLOGY AND FOOD SAFETY

Subject Code: BFOTS1-303

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

1. To understand the morphology of micro-organisms and their importance in foods.
2. To identify enumeration techniques involved in qualitative and quantitative determination of micro-organisms in food products.
3. To impart knowledge regarding different methods of preservation to prevent microbial spoilage of food products.
4. To differentiate between food infection and food intoxication and understand the microbiology of different raw and processed foods.
5. Creating awareness regarding types of hazards, food safety and management tools.

Course Outcomes:

1. Understanding the morphology of micro-organisms and their importance in foods.
2. Identification of enumeration techniques involved in qualitative and quantitative determination of micro-organisms in food products.
3. Imparting knowledge regarding different methods of preservation to prevent microbial spoilage of food products.
4. Differentiating between food infection and food intoxication and understand the microbiology of different raw and processed foods.
5. Creating awareness regarding types of hazards, food safety and management tools.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | | | | 3 | | | | | | | |
| CO3 | | | | | | 3 | | | | | | |
| CO4 | | | | 2 | | | | | | | | |
| CO5 | | | | | | | 3 | | | | | |

UNIT-I (15 Hours)

Types of Microorganisms in Food

Classification, Morphology and Structure of microorganisms, Importance in food (bacteria, fungi and viruses), Significance of spores.

UNIT-II (15 Hours)

Enumeration techniques & control of microorganisms in foods

Qualitative and quantitative methods-conventional as well as rapid, Principles and methods of preservation (thermal and non-thermal), Introduction to Hurdle Technology.

UNIT-III (15 Hours)

Microbiology of raw, processed and spoiled foods: Fruits and vegetables, Meat and meat products, milk and milk products, eggs, canned foods, cereals and cereal products.

| | | | | | | | | | | | | |
|---|-----|-----|-----|---------|-----|-----|-----|---------------------|-----|------|------|------|
| Food infection and Food intoxication. | | | | | | | | | | | | |
| UNIT-IV (15 Hours) | | | | | | | | | | | | |
| Introduction to Food Safety Definition, Types of hazards, biological, chemical, physical hazards, Factors affecting food safety. Sources of contamination, Control methods using physical and chemical agents, waste disposal, pest and rodent control, personnel hygiene. | | | | | | | | | | | | |
| Food Safety Management Tools HACCP, ISO series, TQM and Risk Analysis. | | | | | | | | | | | | |
| Recommended Text Books / Reference Books: 1. Frazier William C and Westhoff, Dennis C, Food Microbiology, TMH, New Delhi, 2004. 2. Jay, James M., Modern Food Microbiology, CBS Publication, New Delhi, 2000. 3. Garbutt, John., Essentials of Food Microbiology, Arnold, London,1997. 4. Pelczar MJ, Chan E.C.S and Krieg, Noel R , Microbiology, TMH, New Delhi, 1993. 5. Lawley, R., Curtis L. and Davis,J. , The Food Safety Hazard Guidebook , RSC Publication, 2004. 6. De Vries, Food Safety and Toxicity, CRC, New York, 1997. 7. Marriott, Norman G., Principles of Food Sanitation, AVI, New York, 1985. 8. Forsythe, S J., Microbiology of Safe Food, Blackwell Science, Oxford, USA, 1987. | | | | | | | | | | | | |
| DAIRY TECHNOLOGY LAB-IV | | | | | | | | | | | | |
| Subject Code: BFOTS1-304 | | | | L T P C | | | | Duration: 30 (Hrs.) | | | | |
| | | | | 0 0 4 2 | | | | | | | | |
| Course Objectives: 1. To understand procedures and significance of platform tests in milk. 2. To determine different components of milk affecting its quality. 3. To impart knowledge regarding various equipments used in milk industry. 4. To develop various milk based products in compliance with legal specifications. 5. To create awareness regarding adulteration of milk and detection methods. | | | | | | | | | | | | |
| Course Outcomes: 1. Understanding procedures and significance of platform tests in milk. 2. Determination of different components of milk affecting its quality. 3. Imparting knowledge regarding various equipments used in milk industry. 4. Development of various milk based products in compliance with legal specifications. 5. Creating awareness regarding adulteration of milk and detection methods. | | | | | | | | | | | | |
| MAPPING | | | | | | | | | | | | |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | | | | 3 | | | | | | | | |

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

| | | | | | | | | | | | | | |
|--|-----|--|---|--|--|---|---|---|--|--|--|--|--|
| | CO2 | | | | | | | 2 | | | | | |
| | CO3 | | | | | 3 | | | | | | | |
| | CO4 | | | | | | 3 | | | | | | |
| | CO5 | | 3 | | | | | | | | | | |

Practicals:

1. To perform platform tests in milk (Alcohol-Alizarin test, COB, MBRT, specific gravity).
2. To estimate milk fat by Gerber method.
3. Determination of titrable acidity and pH of milk.
4. To determine adulteration of milk.
5. Preparation of pasteurized milk.
6. Preparation of flavoured milk.
7. Preparation of Paneer.
8. To perform neutralization of cream.
9. To study the working of cream separator.
10. Preparation of butter and determination of overrun in butter.
11. Preparation of Ice-cream.
12. Preparation of shrikhand.
13. Preparation of ghee.
14. Visit to milk processing plant.

| TECHNOLOGY OF FRUITS AND VEGETABLES LAB-V | | | |
|---|----------|----------|------------|
| Subject Code: BFOTS1-305 | L | T | P C |
| | 0 | 0 | 4 2 |
| Duration: 30 (Hrs.) | | | |
| Course Objectives: | | | |
| <ol style="list-style-type: none"> 1. To understand the processing techniques involved in production of various value added products from fruits and vegetables meeting the specified needs of society. 2. To impart knowledge regarding quality parameters of products to meet legal specifications. 3. To analyze quality attributes of packaged food product. 4. To utilize by-products of fruits and vegetables industry for societal benefits and reducing | | | |

environmental stress.

5. To create an ability to communicate the related issues during industrial visits.

Course Outcomes:

1. Understanding the processing techniques involved in production of various value-added products from fruits and vegetables meeting the specified needs of society.
2. Imparting knowledge regarding quality parameters of products to meet legal specifications.
3. Analyzing quality attributes of packaged food product.
4. Utilization of by-products of fruits and vegetables industry for societal benefits and reducing environmental stress.
5. Creating an ability to communicate the related issues during industrial visits.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | 3 | | | | | | | | | |
| CO2 | | | | | | 3 | | | | | | |
| CO3 | 2 | | | | | | | | | | | |
| CO4 | | | | | | | 3 | | | | | |
| CO5 | | | | | | | | | | 3 | | |

Practicals:

1. Estimation of total soluble solids (TSS).
2. Estimation of brix: acid ratio.
3. Preparation of pickles.
4. Preparation of tomato paste.
5. Preparation of tomato ketchup and sauce.
6. Preparation of Jam and marmalades.
7. Preparation of Jelly.
8. Cut out analysis of canned food products.
9. Preparation of fruit preserve from Amla, Apple and carrot.
10. Preparation of Mango Leather.
11. Determination of dehydration and rehydration ratio of dehydrated vegetables.
12. Preparation of candied peels, glazed fruits and reformed fruits.
13. Visit to fruits and vegetable processing industry.

FOOD MICROBIOLOGY AND FOOD SAFETY LAB-VI

Subject Code: BFOTS1-306

L T P C

Duration: 30 (Hrs.)

0 0 4 2

Course Objectives:

1. To understand the application of various equipments used in microbiology.
2. To summarize methodologies and techniques involved in microbial analysis of different food commodities.
3. To describe the effect of various preservation methods on microbial load of different food products.
4. To analyze various food samples in terms of their pathogenic counts to ensure their safety for consumption.
5. To develop various fermented food products meeting the specified needs of population.

Course Outcomes:

1. Understanding the application of various equipments used in microbiology.
2. Summarizing the methodologies and techniques involved in microbial analysis of different food commodities.
3. Describing the effect of various preservation methods on microbial load of different food products.
4. Analyzing various food samples in terms of their pathogenic counts to ensure their safety for consumption.
5. Developing various fermented food products meeting the specified needs of population.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | 3 | | | | | | | |
| CO2 | | 3 | | | | | | | | | | |
| CO3 | | | | 2 | | | | | | | | |
| CO4 | | | | | | | 3 | | | | | |
| CO5 | | | | | | 3 | | | | | | |

Practicals:

1. Sterilization and disinfection of equipment used in food microbiology laboratory.
2. Study of different types of microorganism colony shapes on agar plates.
3. Effect of extrinsic factors on growth of micro-organisms.
4. Effect of preservation methods on microbial load of different food samples.
5. Detection of food borne pathogens in a given food sample.
6. Isolation of fungi from food materials.
7. Study of incubation test of heated canned foods.
8. Study of Dye reduction test of milk.
9. Microbiological analysis of egg, cereal product and fruit product.
10. Spawn preparation of different mushrooms.
11. Production of red and white wine.
12. Production of vinegar.
13. Effect of sanitizers on microbial load.

ENTREPRENEURSHIP DEVELOPMENT

Subject Code: BFOTD1-311

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

1. To understand the basics of Entrepreneur, Entrepreneurship and Enterprise for future prospectives.
2. To summarize entrepreneurial skills, techniques to develop, and assessment tests.
3. To interpret case studies of successful entrepreneurs in order to deal with different situations arising during Entrepreneurship.
4. To create an ability to identify opportunities in business and generation of unique business ideas.
5. To apply SWOT Analysis for business and for competitors.

Course Outcomes:

1. Understanding the basics of Entrepreneur, Entrepreneurship and Enterprise for future prospectives.
2. Summarizing entrepreneurial skills, techniques to develop, and assessment tests.
3. Interpreting case studies of successful entrepreneurs in order to deal with different

situations arising during Entrepreneurship.

4. Creating an ability to identify opportunities in business and generation of unique business ideas.
5. Application of SWOT Analysis for business and for competitors.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2 | | | | | | | | | | | |
| CO2 | | | | | | | | | | 3 | | |
| CO3 | | 2 | | | | | | | | | | |
| CO4 | | | | | | | | | | | 3 | |
| CO5 | | | | | | | | | | | | 2 |

UNIT-I (9 Hours)

Entrepreneur, Entrepreneurship and Enterprise: Concept and role in development, characteristics of entrepreneurs, developing entrepreneurial competencies, types of enterprise and ownership, charms of becoming an entrepreneur, reinforcing entrepreneurial motivation and competencies.

UNIT-II (12 Hours)

Entrepreneurial development

Case studies of successful entrepreneurs.

Exercises on ways of sensing opportunities – sources of idea, creating efforts, SWOT analysis.

Entrepreneurial skill assessment test.

Techniques of development of entrepreneurial skills, positive self-image and locus of control

UNIT-III (12 Hours)

Food business management

Case studies of Food processing business and its aspects.

Business opportunity identification and assessment techniques.

Business idea generation and evaluation exercise.

Market assessment study and analysis of competitive situation.

UNIT-IV (12 Hours)

SWOT Analysis for business and for competitors.

Preparation of business plan.

Preparation of project report.

Methods of arrangement of inputs–finance and material.

Recommended Text Books / Reference Books:

1. Vasant Desai, Fundamentals of Entrepreneurship and Small Business Management, Himalya Publishing House Pvt. Ltd., Mumbai, 2012.
2. Vasant Desai, The Dynamics of Entrepreneurial Development and Management, Himalya Publishing House Pvt. Ltd., Mumbai, 2011.
3. D. David and S Erickson, Principles of Agri Business Management, Mc Graw Hill Book Co., New Delhi, 1987.
4. Acharya S S and Agarwal N L, Agricultural Marketing in India, Oxford & ISH Publishing Co., New Delhi, 1987.
5. David H. Holt, Entrepreneurship – Anew Venture Creation, Prentice Hall of India, New Delhi, 2002.
6. Phill Kottler, Marketing Management, Prentice Hall of India Private Limited, New Delhi,

1994.

7. Chandra, Prasanna, Projects, Planning, Analysis, Selection, Implementation and Review, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1996.

FOOD FERMENTATION TECHNOLOGY

Subject Code: BFOTD1-312

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

1. To understand the basics of food fermentation.
2. To impart knowledge regarding design and operation of a bio-fermenter.
3. To identify types of starters useful for food industries.
4. To summarize the techniques involved in production of organic acids, vitamins, and yeast.
5. To create an ability to develop different types of fermented foods for desired health benefits.

Course Outcomes:

1. Understanding the basics of food fermentation.
2. Imparting knowledge regarding design and operation of a bio-fermenter.
3. Identification of different types of starters useful for food industries.
4. Summarizing the techniques involved in production of organic acids, vitamins, and yeast.
5. Creating an ability to develop different types of fermented foods for desired health benefits.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | | | | 3 | | | | | | | |
| CO3 | | | | | 3 | | | | | | | |
| CO4 | | | | | | 3 | | | | | | |
| CO5 | | | 3 | | | | | | | | | |

UNIT-I (10 Hours)

Introduction to fermentation technology, Principles of food fermentation, Types of fermentation (Continuous fermentation, Batch fermentation, Submerged fermentation and solid state fermentation), Microbial culture selection for fermentation.

UNIT-II (11 Hours)

Study of a Bio fermenter – its design and operation, Down Stream Processing and Product recovery.

| | | |
|---|----------------|----------------------------|
| Raw material availability, quality, processes and pre-treatments of raw materials. Major alcoholic raw materials. | | |
| UNIT-III (12 Hours) | | |
| Starter cultures, Types of starters used in Food Industry. Fermented foods: methods of manufacture for vinegar, sauerkraut, Yoghurt, soya sauce, wine and traditional Indian foods, Fermented milk and products such as cheese, Fermented pickles. | | |
| UNIT-IV (12 Hours) | | |
| Production of organic acids (citric acid, lactic acid, gluconic acid and acetic acid), production of vitamins (Vitamin B2) and yeast (SCP). | | |
| Recommended Text Books / Reference Books: | | |
| <ol style="list-style-type: none"> 1. Adams M & Moss, M., Food Microbiology. 2nd Edition, RSC Publishing, 2008. 2. Joshi V. K. & Pandey, A., Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology. Volume 2, Sanjanya Books, 1999. 3. John Garbutt, Essentials of Food Microbiology, Arnold International Students, 1997. 4. Brian J. Wood. Elsevier, Microbiology of Fermented Foods. Volume II and I, Applied Science Publication, 1997. 5. Stanbury, P.F., Whitekar A. and Hall, Principles of Fermentation Technology, Pergaman. McNeul and Harvey. (AC) NEW, 1995. | | |
| FOOD ADDITIVES | | |
| Subject Code: BFOTD1-313 | L T P C | Duration: 45 (Hrs.) |
| | 3 0 0 3 | |
| Course Objectives: | | |
| <ol style="list-style-type: none"> 1. To understand the types, applications, and legal specifications of different food additives. 2. To impart knowledge regarding types, mode of action, and applications of different types of preservatives and flavoring agents. 3. To summarize the properties and applications of different types of sweeteners and emulsifiers used in food industries. 4. To create awareness regarding chemical composition, extraction procedures, and uses of different spices and condiments. 5. To differentiate between natural-, and synthetic food colors and their applications. | | |
| Course Outcomes: | | |
| <ol style="list-style-type: none"> 1. Understanding the types, applications, and legal specifications of different food additives. 2. Imparting knowledge regarding types, mode of action, and applications of different types of preservatives and flavoring agents. 3. Summarizing the properties and applications of different types of sweeteners and emulsifiers used in food industries. 4. Creating awareness regarding chemical composition, extraction procedures, and uses of | | |

different spices and condiments.

5. Differentiating between natural-, and synthetic food colors and their applications.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | | 3 | | | | | | |
| CO2 | 3 | | | | | | | | | | | |
| CO3 | | | 3 | | | | | | | | | |
| CO4 | | | | | | | | | | 3 | | |
| CO5 | | | 3 | | | | | | | | | |

UNIT-I (10 Hours)

Introduction to food additives: General Classification, types (On basis of their origin, natural and synthetic), uses, functions, legal aspects, risks and benefits

UNIT-II (11 Hours)

Preservatives: Antimicrobial agents, antioxidants and anti-browning agents (Types, mode of action and their applications in different food products)

Flavouring agents: Flavours (Natural and artificial), flavour enhancers, flavour stabilisation and flavour encapsulation.

UNIT-III (12 Hours)

Sweeteners: Natural and artificial sweeteners, Nutritive and non-nutritive sweeteners, properties and uses of saccharin, aspartame, acesulfame-K, corn sweeteners, invert sugar and sugar alcohols.

Emulsifiers: Types, selection of emulsifier, emulsion stability, functions and mechanism of action.

Stabilizers: Types, uses and functions

UNIT-IV (12 Hours)

Food Spices and condiments: Types and uses of spices and condiments, Chemical composition, Extraction and processing of Indian spices like pepper, cinnamon, cardamom, clove, ginger, turmeric, fenugreek and fennel, Seasonings and condiment blends.

Food Colors: Introduction, natural (biocolors) and synthetic food colors.

Recommended Books

1. A.L. Branen, 'Food Additives', Marcel Dekker Inc., New York, U.S.A.
2. J.W. Purseglove 'Spices' Longman Publishers, London, England.
3. D.R. Tainter and A.T. Grenis, 'Spices and Seasonings- A Food Technology Handbook', VCH Publishers, Inc., Hoboken, U.S.A.
4. J. Merory, 'Food Flavorings, Composition, Manufacture and Use', AVI Publishing Inc., Westport, U.S.A.
5. K.T. Farrell 'Spices, Condiments and Seasonings', Springer, U.S.A.

DRUG ABUSE

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

| | | | | | |
|--------------------------|--|---------|--|---------------------|--|
| Subject Code: BMNCC0-004 | | L T P C | | Duration: 30 (Hrs.) | |
| | | 2 0 0 0 | | | |

Course Objectives:

1.

To understand the basics of drug abuse, drugdependenceanddrugaddiction, and drug tolerance.

2.

To identify nature of problem, sign, and symptoms associated with drug abuse.

3.

To impart basic knowledge regarding causes and consequences of drug abuse.

4.

To create awareness regarding prevention of drug abuse.

5.

To analyze short term, long term effects and withdrawal symptoms of drug abuse.

Course Outcomes:

1.

Understanding the basics of drug abuse, drugdependenceanddrugaddiction, and drug tolerance.

2.

Identification of nature of problem, sign, and symptoms associated with drug abuse.

3.

Imparting basic knowledge regarding causes and consequences of drug abuse.

4.

Creating awareness regarding prevention of drug abuse.

5.

Analyzing short term, long term effects and withdrawal symptoms of drug abuse.

MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2 | | | | | | | | | | | |
| CO2 | | 3 | | | | | | | | | | |
| CO3 | | | | | | 2 | | | | | | |
| CO4 | | | | | | | | | | 3 | | |
| CO5 | | | | | | | 3 | | | | | |

UNIT-I (10 Hours)

Problem of Drug Abuse: Concept and Overview; Types of Drug Often Abused

Concept and Overview

What are drugs and what constitutes Drug Abuse?

Prevalence of menace of Drug Abuse

How drug Abuse is different from Drug Dependence and Drug Addiction?

Physical and psychological dependence- concepts of drug tolerance

Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms

Stimulants: Amphetamines, Cocaine, Nicotine

Depressants: Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines – Diazepam, Alprazolam, Flunitrazepam

Narcotics: Opium, morphine, heroin

Hallucinogens: Cannabis & derivatives (marijuana, hashish, hash oil), Steroids and inhalants

UNIT-I (10 Hours)

Problem of Drug Abuse: Concept and Overview; Types of Drug Often Abused

Concept and Overview

What are drugs and what constitutes Drug Abuse?

Prevalence of menace of Drug Abuse

How drug Abuse is different from Drug Dependence and Drug Addiction?

Physical and psychological dependence- concepts of drug tolerance

Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms

Stimulants: Amphetamines, Cocaine, Nicotine

Depressants: Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines – Diazepam, Alprazolam, Flunitrazepam

Narcotics: Opium, morphine, heroin

Hallucinogens: Cannabis & derivatives (marijuana, hashish, hash oil), Steroids and inhalants

UNIT-II (8 Hours)

Nature of the Problem

Vulnerable Age Groups

Signs and symptoms of Drug Abuse

(a)- Physical indicators

(b)- Academic indicators

(c)- Behavioural and Psychological indicators

UNIT-III (6 Hours)

Causes and Consequences of Drug Abuse

Causes

Physiological

Psychological

Sociological

Consequences of Drug Abuse

For individuals

For families

For society & Nation

UNIT-IV (6 Hours)

Management & Prevention of Drug Abuse

Management of Drug Abuse

Prevention of Drug Abuse

Role of Family, School, Media, Legislation & Deaddiction Centres

Recommended Text Books / Reference Books:

1. Kapoor. T., Drug Epidemic among Indian Youth, Mittal Pub, New Delhi, 1985.
2. Modi, Ishwar and Modi, Shalini, Drugs: Addiction and Prevention, Rawat Publication, Jaipur, 1997.
3. Ahuja, Ram, Social Problems in India, Rawat Publications, Jaipur, 2003.
4. National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
5. World Drug Report , United Nations Office of Drug and Crime, 2011
6. World Drug Report, United nations Office of Drug and Crime, 2010.
7. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
8. The Narcotic Drugs and Psychotropic Substances Act, 1985, New Delhi: Universal, 2012.

MRSPTU

SEMESTER IV

TECHNOLOGY OF CEREALS, PULSES AND OILSEEDS

Subject Code: BFOTS1-401

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

1. To understand the structure, composition, and physico-chemical properties of cereals, pulses and oilseeds.
2. To impart knowledge regarding milling of cereals and pulses.
3. To familiarize students with extraction and processing of fats and oils.
4. To develop value added products from cereals, pulses and oilseeds.
5. To create awareness regarding advantages and disadvantages of steps involved in processing of cereals, pulses and oilseeds.

Course Outcomes:

1. Understanding the structure, composition, and physico-chemical properties of cereals, pulses and oilseeds.
2. Imparting knowledge regarding milling of cereals and pulses.
3. Familiarizing students with extraction and processing of fats and oils.
4. Development of value added products from cereals, pulses and oilseeds.
5. Creating awareness regarding advantages and disadvantages of steps involved in processing of cereals, pulses and oilseeds.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | 2 | | | | 1 | | | | | | | |
| CO3 | 1 | | 1 | | 2 | | | | | | | |
| CO4 | | | 3 | | | 2 | | | | | | |
| CO 5 | | | | | | | 3 | | | 2 | | |

UNIT-I (15 Hours)

Wheat-Structure and chemical composition of wheat grain, Types, milling, flour grade, flour treatments (bleaching, maturing), flour for various purposes, bread, biscuit, cake manufacturing.

UNIT-II (15 Hours)

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

| |
|--|
| Rice – Structure and chemical composition of rice grain, physicochemical properties, milling, parboiling of rice, changes during parboiling, Advantages and disadvantages of parboiling, ageing of rice |
| UNIT-III (15 Hours) |
| Corn – Milling (wet & dry), cornflakes, corn starch and corn sweeteners. Barley- Milling, Malting of barley: steeping, Germination and drying. Sorghum and millets – Milling and uses. |
| UNIT-IV (15 Hours) |
| Milling of pulses: Dry milling, wet milling, improved milling methods Technology of oil seeds Extraction of oil and refining. Preparation of defatted flour, protein concentrates, isolates, Uses. |
| Recommended Text Books / Reference Books: |
| <ol style="list-style-type: none"> 1. Kent, N.L., Technology of Cereal, 5th Ed., Pergamon Press, 2003. 2. Chakraverty, Post Harvest Technology of Cereals, Pulses and Oilseeds, revised Ed., Oxford & IBH Publishing Co. Pvt Ltd., 1988. 3. Marshall, Rice Science and Technology, Wadsworth, New York, 1994. 4. Manay, S. and Sharaswamy, M., Food Facts and Principles, Wiley Eastern Limited, 1994. |

| EGG, POULTRY AND MEAT TECHNOLOGY | | | | |
|---|----------|----------|----------|----------|
| Subject Code: BFOTS1-402 | L | T | P | C |
| | 3 | 1 | 0 | 4 |
| Course Objectives: <ol style="list-style-type: none"> 1. To understand the chemical composition and nutritive value of egg, meat and poultry. 2. To impart knowledge regarding packaging, spoilage and preservation of egg, meat and poultry. 3. To apply ethical principles during handling of animal and their conversion into meat and other products. 4. To analyze quality parameters of eggs, meat and poultry. 5. To create awareness regarding by product utilization of meat industry. | | | | |
| Course Outcomes: <ol style="list-style-type: none"> 1. Understanding the chemical composition and nutritive value of egg, meat and poultry. 2. Imparting knowledge regarding packaging, spoilage and preservation of egg, meat and poultry. 3. Application of ethical principles during handling of animal and their conversion into meat and other products. | | | | |

4. Analysis of quality parameters of eggs, meat and poultry.
5. Creating awareness regarding by product utilization of meat industry.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | 1 | | | | | | | | | |
| CO2 | 3 | | | | | | 2 | | | | | |
| CO3 | | | | | | | | 3 | | | | |
| CO4 | | 2 | | | | 3 | | | | | | |
| CO 5 | | | | | | | 2 | | | 2 | | |

UNIT-I (15 Hours)

Egg: Structure and composition, Nutritive value and functional properties.
 Quality of egg: Interior quality evaluation, candling, grading, handling, packaging, storage, transportation.
 Egg powder.
 Liquid egg preservation.
 Packaging and transportation of eggs.

UNIT-II (15 Hours)

Poultry: Types, chemical and nutritive value of poultry meat.
 Poultry dressing and slaughtering methods.
 Preservation, grading and packaging of poultry meat.

UNIT-III (15 Hours)

Status and scope of meat industry in India.
 Ante-mortem and post-mortem examination of meat animal, their slaughtering and dressing.
 Structure and physico-chemical properties of muscle.
 Post-mortem changes in meat.
 Ageing of meat, meat tenderization-natural and artificial methods.
 Quality Parameters: Meat color, water holding capacity, Marbling, Firmness and factors affecting it.

UNIT-IV (15 Hours)

Restructured meat products, meat analogs.
 Preservation and spoilage of meat.
 Meat industry by products: Importance and utilization.

Recommended Text Books / Reference Books:

1. Lawrie R A, Lawrie's, Meat Science, 5th Ed, Woodhead Publisher, England, 1998.
2. Parkhurst & Mountney, Poultry Meat and Egg Production, CBS Publication, New Delhi, 1997.
3. Pearson & Gillet Processed Meats, 3rd Ed, CBS Publication, New Delhi, 1997.
4. Shai Barbut, Poultry Products Processing, CRC Press, 2005.
5. Stadelman WJ, Owen J Cotterill Egg Science and Technology, 4th Ed. CBS Publication New Delhi, 2002.
6. Romans. JR and Costllo WJ, Carlson WC, Greaser, ML and Jones KW, The Meat we eat, Interstate Publishers, USA, 2004.

FOOD PLANT HYGIENE AND SANITATION

Subject Code: BFOTS1-403

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

1. To understand the concept and importance of personal hygiene and its role in food safety.
2. To impart knowledge regarding principles and methods of cleaning and sanitation.
3. To design layout of ETP plants keeping in view all the requirements of food processing industry.
4. To develop value added products from wastes of food industry.
5. To create awareness regarding disposal and treatment of waste.

Course Outcomes:

1. Understanding the concept and importance of personal hygiene and its role in food safety.
2. Imparting knowledge regarding principles and methods of cleaning and sanitation.
3. Designing the layout of ETP plants keeping in view all the requirements of food processing industry.
4. Development of value added products from wastes of food industry.
5. Creating awareness regarding disposal and treatment of waste.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | | 2 | | | | | | |
| CO2 | 3 | | | | | | | | | | | |
| CO3 | | | | | 2 | | | | | | | |
| CO4 | | | 3 | | | | 2 | | | | | |
| CO 5 | | | | | | | 1 | | | 2 | | |

UNIT-I (15 Hours)

Introduction:

Importance of personal hygiene of food handler-habits, clothes, illness, education of handler in Handling and service.

UNIT-II (15 Hours)

Industrial Hygiene:

Cleaning methods – sterilization, disinfection, heat & chemicals, chemical tests for sanitizer strength. Cleaning agents and disinfectants.

Food sanitation-Principles & methods, control, inspection. Sanitation in fruits & vegetables

| |
|---|
| industry, cereals industry, dairy industry, meat, egg & poultry units. |
| UNIT-III (15 Hours) |
| Waste disposal, Control methods using physical and chemical agents, Pest and rodent control, ETP design and layout. Food storage sanitation, transport sanitation and water sanitation. |
| UNIT-IV (15 Hours) |
| By-products utilization obtained from dairy plant, egg & poultry processing industry and meat industry. Wastewater and solid waste treatment: Waste-types-solid and liquid waste characterization, physical, chemical, biological, aerobic, anaerobic, primary, secondary and tertiary (advanced) treatments. |
| Recommended Text Books / Reference Books: |
| <ol style="list-style-type: none"> 1. Norman G. Marriott and Robert B. Gravani, Principles of Food Sanitation, 5th edition, 2006. 1. Rao, D. G., Fundamentals of Food Engineering, PHI learning Private Ltd., 2010. 2. Fellows P., Food Processing Technology, 2nd Edition. Woodhead Publishing Limited and CRC Press LLC, 2000. 3. James A, The supply chain handbook, distribution group, 2013. 4. FAO, US, Design and operations of cold store in developing, 1984. |

| TECHNOLOGY OF CEREALS, PULSES AND OILSEEDS LAB-VII | | | | |
|---|----------|----------|----------|----------|
| Subject Code: BFOTS1-404 | L | T | P | C |
| | 0 | 0 | 4 | 2 |
| Course Objectives: <ol style="list-style-type: none"> 1. To impart knowledge regarding proximate composition of flour and its analysis. 2. To familiarize students with processing of cereals, pulses and oilseeds. 3. To develop value added products from cereals, pulses and oilseeds. 4. To analyze physico-chemical characteristics of grains and flour relating to product quality. 5. To create awareness regarding adulteration of fats and oils and detection techniques. | | | | |
| Course Outcomes: <ol style="list-style-type: none"> 1. Imparting knowledge regarding proximate composition of flour and its analysis. 2. Familiarizing the students with processing of cereals, pulses and oilseeds. 3. Development of value added products from cereals, pulses and oilseeds. 4. Analysis of physico-chemical characteristics of grains and flour relating to product quality. 5. Creating awareness regarding adulteration of fats and oils and detection techniques. | | | | |

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | | | | 2 | | | | | | | |
| CO3 | | | 3 | | | 2 | | | | | | |
| CO4 | | 2 | | | | | 2 | | | | | |
| CO 5 | | 2 | | | | | | | | 2 | | |

Practicals:

1. Physical characteristics of cereal grains.
2. Proximate analysis of wheat flour (moisture, ash, fat, protein and crude fiber content).
3. Estimation of gluten content of flour.
4. Estimation of Polenske value of flour.
5. Estimation of alkaline water retention capacity of flour.
6. Determination of sedimentation value of flour
7. Cooking characteristics of rice.
8. Experimental parboiling of rice by different methods.
9. Determination of soaking and hydration capacity of pulses.
10. Preparation of full fat and defatted soya flour.
11. Extraction of oil from groundnuts.
12. Determination of saponification value.
13. Detection of adulteration of cotton seed oil and ground nut oil.
14. Visit to cereal and oilseed processing industry.

EGG, POULTRY AND MEAT TECHNOLOGY LAB-VIII

**MRSPTU B.Sc. (FOOD SCIENCE AND TECHNOLOGY)/B.F.S.T (Hons.)
SYLLABUS 2019 BATCH ONWARDS**

| | | | | | | | | | | | | |
|---|-----|-----|-----|---------|-----|-----|-----|---------------------|-----|------|------|------|
| Subject Code: BFOTS1-405 | | | | L T P C | | | | Duration: 30 (Hrs.) | | | | |
| | | | | 0 0 4 2 | | | | | | | | |
| Course Objectives: | | | | | | | | | | | | |
| <div>1. To determine the proportion of different constituents present in eggs</div> <div>2. To impart knowledge regarding techniques involved in grading and quality evaluation of eggs, poultry and meat products.</div> <div>3. To familiarize students about ethical principles of slaughtering and dressing for the conversion of muscles into meat.</div> <div>4. To formulate value added products from eggs, poultry, and meat to meet needs of society.</div> <div>5. To create awareness regarding various methods used to preserve eggs, poultry, and meat.</div> | | | | | | | | | | | | |
| Course Outcomes: | | | | | | | | | | | | |
| <div>1. Determination of different constituents present in eggs</div> <div>2. Imparting knowledge regarding techniques involved in grading and quality evaluation of eggs, poultry and meat products.</div> <div>3. Familiarizing students about ethical principles of slaughtering and dressing for the conversion of muscles into meat.</div> <div>4. Formulating value added products from eggs, poultry, and meat to meet needs of society.</div> <div>5. Creating awareness regarding various methods used to preserve eggs, poultry, and meat.</div> | | | | | | | | | | | | |
| MAPPING | | | | | | | | | | | | |
| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | | | | | | | | | | | |
| CO2 | | | | | 3 | | | | | | | |
| CO3 | | | | | | | | 3 | | | | |
| CO4 | | | 3 | | | 2 | | | | | | |
| CO 5 | | | | | | | | | | 2 | | 1 |

| Practicals: | | | | | | | | | | | |
| 1) Determination of moisture and ash contents of egg components. 2) Determination of percentage of various egg constituents 3) Grading and Quality evaluation of eggs. 4) Preservation of shell eggs by various methods. 5) Candling of eggs. 6) Determination of time temperature condition on formation of iron sulphide in egg. | | | | | | | | | | | |

- 7) Preparation of egg products: boiled, fried, poached, scrambled, poached.
- 8) Preparation of egg pickle
- 9) Slaughtering and dressing of poultry.
- 10) Post mortem examination of poultry meat and identifying different parts of poultry.
- 11) Preservation of meat by pickling method.
- 12) Preparation of different meat products.
- 13) Evaluation of meat quality.
- 14) Visit to poultry and meat industry.

MRSPTU

FOOD PLANT HYGIENE AND SANITATION LAB-IX

Subject Code: BFOTS1-406

L T P C

Duration: 30 (Hrs.)

0 0 4 2

Course Objectives:

1. To understand the importance of sterilization of equipments and different ways to achieve the same.
2. To impart knowledge regarding methodology and significance of BOD and COD.
3. To familiarize the students with importance of cleaning and sanitation of equipments in the plant and methods to ensure the same.
4. To analyze microbial load of air, workplace, and equipments.
5. To create awareness regarding evaluation of different quality parameters of water.

Course Outcomes:

1. Understanding the importance of sterilization of equipments and different ways to achieve the same.
2. Imparting knowledge regarding methodology and significance of BOD and COD.
3. Familiarizing the students with importance of cleaning and sanitation of equipments in the plant and methods to ensure the same.
4. Analysis of microbial load of air, workplace, and equipments.
5. Creating awareness regarding evaluation of different quality parameters of water.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | 3 | | | | | | | |
| CO2 | 3 | | | | | | | | | | | |
| CO3 | 2 | | | | | | 1 | | | | | |
| CO4 | | 3 | | | | | | | | | | |
| CO 5 | | | | | | | | | | 2 | | 1 |

Practicals:

1. Sterilization of equipments used in the laboratory by using heat and chemicals.
2. Determination of B.O.D
3. Determination of C.O.D
4. Determination of sanitary status of plant equipment.
5. Measurement of Chlorine content in water.

6. Measurement of hardness of water.
7. Measurement of quality parameters and chemical analysis of water.
8. Determination of microbial load of air.
9. Determination of microbial load of workplace.
10. Determination of microbial load of equipments using swab test.

MRSPTU

NUTRACEUTICAL AND FUNCTIONAL FOODS

Subject Code: BFOTD1-411

L T P C

Duration: 60 (Hrs.)

4 0 0 4

Course Objectives:

1. To understand the basics of nutraceuticals, their types and importance.
2. To impart knowledge regarding different food commodities with potential to be used as functional foods.
3. To familiarize students with fermented foods and their role in addressing specific needs of society.
4. To develop an ability to differentiate between nutraceuticals and functional foods.
5. To create awareness regarding nutraceuticals and functional foods and their potential role in human health.

Course Outcomes:

1. Understanding the basics of nutraceuticals, their types and importance.
2. Imparting knowledge regarding different food commodities with potential to be used as functional foods.
3. Familiarizing students with fermented foods and their role in addressing specific needs of society.
4. Developing an ability to differentiate between nutraceuticals and functional foods.
5. Creating awareness regarding nutraceuticals and functional foods and their potential role in human health.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | 2 | | | | | | 2 | | | | | |
| CO3 | | | | | | | | | | | 2 | |
| CO4 | 2 | | | | | | | | | | | 1 |
| CO 5 | | | | | | 3 | | | | 2 | | |

UNIT-I (15 Hours)

Introduction

Background, definitions, difference between nutraceuticals and functional foods, types of

| |
|--|
| nutraceutical compounds and their health benefits, current scenario. |
| UNIT-II (15 Hours) |
| Nutraceuticals Types of nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds, peptides and proteins, carbohydrates (dietary fibers, oligosaccharides and resistant starch). Prebiotics, probiotics and synbiotics. Lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), vitamins and minerals; their sources and role in promoting human health. |
| UNIT-III (15 Hours) |
| Functional Foods Cereal and cereal products, milk and milk products, egg, oils, meat and products, sea foods, nuts and oilseeds, functional fruits and vegetables, herbs and spices, beverages (tea, wine etc) |
| UNIT-IV (15 Hours) |
| Fermented foods – their health benefits and role in conditions like cardiovascular diseases, hypertension, diabetes etc. Future prospects of functional foods and nutraceuticals and their potential for use in improving health. |
| Recommended Text Books / Reference Books: 1. Wildman REC, Handbook of Nutraceutical and Functional Foods, CRC Press, 2001. 2. Ghosh D et al, Innovations in Healthy and Functional Foods, CRC Press, 2012. 3. Pathak YV, Handbook of nutraceuticals Volume 2, CRC Press, 2011. |

| NUTRACEUTICAL AND FUNCTIONAL FOODS LAB-X | | | | |
|--|----------|----------|----------|----------|
| Subject Code: BFOTD1-412 | L | T | P | C |
| | 0 | 0 | 4 | 2 |
| Course Objectives: <ol style="list-style-type: none"> To identify various Nutraceuticals and functional foods available in the market. To impart knowledge regarding compounds responsible for imparting nutraceutical and functional properties to the food product. To develop various functional foods adhering to legal specifications. To analyze different food components which may act as nutraceuticals and functional foods. To create awareness regarding health benefits of Nutraceuticals and functional foods. | | | | |
| Course Outcomes: <ol style="list-style-type: none"> Identification of various nutraceuticals and functional foods available in the market. Imparting knowledge regarding compounds responsible for imparting nutraceutical and functional properties to the food product. | | | | |

3. Development of various functional foods adhering to legal specifications.
4. Analysis of different food components which may act as nutraceuticals and functional foods.
5. Creating awareness regarding health benefits of nutraceuticals and functional foods.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | 3 | | | | | 1 | | | | | | |
| CO3 | | | 3 | | | 2 | | | | | | |
| CO4 | 1 | | | | | | 2 | | | | | |
| CO 5 | | | | | | | 1 | | | 2 | | |

Practicals:

1. Identification of various nutraceuticals and functional foods available in the market
2. Estimation of chlorophyll content of green vegetable
3. Determination of lycopene in fruit/vegetable
4. Determination of total pectin in plant material
5. Estimation of crude fibre/dietary fibre content in cereals and their products
6. Estimation of anthocyanins in food sample
7. Determination of Vitamin C content of sample
8. Preparation and evaluation of probiotic/prebiotic foods
9. Determination of antioxidant activity in food.
10. Determination of total phenolic content in foods
11. Determination of total flavonoids content in foods
12. Development of functional foods.

BAKERY TECHNOLOGY

Subject Code: BFOTD1-413

L T P C

Duration: 60 (Hrs.)

4 0 0 4

Course Objectives:

1. To familiarize the students with current scenario and economic importance of Bakery industry in India.
2. To understand the role of different ingredients used in the formulation of different bakery products.
3. To impart knowledge regarding processing techniques involved in manufacturing of various baked products.
4. To create awareness regarding quality attributes of different bakery products.
5. To develop modified bakery products addressing specific needs of society.

Course Outcomes:

1. Familiarizing the students with current scenario and economic importance of Bakery industry in India.
2. Understanding the role of different ingredients used in the formulation of different bakery products.
3. Imparting knowledge regarding processing techniques involved in manufacturing of various baked products.
4. Creating awareness regarding quality attributes of different bakery products.
5. Development of modified bakery products addressing specific needs of society.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | | | | | | | | | | | |
| CO2 | | 3 | | | | | | | | | | |
| CO3 | | | | 3 | | | | | | | | |
| CO4 | | | | | | 2 | | | 2 | | | |
| CO 5 | | | 3 | | | 2 | | | | | | |

UNIT-I (15 Hours)

Bakery industry

Current status, growth rate, and economic importance of Bakery Industry in India. Product types, nutritional quality.

UNIT-III (15 Hours)

Bread: Ingredients, bread making process, faults and corrective measures

Cakes: Ingredients, cake making process, different types of icings.

| | | | | |
|---|----------|----------|----------|----------|
| UNIT-III (15 Hours) | | | | |
| Biscuits, cookies & crackers Technology of biscuit, cookies and cracker manufacturing. Baking powders as leavening agents in bakery industry. | | | | |
| Modified bakery products Modification of bakery products for people with special nutritional requirements e.g. high fiber, low sugar, low fat, gluten free bakery products. | | | | |
| UNIT-IV (15 Hours) | | | | |
| Breakfast cereals, macaroni products and malt Production and quality of breakfast cereals, macaroni products and malt. | | | | |
| Recommended Text Books / Reference Books: | | | | |
| <ol style="list-style-type: none"> 1. Dubey, S.C., Basic Baking 5th Ed., Chanakya Mudrak Pvt. Ltd., 2007. 2. Raina et.al., Basic Food Preparation-A complete Manual. 3rd Ed., Orient Longman Pvt. Ltd., 2003. 3. Manay, S. & Shadaksharaswami, M., Foods: Facts and Principles, New Age Publishers, 2004. 4. Barndt R. L., Fat & Calorie – Modified Bakery Products, Springer US, 1993. 5. Samuel A. Matz, Bakery Technology and Engineering, PAN-TECH International Incorporated, 1999. 6. Faridi Faubion , Dough Rheology and Baked Product Texture, CBS Publications, 1997. 7. Samuel A. Matz, Cookies & Cracker Technology, Van Nostrand Reinhold, 1992. | | | | |
| BAKERY TECHNOLOGY LAB-XI | | | | |
| Subject Code: BFOTD1-414 | L | T | P | C |
| | 0 | 0 | 4 | 2 |
| Course Objectives: | | | | |
| <ol style="list-style-type: none"> 1. To impart knowledge regarding selection of ingredients for the development of various baked products and ensuring their safety to the allergic persons. 2. To familiarize students with methodologies of sensory evaluation of baked products. 3. To determine various quality attributes of baked products. 4. To develop various baked products adhering to legal standards. 5. To create awareness regarding ingredients falling under category of allergens as per legal standards. | | | | |
| Course Outcomes: | | | | |
| <ol style="list-style-type: none"> 1. Imparting knowledge regarding selection of ingredients for the development of various baked products and ensuring their safety to the allergic persons. 2. Familiarizing students with methodologies of sensory evaluation of baked products. 3. Determination of various quality attributes of baked products. 4. Development of various baked products adhering to legal standards. 5. Creating awareness regarding ingredients falling under category of allergens as per legal | | | | |

standards.

MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2 | | | | | | 1 | | | | | |
| CO2 | 2 | | | | 1 | | | | | | | |
| CO3 | | 1 | | | | | 2 | | | | | |
| CO4 | | | 3 | | | 1 | | | | | | |
| CO 5 | | | | | | 2 | | | | 2 | | |

Practicals:

1. Preparation of bread and assessment of its quality
2. Estimation of fermentation power of yeast.
3. Preparation of buns and assessment of quality
4. Preparation of cake and assessment of its quality.
5. Icing of cake.
6. Preparation of cookies and assessment of quality.
7. Preparation of biscuits and assessment of quality.
8. Sensory evaluation of bakery products.
9. Preparation of gluten free biscuits from pseudo cereals.
10. Preparation of low calorie biscuits and cakes.
11. Preparation of high fiber biscuits and cakes.
12. Preparation of pasta and evaluation of its quality.
13. Visit to local bakery.