



MGM UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE-BASED CREDIT SYSTEM(CBCS) SEMESTER PATTERN

Faculty of Basic and Applied Sciences Graduate (UG) Program

Food Technology and Processing - CURRICULUM

W.e.f. Academic Year 2023-24

B.Sc., B. Sc. (Hons.), B. Sc. (Hons.) with Research of Food Technology and Processing

SEMESTER (I,II)

**Prepared By
Dr. S. V. Maske**

**Submitted By
Dr. S. V. Maske**

**Approved By
Board of Studies**

B.Sc., B. Sc. (Hons.), B. Sc. (Hons.) with Research of Food Technology and Processing

CURRICULUM

Academic Year 2023-24

B.Sc., B. Sc. (Hons.), B. Sc. (Hons.) with Research of Food Technology and Processing

FIRST YEAR

(SEMESTER I)

MGM University
Chhatrapati Sambhajinagar– 431003

Name of the College/Institute: Institute of Bioscience and Technology

Faculty of Basic and Applied Sciences Graduate (UG) Program

Name of the Program : (3/4 Years UG program) B.Sc./B.Sc. Hons. /B.Sc. Hons with Research

Program Type: UG/ B.Sc./B.Sc. Hons./B.Sc. Hons with Research of Food Technology and Processing

Duration: - 04 Years (08 Semesters)

Level	First Year (Semester I)																			
	Course Type	Course code	Course Title	Type	Teaching period per week (Hrs /week)			Credits	Duration of Exam	Evaluation Scheme (Marks)							Minimum Passing (Marks)			
					Internal					External				Total	Internal		External		Total	
					CA-I	MSE	CA-II			TW	ESE	PR	CA/MSE/TW		ESE	PR				
4.5	Core	BFMML101	Introduction to Food Science	Theory	3			3		10	10	10	-	20	-	50		8		20
	Core	BFMML102	Basic Food Engineering (Fluid Mechanics, Heat and mass transfer-I)	Theory	2		-	2		20	20	20	-	40	-	100		16		40
	IKS		Annexure I	Theory	2		-	2		10	10	10	-	20	-	50		8	-	20
	AEC		Communicative English I	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20
	OE**	BFOEL103	Open Elective I	Theory	2		-	2		10	10	10	-	20	-	50		8		20
	OE	BFOEL104	Open Elective II	Theory	2		-	2		10	10	10	-	20	-	50		8		20
	VEC		Annexure I	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20
	VSC*	BFVSP105	Food Lab I	Practical			4	2					30		20	50			8	20
	SEC*	BFSEP106	Sensory Evolution of food	Practical			4	2					30		20	50			8	20
	Core	BFMMP107	Key Skills in food & Nutritional Science	Practical	-	-	2	1					30	-	20	50			8	20
CC		Co-Curricular Course	Practical		-	4	2					30	-	20	50			8	20	
Total (L-T-P) Hrs / week = 29					15		14	22												

Level	First Year (Semester II)																			
	Course Type	Course code	Course Title	Type	Teaching period per week			Credit	Duration of Exam	Evaluation Scheme							Minimum Passing			
					Internal					External				Total	Internal		External		Total	
					CA-I	MSE	CA-II			TW	ESE	PR	CA/MSE/TW		ESE	PR				
4.5	Core	BFMML108	Basic Food Engineering (Unit operation for food process)-II	Theory	2			2		10	10	10	-	20	-	50		8		20
	Core	BFMML109	Food Microbiology	Theory	3		-	3		20	20	20	-	40	-	100		16		40
	MIN	BFMIL110	Annexure I	Theory	2		-	2		10	10	10	-	20	-	50		8		20
	AEC		Communicative English II	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20
	OE**	BFOEL111	Open Elective I	Theory	2		-	2		10	10	10	-	20	-	50		8		20
	OE	BFOEL112	Open Elective II	Theory	2		-	2		10	10	10	-	20	-	50		8		20
	VEC		Annexure I	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20
	VSC*	BFVSP113	Food Lab II	Practical			4	2					30		20	50			8	20
	SEC*	BFSEP114	Food Quality Labelling & Composition	Practical			4	2					30		20	50			8	20
	Core	BFMMP115	Microbiological safety & Chemical Analysis of food	Practical	-	-	2	1					30	-	20	50			8	20
CC		Annexure I	Practical	-	-	4	2					30	-	20	50			8	20	
Total (L-T-P) Hrs / week = 29					15		14	22												

*As per the requirement VSC / SEC can be used for Theory or Practical of core subject **As per the requirement, Department/Institute can offer OE practical

Level 4.5 Award of UG certificate with 44 credits and an additional 4-credits core NSQF course / internship OR continue with major and minor

BFMML101 INTRODUCTION TO FOOD SCIENCE Credits: 3+0

University: MGM University, Chhatrapati Sambhajnaga Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Introduction to food science

Course Code- BFMML101

Credits- 3+0 (Theory)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 3 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/ Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Upon successful completion, students will have the knowledge and skills to: introduce food in that learn about the classifications of foods, nutrients composition available in food, Spoilage of food, Causes of food spoilage, food poisoning etc. Student also learn about the primary food preservation methods, properties of food, etc

Objective:

This course is designed to introduce a basics of Food, nutrition, food processing, perishability of product, causes of spoilage of food, etc.

COURSE CONTENT (Total Lecture- 45)

THEORY:

UNIT I: INTRODUCTION TO FOOD (10 Lecture)

Introduction – Defining food; classification of food on the basis of perishability; classification of food on the basis of Nutrient Composition, constituents of foods Carbohydrates: Occurrence, Classification & Structures; Physicochemical and Metabolic functions; Biological role of carbohydrates; Metabolism of carbohydrates - glycolysis and respiration, production of ATP, brief description of electron transport chain, oxidative and substrate phosphorylation; Proteins: Occurrence, Classification & Structures; Physicochemical & Metabolic functions; Metabolism of proteins - Breakdown of proteins, transamination, deamination, decarboxylation, nitrogen fixation, urea cycle;

UNIT II : LIPIDS, VITAMINS, MINERALS (7)

Lipids: Occurrence, Classification & Structure; Physicochemical and metabolic functions; Biological role of lipids; classification and biosynthesis; Introduction to water; roles, sources and its types, recent trends in food processing and preservation Vitamins; Sources and classification, Chemistry and Metabolic functions, deficiency syndromes, Minerals; Sources and classification, Chemistry and Metabolic functions, deficiency syndromes

UNIT III: FOOD SPOILAGE AND FOOD PRESERVATION (9 Lecture)

Food spoilage – introduction, causes of food spoilage, food poisoning, food-borne intoxication, food-borne infection.

Food preservation and processing: Introduction; necessity; Principles of food preservation; Asepsis, Removal of microorganisms, Maintaining Anaerobic conditions, High temp., Low Temp., Drying, Food Additives and Radiations

UNIT IV: PRESERVATION METHODS (14 Lecture)

Different food preservation methods: Preservation of food by using high temperature, low temperature, salt, sugar, acid, irradiation, chemical, etc. Canning, Filtration, Pickling, Pasteurization, Sterilization, Chilling, Freezing, Cold Storage, drying, freeze drying, UV radiation, Evaporation, smoking.

Recent methods in processing: Introduction; PEF, HPP, ultrasound, dielectric heating; microwave heating, ohmic heating; infrared heating; UV light, X-rays, membrane processing, ionization; high intensity electric field in pulses; new hybrid drying technologies; monitoring by NMR and MRI Technology, etc

UNIT V: EFFECT OF PROCESSING ON FOOD (5 Lecture)

Effect of processing on nutritional value of food: Introduction; consuming raw foods; effect of processing on vitamins; effect of processing on minerals; effect of processing on carbohydrates; effect of processing on lipid.

REFERENCES / TEXTBOOKS:

1. Food Facts and Principles Manay, N. Shakuntala, Shadaksharaswamy, M New Age International Private Limited Fifth, 2022
2. Food Science (Multi Colour Edition) by B Srilakshmi generic 2022 nd edition.
3. Textbook of Food Science and Technology by Vijaya Khader Indian Council of Agricultural Research (ICAR);1 January 2013
4. Fundamentals of Biochemistry Jain JL, Jain S and Jain N S. Chand Publication, India 2016
5. Biochemistry Satyanarayana Elsevier, 2013
6. Leininger Principles of Biochemistry David L. Nelson and Michael M. Cox 6th Ed. Macmillan Learning, NY, USA. 2012
7. Outlines of Biochemistry Conn EE and Stumpf PK 4 th Edition Wiley Eastern Ltd, Pune (India)
8. Food science, Chemistry and Experimental foods by M. Swaminathan.
9. Food Science by Norman. N. Potter.
10. Experimental study of Foods by Griswold R.M.

BFMML102

BASIC FOOD ENGINEERING I

Credits: 2+0

(Fluid Mechanics, Heat and mass transfer)

University: MGM University, Chhatrapati Sambhajanagar

Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Basic Food Engineering -I

Course Code- BFMML102

Credits- 2+0 (2 Theory)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 2 hrs./weekly

**Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year 1/
Semester I**

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Upon successful completion, students will have the knowledge and skills to: Basic heat transfer processes, Convection, Heat Exchangers, Mass transfer and Unit operation etc

Objective:

This course is designed to introduce a basic study of the phenomena of heat and mass transfer, to develop methodologies for solving a wide variety of practical engineering problems, and to provide useful information concerning the performance and design of particular systems and processes.

COURSE CONTENT (Total Lecture- 30)

THEORY:

UNIT I: BASICS OF FLUID MECHANICS AND ENGINEERING (8 Lecture)

Units and Dimensions, Introduction to fluids, properties of different fluids, Compressible and non-compressible fluids; Surface tension, capillarity, Pressures of liquids, static pressure, hydraulic pressure, gauge pressure etc

UNIT II: PRESSURE MEASURING DEVICES (6 Lecture)

Manometers, simple manometers, differential manometers, micro inclined manometers, pressure gauges, mechanical gauges, piezometers etc

UNIT III: FLUID FLOW (8 Lecture)

Introduction, Classification, Steady, uniform and non-uniform Fluid flow, laminar flow, turbulent flow, Reynolds Number, definition, equation and examples, Bernoulli's Equation

UNIT IV: BASIC OF HEAT AND MASS TRANSFER (8 Lecture)

Basics of heat and mass transfer process, heat transfer coefficient, heat transfer properties, conduction, convection and radiation, theory of heat conduction, Fourier's law and its derivation, forced and free convection, radiation, Heat Exchangers: General discussion, fouling factors, jacketed kettles, LMTD, parallel and counter flow heat exchangers, shell and tube and plate heat exchanger, heat exchanger design.

TEXT BOOK

1. Heat and Mass Transfer Nag P McGraw Hill, 2011
2. Heat and Mass Transfer –Fundamentals and Applications Yunus AC and AfshinJGMcGraw Hill, 2015
3. Heat TransferJ.P. Gupta CP Prentice Hall of Media, New Delhi 1994
4. Heat Transfer Holman10 th Ed. McGraw-Hill Book Co., Boston,USA. 2010
5. Food Engineering Operations, J. G. Brennan, J. R. Butters, N. D. Cowell
6. Introduction to Food Engineering, R Paul Singh, Dennis Heldman
7. Fluid Mechanics, Frank M. White. 7th Ed. McGraw-Hill Book Co., Inc.,Boston, USA. 2010
8. Fluid Mechanics: Fundamentals and Applications. Yunus A. Çengel and John M. Cimbala, McGraw-Hill, Inc., New York, USA. 2006.
9. Fundamentals of Fluid Mechanics, Bruce R. M., Donald F. Y. and Theodore H. O. 4th Ed. John Wiley & Sons, Inc., New York, USA. 2002

Food Lab -I

BFVSP105

Credits: 0+2

University: MGM University, Chhatrapati Sambhajnagar

Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Food Lab I

Course Code- BFVSP105

Credits- 0+2 (Practical)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs/weekly

**Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/
Semester I**

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Students will gain the knowledge about new techniques also they will invent new ideas. They can handle all the equipment which are in laboratory.

Objective: While doing Lab students will understand new techniques.

COURSE CONTENTS

Synopsis, Lab work, Thesis Writing, Presentation

Ideas of Lab:

Defining Lab ideas is crucial for setting realistic expectations and laying out a clear vision for a Lab life cycle. Lab-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey:

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

Performance:

Performance measurement during a Lab is to know how things are going so that we can have early warning of problems that might get in the way of achieving Lab objectives and so that we can manage expectations. The criteria of it as given below.

1. Implementation:

Follows closely the design, uses appropriate techniques with skill and understanding to produce a good solution.

2. Evaluation:

Clearly relates to the problem. Shows a good understanding and appreciation of the solution. Objectives of what has been done.

3. Lab Log:

- a. The individual student's effort and commitment.
- b. The quality of the work produced by the individual student.
- c. The student's integration and co-operation with the rest of the group.
- d. The completeness of the logbook & time to time signature of guide

Objective: To elaborate the procedure for Guiding Student Labs

Responsibility:

- All the Lab Guide.
- All Semester B.Sc. students
- Lab Heads

BFSEP106

SENSORY EVALUATION OF FOOD

Credits: 0+2

University: MGM University, Chhatrapati Sambhajinagar

Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Sensory evaluation of food

Course Code- BFSEP106

Credits- 0+2 (Practical)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Practical 4hrs/weekly

**Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/
Semester I**

Prerequisites for registration:

Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Upon successful completion, students will have the practical knowledge and skills to: Basic sensorial evaluation of food, heat and mass transfer in food, different food processing operation, food preservation and processing.

Objective:

This course is designed to introduce to the practical knowledge and skills of sensorial evaluation of food, heat and mass transfer in food, different food processing operation, food preservation and processing.

Course Content

Practical's:

1. Perform preference tests: Paired Comparison
2. Perform discrimination tests: Duo-trio
3. Perform discrimination tests: Triangle
4. Perform discrimination tests: Ranking test
5. Sensory evaluation of various food products using different scales, score cards etc.
6. Texture profile analysis of selected food product
7. Designing a sensory laboratory
8. Heat transfer analysis during conduction
9. Heat transfer analysis during convection
10. Study on various types of heat exchangers used in food industry

11. Study of thermocouples
12. Freezing of foods by different methods
13. Study of blancher, pasteurizers and Homogenizers
14. Preservation of food by using salt
15. Preservation of food by using chemicals

BFMMP107 KEY SKILLS IN FOOD AND NUTRITIONAL SCIENCE Credits: 0+1

University: MGM University, Chhatrapati Sambhajnagar **Faculty:** Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Key Skills in Food and Nutritional Science Course **Code- BFMMP107**

Credits- 0+1 (Practical) **Level of Study:** UG

Mode of delivery planned learning activities and teaching method: Practical 2 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/
Semester I

Prerequisites for registration:

Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Upon successful completion, students will have the practical knowledge and skills to: Basic food processing and food analysis, food sustainability.

Objective:

This course is designed to introduce student to the practical knowledge and skills for basic food processing and food analysis, food sustainability, nutritional value of food groups.

COURSE CONTENT

PRACTICALS:

1. Determination of moisture content of foods using Hot air oven method
2. Determination of moisture content of liquid foods by Karl Fischer method
3. Determination of ash content of foods
4. Determination of acidity of foods
5. Minimal processing of food
6. Preservation of vegetables with minimal processing
7. Preservation of fruits with minimal processing
8. Sustainable food product development
9. Calculation of Basal Metabolic Rate
10. Calculation of Basal Metabolic Index
11. Studies on role of various national and international agencies in the field of food and human nutrition
12. Studies on nutritional value of different food groups
13. Nutritional labelling of food products
14. Visit to food analytical laboratory
15. Visit to Food processing industry

First Year II Semester

Level	First Year (Semester II)																				
4.5	Course Type	Course code	Course Title	Type	Teaching period per week			Credit	Duration of Exam	Evaluation Scheme							Minimum Passing				
										Internal				External			Total	Internal	External		Total
					L	T	P			CA-I	MSE	CA-II	TW	ESE	PR		CA/MSE/TW	ESE	PR		
	Core	BFMML108	Basic Food Engineering (Unit operation for food process)-II	Theory	2			2		10	10	10	-	20	-	50		8		20	
	Core	BFMML109	Food Microbiology	Theory	3		-	3		20	20	20	-	40	-	100		16		40	
	MIN	BFMIL110	Annexure I	Theory	2		-	2		10	10	10	-	20	-	50		8		20	
	AEC		Communicative English II	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20	
	OE**	BFOEL111	Open Elective I	Theory	2		-	2		10	10	10	-	20	-	50		8		20	
	OE	BFOEL112	Open Elective II	Theory	2		-	2		10	10	10	-	20	-	50		8		20	
	VEC		Annexure I	Theory	2	-	-	2		10	10	10	-	20	-	50		8		20	
	VSC*	BFVSP113	Food Lab II	Practical			4	2					30		20	50			8	20	
	SEC*	BFSEP114	Food Quality Labelling & Composition	Practical			4	2					30		20	50			8	20	
	Core	BFMMP115	Microbiological safety & Chemical Analysis of food	Practical	-	-	2	1			-		30	-	20	50			8	20	
	CC		Annexure I	Practical	-	-	4	2			-		30	-	20	50			8	20	
	Total (L-T-P) Hrs / week = 29							15											14		22

BFMML 108

Basic Food Engineering

Credits: 2+0

(Unit operation for food process)-II

University: MGM University, Chhatrapati Sambhajanagar

Faculty: Science (Food Tech. & Processing)

Institute: Institute of Biosciences and Tech.

Degree: Food Tech. & Processing (UG)

Course Unit Title: Food Engineering

Course Code: BFMML 108

Credits allocated: 2+0 (Theory)

Level of Study: UG

Mode of delivery, planned learning activities and teaching method: Lecture 2hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Bachelor of Science, Year I/ Semester II

Learning Outcomes: Upon successful completion, students will have the knowledge and skills to:
Basic concepts: systems, processes, cycles, energy, The Zeroth Law of Thermodynamics Ideal gases and Properties of steam.

Objective: To familiarize the students with the fundamental principles of Energy Generation & Conservation, various developments and its potential applications.

COURSE CONTENT (Total Lecture- 30)

THEORY:

UNIT I: BASIC CONCEPTS OF THERMODYNAMICS (6 Lecture)

Basic concepts: systems, processes, cycles, energy, The Zeroth Law of Thermodynamics Ideal gases: Equation of state, Compression and expansion of gases, The first Law of Thermodynamics: Internal energy, enthalpy.

UNIT II: BASICS OF UNIT OPERATION FOR FOOD PROCESSING (14 Lecture)

Size reduction: Benefits, classification, sieve/screen analysis, principle and mechanisms of comminution of food

Size reduction equipment: Principal types, hammer mills and impactors, attrition mills, buhr mill, tumbling mills, tumbling mills, colloid mill, cutting machines (slicing, dicing, shredding, pulping);

Mixing: Theory of solids mixing, criteria of mixer effectiveness and mixing indices, rate of mixing, theory of liquid mixing, power requirement for liquids mixing; Mixing equipment: Mixers for low- or medium-viscosity liquids (paddle agitators, impeller agitators, powder-liquid contacting devices, other mixers),

Mechanical Separations: theory, centrifugation, liquid-liquid centrifugation, liquid-solid centrifugation, clarifiers, desludging machines; Filtration: theory of filtration, rate of filtration, pressure drop during filtration, applications, Filtration equipment; plate and frame filter press, rotary filters, centrifugal filters and air filters,

filter aids; Membrane separation: Concept, materials for membrane construction, Applications of ultra-filtration in food processing; Evaporation, concept of evaporation, mechanism

UNIT III: RENEWABLE ENERGY SOURCES (5 Lecture)

Renewable energy sources like solar, wind and biogas and the its utilization in food processing, Related equipment and machineries to renewable energy sources

UNIT IV: FUELS AND CALORIFIC VALUE (5 Lecture)

Fuels: Chemical properties, air force combustion, Calorific value and its determination. Properties of steam: Wet, dry saturated super-heated steam

Condensers; Layout of pipe-line and expansion joints, Air Compressors: Reciprocating, Single and two stage air compressors.

REFERENCES / TEXTBOOK

1. Food Engineering Operation Brenan JG, Butters JR, Elsevier Applied Science London. 1990
2. Unit Operations in Food Processing Earle RL Elsevier, 2013
3. Unit Operations in Food Processing Ibarz A. and Gustavo VBC CRC Press, 2002
4. Engineering Thermodynamics C.P. Gupta and Rajendra Prakash
5. Thermal Engineering Ballaney P.L.S. Sivanagaraju, M. Balasubba Reddy, D.
6. Electric Energy-Generation, Utilization and Conservation S. Sivanagaraju,
7. Energy Management and Conservation P. Diwan and Dwivedi
8. Energy generation.
9. N.C. Pandya & C.S. Shah. Elements of Heat Engines Charotar Publishing House, Anand 1990
10. Indian Boiler Regulation Codes Indian Boiler Regulation Codes, 1991
11. Generation of Electrical Energy Gupta BR S. Chand Publishing, New Delhi 2010

FOOD MICROBIOLOGY

BFMML109

Credits: 3+0

University: MGM University, Chhatrapati Sambhajnagar Faculty: Science (Food Tech. & Processing)

Institute: Institute of Biosciences and Tech.

Degree: Food Tech. & Processing (UG)

Course Unit Code: BFMML109

Credits allocated: 3+0 (Theory)

Course Unit Title: Food Microbiology

Level of Study: UG

Mode of delivery, planned learning activities and teaching method: Lecture 3hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Bachelor of Science, Year I/ Semester II

Learning Outcomes: Upon successful completion, students will have the knowledge and skills to: Basic heat transfer processes, Convection, Heat Exchangers, Mass transfer and Unit operation etc

Objective: This Course is designed to introduce a basic study of the phenomena of heat and mass transfer, to develop methodologies for solving a wide variety of practical engineering problems, and to provide useful information concerning the performance and design of particular systems and processes.

COURSE CONTENT (Total Lecture- 45)

THEORY:

UNIT I- INTRODUCTION OF FOOD MICROBIOLOGY (8 Lecture)

Importance and significance of microbiology, microorganisms in food science, classification of Microorganisms, morphology of microorganisms, structure of cell (plant cell & animal cell)

UNIT II-BACTERIA, YEAST, MOULD, VIRUSES (8 Lecture)

Morphology and structure of Bacteria, Yeast, Mould and Viruses. cultivation of bacteria, nutritional requirements, nutritional classification of bacteria, phototrophs, chemotrophs, autotrophs and heterotrophs, obligate parasites. Thermophilic bacteria, Thermophobic bacteria, Prebiotics, Probiotics, Role of bacteria in different food production, bacterial spoilage

UNIT III-MICROBIAL SPOILAGE OF FOOD (16 Lecture)

Microbial spoilage of foods Factors affecting kinds, numbers, growth and survival of microorganisms in foods, Intrinsic factors; pH, water activity, nutrients etc and Extrinsic factors: Relative humidity, temperature and gaseous atmosphere. Chemical changes caused by microorganisms: Changes in nitrogenous organic compounds, non-nitrogenous organic compounds, organic acids, other compounds, lipids, pectic substances, Contamination of foods; Sources of contamination, Genera of bacteria, Maintenance of anaerobic conditions; Asepsis, removal of microorganisms; Intermediate moisture foods; Microbiology of cereal and cereal products, milk and milk products, meat and meat

products, poultry and eggs, fish and other sea foods, Microbiology of fruits and vegetables and canned foods, Microbiology of fruits and vegetables and canned foods

UNIT IV- MICROSCOPES (6 Lecture)

Introduction of Microscope, history, application, classification of microscope, basic to advance microscopes, Microscopy, introduction, types, application etc

UNIT V- GROWTH CURVE (7 Lecture)

Growth curve of bacteria, lag phase, log phase, Z value, D value, Bacteriological media, growth of bacteria, reproduction of bacteria, introduction to fungi, algae and protozoa and virus

REFERENCES / TEXTBOOK

1. Food Microbiology Frazier and Dennis 4th Ed. Tata McGraw-Hill Education, New Delhi. 1987
2. Modern Food Microbiology James M. Jay 6th Ed. Aspen Publishers, Inc., Gaithersburg, Maryland, USA. 2002
3. Basic Food Microbiology Banawart GJ 2nd Ed. AVI Publ. 1989
4. Essentials of Food Microbiology Garbutt J Arnold Heinemann, 1997
5. Fundamentals of Food Microbiology Ray B 3rd Edition, CRC Press, 2004
6. Microbiology by Pelczar, Chan and Krieg, 5th Ed. Tata McGraw-Hill Education, New Delhi.
7. Fundamentals of Microbiology , Jeffrey C.P. Elsevier Publication, London 2017

NUTRACEUTICAL AND FUNCTIONAL FOODS

BFMIL110

Credits: 2+0

University: MGM University, Chhatrapati Sambhajanagar Faculty: Science (Food Tech. & Processing)

Institute: Institute of Biosciences and Tech.

Degree: B.Sc. (Hons). Food Tech. & Processing (UG)

Course Unit Code: BFMIL110

Course Unit Title: Nutraceuticals and functional Foods

Credits allocated: 2+0 (Theory)

Level of Study: UG

Mode of delivery, planned learning activities and teaching method: Lecture 2hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Bachelor of Science, Year I/ Semester II

Learning outcomes: Upon successful completion, students will have the knowledge of basic concepts of nutraceuticals, bioactive compounds, functional foods, etc.

Objective: To familiarize students with the functional foods, nutraceutical in different foods, raw materials, function of bioactive component.

COURSE CONTENT (Total Lecture- 30)

THEORY:

UNIT-I: TECHNOLOGICAL ASPECTS OF NUTRACEUTICALS AND FUNCTIONAL FOODS (12 Lecture)

Defining nutraceuticals and functional foods, nature, type and scope. Nutraceuticals and functional foods applications and their health benefits, classification, relevant descriptions.

Nutraceutical for specific diseases: Food recommended and restricted in metabolic disorders and disturbances, gastrointestinal disorders; fever and infection; liver, blood, circulatory and cardiac diseases; urinary and musculoskeletal diseases, allergies, infant and baby foods, adolescent/ teen age foods, foods for pregnant ladies and nursing mothers, geriatric foods

UNIT –III: FUNCTIONAL ROLE OF BIO-ACTIVE COMPOUNDS (7 Lecture)

Antioxidants, phytochemicals, isoflavones, lycopenes, their role in Nuraceuticals and functional foods, dietary fibers and complex carbohydrates as functional food ingredients. Health benefits/ mode of action of PUFA/ gamma linolenic acids, probiotic foods and their functional role, minerals and other miner food constitutes as reported in literature.

UNIT –IV: ROLE OF SPECIFIC FOOD PRODUCTS AS A FUNCTIONAL FOOD (6 lecture)

Herbs as functional foods, health promoting activity of common herbs. Cereal products as functional foods- Oats, Wheat bran, rice bran etc. Functional vegetable products, oil seeds and sea foods. Coffee, tea and other beverages as functional foods/ drinks.

UNIT –V: LEGAL ASPECTS OF NUTRACEUTICALS & FUNCTIONAL FOODS (5 Lecture)

Effects of processing and storage, interaction of various environmental factors on the potentials of such foods. Marketing and regulatory issues of Nutraceuticals and functional foods and. Recent developments and advances in the area of Nutraceuticals and functional foods.

REFERENCES / TEXTBOOK

1. Handbook of Nutraceutical and Functional Foods, Wildman REC
2. Angi-angiogenic Functional and Medicinal Foods, Losso JN
3. Handbook of Nutraceuticals, Pathak YV
4. Innovations in Healthy and Functional Food, Ghosh D et al
5. Nutrition and Dietetics, S. A. Joshi

FOOD LAB-II

BFVSP113

Credits: 0+2

University: MGM University, Chhatrapati Sambhajanagar

Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: FOOD LAB II

Course Code- BFVSP113

Credits- 0+2 (Practical)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Practical 4hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/
Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes: Students will gain the knowledge about new techniques also they will invent new ideas. They can handle all the equipment which are in laboratory.

Objective: While doing Lab students will understand new techniques.

COURSE CONTENTS

Synopsis, Lab work, Thesis Writing, Presentation

Ideas of Lab:

Defining Lab ideas is crucial for setting realistic expectations and laying out a clear vision for a Lab life cycle. Lab-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey:

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

Performance:

Performance measurement during a Lab is to know how things are going so that we can have early warning of problems that might get in the way of achieving Lab objectives and so that we can manage expectations. The criteria of it as given below.

1. Implementation:

Follows closely the design, uses appropriate techniques with skill and understanding to produce a good solution.

2. Evaluation:

Clearly relates to the problem. Shows a good understanding and appreciation of the solution. Objectives of what has been done.

3. Lab Log:

- a. The individual student's effort and commitment.
- b. The quality of the work produced by the individual student.
- c. The student's integration and co-operation with the rest of the group.
- d. The completeness of the logbook & time to time signature of guide

Objective: To elaborate the procedure for Guiding Student Labs

Responsibility:

- All the Lab Guide.
- All Semester B.Sc. students
- Lab Heads

University: MGM University, Chhatrapati Sambhajanagar

Faculty: Science (Food Tech. & Processing)

Institute: Institute of Biosciences and Tech.

Degree: Food Tech. & Processing (UG)

Course Code: BFSEP114

Credits allocated: 0+2 (Practical)

Course Unit Title: Food Quality Labeling & Composition

Level of Study: UG

Mode of delivery, planned learning activities and teaching method: Lecture 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Bachelor of Science, Year I / Semester II

Course Objectives: To develop an understanding of basic skills for determination of food quality, different product development rich in nutraceuticals.

Course outcomes: To provide knowledge to the student for quality determination of foods, development of nutraceutical rich foods, labelling of food products.

COURSE CONTENT

PRACTICAL:

1. Preparation of functional food enriched with nutraceutical.
2. Production of flaxseed oil enriched cookies
3. Production of high value vitamin C enriched mango leather
4. Production of xylitol enriched hard boiled candy.
5. Production of iron enriched beverage.
6. Development of probiotic/ prebiotic food
7. Effect of packaging on food product.
8. Designing label for functional foods.
9. Quick test for food quality determination.
10. Adulteration detection test.
11. Study of FSSAI.
12. Determination of calorific value of fuel
13. Determination of dryness fraction of steam by throttling calorimeter
14. Determination of dryness fraction of steam by separating calorimeter
15. Study of Boiler mounting and boiler accessories.

BFMMP115 MICROBIOLOGICAL SAFETY & CHEMICAL ANALYSIS OF FOOD

Credits: 0+1

University: MGM University, Chhatrapati Sambhajanagar

Faculty: Science (Food Tech. & Processing)

Institute: Institute of Biosciences and Tech. Degree: Food Tech. & Processing (UG)

Course Unit Code: BFMMP115 Credits allocated: 0+1 (Practical)

Course Unit Title: Microbiological safety & Chemical Analysis of food Level of Study: UG

Mode of delivery, planned learning activities and teaching method: 2hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Bachelor of Science, Year I / Semester II

Course Objectives: To develop an understanding of basic skills for microbial and chemical analysis of food

Course outcomes: To provide knowledge to the student for basic skills for microbial and chemical analysis of food

COURSE CONTENT

PRACTICAL:

1. Estimation of Salmonella / Shigella / Staphylococcus from food samples
2. Estimation of Fungal toxins form food Samples
3. Heavy metal detection (Lead) in food.
4. Isolation and identification of Listeria and E. coli.
5. Study of HACCP for food industries by taking few models
6. Study of National and International microbial quality standards
7. Microbial analysis of water
8. Chemical analysis of water
9. Study of swelling characteristics of starches
10. Studies of solubility characteristics of starches
11. Study of rheological properties of food
12. Determination of essential amino acids in food
13. Isolation of protein from different sources of food
14. Preparation of protein isolates
15. Preparation of protein concentrates

List of Options to select from Bucket of Courses provided in various categories (Sample of Faculty of Basic and Applied Sciences):

Major
Food Technology and Processing

Minor options Within Faculty of Basic Sciences	Food Nutrition and Dietetics
	Microbiology
	Biotechnology
	Bioinformatics

Minor options from Other Faculty	Faculty of Engineering and Technology	Faculty of Social Sciences and Humanities	Faculty of Design	Faculty of Management and Commerce	Interdisciplinary Faculty	Performing Arts
	Artificial Intelligence (AI)	Journalism and Mass Communication	Product Design	Operations and Supply Management	Cosmetic Technology	Theatre Arts
	Machine Learning (ML)	Film Making	Visual Communication	Human Resource (HR)	Educational Technology	Dance
	Data Analytics	Photography	Contemporary Arts	Finance Management	Yog Sciences	Music
	Robotics	Psychology	Interior Design	Marketing	Physical Education	Painting
	Industrial Automation	Economics	Fashion Technology	Accounting	Library Sciences	Pottery

IKS (As per the UGC guidelines. Visit Link:https://iksindia.org/English-BGSamposhan-Kendram-1-updated.pdf) ***	Faculty of	AEC (to be discussed and developed by committee of Dean)*		OE (Provide 4-8 courses of your department to be approved by the BOS)	Faculty of
Holistic medicine and wellness	***Courses For reference purpose only	Communicative English	*Courses For reference purpose only	Food Biotechnology	Food Technology
Indian psychology and yoga		Communication and Soft Skills		Food Chemistry	Food Technology
Indian sports and martial arts		German		Food Microbiology and Fundamentals of Food Technology	Food Technology
Architectural engineering, town planning, civil engineering, Vaastu and Shilpa Shastra		French		Graphics and Product Designing	Food Technology
Sustainable agriculture and food preservation methods		Spanish			

VSEC (Respective departments will prepare the list)	Faculty of	CC(Two courses to be finalized for I & II Semester)***		VEC (to be discussed and developed by committee of Dean) ***
		NSS	***Courses For reference purpose only	Universal Human Values
		Digital Awareness		Gandhian Studies
		Personality Development		Value Education
		Yoga		
		NCC		

Level	Third Year (Semester VI)																					
	Course Type	Course code	Course Title	Type	Teaching period per week			Credits	Duration of Exam	Evaluation Scheme (Marks)						Minimum Passing (Marks)						
					L	T	P			Internal			External			Total	Internal			External		Total
										CA 1	MSE	CA2	TW	ESE	PR		CA	MSE	TW	ESE	PR	
5.5	Core	BFMML312	Advance food safety & Quality Management	Theory	2	-	-	2		10	10	10	-	20	-	50				8		20
	Core	BFMML313	Bakery, Confectionery, Snacks & Beverages processing Technology	Theory	3		-	3		20	20	20	-	40	-	100				16		40
	Core	BFMML314	Post harvest Management of Fruits & Vegetables	Theory	3		-	3		20	20	20	-	40	-	100				16		40
	Core elective	BFMEL315	Food Additives and Preservatives/ Food fortification	Theory	3		-	3		20	20	20	-	40	-	100				16		40
	MIN	BFMIL316	Annexure I	Theory	2		-	2		10	10	10	-	20	-	50				8		20
	MIN	BFMIL317	Annexure I	Theory	2	-		2		10	10	10	-	20	-	50				8		20
	OJT	BFJTP318	On Job Training	Practical		-	8	4					30		20	50					8	20
	Core	BFMMP319	Literature Review in Food Science & Nutrition	Practical	-	-	2	1		-	-	-	30	-	20	50					8	20
	Core	BFMMP320	Quality Assurance-I	Practical	-	-	2	1		-	-	-	30	-	20	50					8	20
	Core elective	BFMEP321	Food Additives and Preservatives Lab/ Food fortification	Practical	-	-	2	1					30	-	20	50					8	20
				Total = 29		15	14	22														

Level 5.5 Award of UG degree in major and minor (44+44+44)=132 credits OR continue with major and minor

Level	Fourth Year (Semester VIII)																					
	Course Type	Course code	Course Title	Type	Teaching period per week			Credits	Duration of Exam	Evaluation Scheme (Marks)						Total	Minimum Passing (Marks)					
					L	T	P			Internal			External				Internal		External			
										CA 1	MSE	CA 2	TW	ESE	PR		CA	MSE	TW	ESE	PR	Total
6.0	Core	BFMML410	Marketing Management	Theory	3	-	-	3		20	20	20	-	40	-	100	-	-	-	16	-	40
	Core	BFMML411	Adv. Quality Assurance and Certification	Theory	3	-	-	3		20	20	20	-	40	-	100	-	-	-	16	-	40
	Core	BFMML412	Food Law and Regulations	Theory	3	-	-	3		20	20	20	-	40	-	100	-	-	-	16	-	40
	Core	BFMML413	Business Management and Economics	Theory	2	-	-	2		10	10	10	-	20	-	50	-	-	-	8	-	20
	Core elective	BFMEL414	Lab Preparation and Management/ Storage and handling of fresh agriculture produce	Theory	3	-	-	3		20	20	20	-	40	-	100	-	-	-	16	-	40
	OJT	BFJTP415	On Job Training	Practical	-	-	8	4		-	-	-	30	-	20	50	-	-	-	-	8	20
	Core elective	BFMEP416	Lab Preparation and Management Lab/ Storage and handling of fresh agriculture produce	Practical	-	-	2	1		-	-	-	30	-	20	50	-	-	-	-	8	20
	Core	BFMMP417	Marketing Management Seminar	Practical	-	-	2	1		-	-	-	30	-	20	50	-	-	-	-	8	20
	Core	BFMMP418	Food Product Quality Lab	Practical	-	-	2	1		-	-	-	30	-	20	50	-	-	-	-	8	20
	Core	BFMMP419	Food Law and Regulation Seminar	Practical	-	-	2	1		-	-	-	30	-	20	50	-	-	-	-	8	20
			Total = 30		14	-	16	22		-	-	-					-	-	-	-		

Level 6.0 Four year UG Honours Degree in major and minor (44+44+44+44) = 176 credits

Level	Fourth Year (Semester VIII)																					
	Course Type	Course code	Course Title	Type	Teaching period per week			Credits	Duration of Exam	Evaluation Scheme (Marks)						Minimum Passing (Marks)						
					L	T	P			Internal				External		Total	Internal			External		Total
										CA 1	MSE	CA 2	TW	ESE	PR		CA	MSE	TW	ESE	PR	
6.0	Core		Marketing Management	Theory	3		-	3		20	20	20	-	40	-	100				16		40
	Core		Adv. Quality Assurance and Certification	Theory	2		-	2		20	20	20	-	40	-	100				16		40
	Core		Food Law and Regulations	Theory	2		-	2		20	20	20	-	40	-	100				16		40
	Core		Business Management and Economics	Theory	2		-	2		10	10	10	-	20	-	50				8		20
	Core elective		Project Preparation and Management/ Storage and handling of fresh agriculture produce	Theory	3		-	3		20	20	20	-	40	-	100				16		40
	Core elective		Project Preparation and Management Lab/ Storage and handling of fresh agriculture produce	Practical	-	-	2	1					30	-	20	50					08	20
	Core		Food Product Quality Lab	Practical	-	-	2	1		-	-	-	30	-	20	50					08	20
	RP		Research Project II	Practical	-	-	16	8		-	-	-	30	-	20	50					08	20
			Total = 31		12		20	22														

Level 6.0 Four year UG Honours with research Degree in major and minor (44+44+44+44) = 176 credits

*[Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year.]

Generic Open Elective Course Syllabus

BFOEL103

BASICS OF FOOD SCIENCE

Credits: 2+0

University: MGM University, Aurangabad Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Basics food science

Course Code- BFOEL103

Credits- 2+0 (Theory)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 2 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year I/ Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Learning Outcomes:

Upon successful completion, students will have the knowledge and skills to: introduce food, spoilage of food, properties of food, etc

Objective:

This course is designed to introduce a basics of Food, nutrition, food processing, perishability of product, causes of spoilage of food, etc.

THEORY: COURSE CONTENT (30 Lecture)

UNIT I: INTRODUCTION TO FOOD (7 Lecture)

Introduction – Defining food; classification of food; constituents of foods; recent trends in food processing and preservation.

UNIT II: FOOD SPOILAGE (7 Lecture)

Food spoilage – introduction, causes of food spoilage, food poisoning, food-borne intoxication, food-borne infection.

UNIT III: FOOD PRESERVATION (7 Lecture)

Food preservation and processing: Introduction; necessary; methodology; principles and methods of food preservation.

UNIT IV: PRESERVATION METHODS (9 Lecture)

Different food preservation methods: Preservation of food by using high temperature, low temperature, salt, sugar, acid, irradiation, chemical, etc. Effect of processing on nutritional value

of food: Introduction; consuming raw foods; effect of processing on vitamins; effect of processing on minerals; effect of processing on carbohydrates; effect of processing on lipid.

REFERENCES / TEXTBOOKS:

1. Food Facts and Principles Manay, N. Shakuntala, Shadaksharaswamy, M New Age International Private Limited Fifth, 2022
2. Food Science (Multi Colour Edition) by B Srilakshmi generic 2022 nd edition.
3. Textbook of Food Science and Technology by Vijaya Khader Indian Council of Agricultural Research (ICAR);1 January 2013
4. Fundamentals of Biochemistry Jain JL, Jain S and Jain N S. Chand Publication, India 2016
5. Biochemistry Satyanarayana Elsevier, 2013
6. Leininger Principles of Biochemistry David L. Nelson and Michael M. Cox 6th Ed. Macmillan Learning, NY, USA. 2012

University: MGM University, Aurangabad Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Chemistry of Foods I

Course Code- BFOEL104

Credits- 2+0 (Theory)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 2 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year 1/ Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Objective:

1. To provide an understanding of the chemical function and properties of major food components.
2. To provide an understanding of the chemical interactions of food components and their effects on sensory and nutritional quality, functional properties, and safety of foods.

Learning Outcomes:

Upon successful completion, students will have the knowledge and skills to: Introduction: Nature Scope and development of food chemistry, role of food chemist, Introduction: Nature Scope and development of food chemistry, role of food chemist, Proteins in foods, Oil processing.

COURSE CONTENTS THEORY: (30 Lecture)

UNIT I: INTRODUCTION OF FOOD CHEMISTRY (7 Lecture)

Introduction: Nature Scope and development of food chemistry, role of food chemist.

Moisture in foods: Role and type of water in foods; Functional properties of water; role of water in food spoilage; Water activity and sorption isotherm

UNIT II: DISPERSION SYSTEM IN FOOD (7 Lecture)

Molecular mobility and foods stability. Dispersed systems of foods: Physicochemical aspects of food dispersion system (sol, gel, foam, emulsions, etc); Rheology of diphasic systems

UNIT III: CARBOHYDRATE (7 Lecture)

Carbohydrates: Changes of carbohydrates on cooking, modification of carbohydrates, dietary fibres and carbohydrates digestibility; Enzymatic and chemical reactions of carbohydrates.

UNIT IV: PROTEIN AND LIPIDS (9 Lecture)

Proteins in foods: Processing induced, physical, chemical and nutritional changes in protein, chemical and enzymatic modification of protein. Lipids in foods: Role and use of lipids/fat, crystallization and consistency, chemical aspects of lipids, lipolysis, auto-oxidation, thermal decomposition, chemistry of frying technology of fat and oil.

REFERENCES / TEXTBOOK

1. Food Chemistry Owen R, Fennema 3rd Ed. Marcel Dekker, Inc., New York, USA. 1996
2. Food Chemistry Lillian Hoagland Meyer the AVI Publishing Co Inc., Connecticut, MA, USA
3. Principles of Food Chemistry De Man JM AVI Publishing Co Inc., 1976
4. Essentials of Food and Nutrition Swaminathan M. Vol. II, Ganesh & Co., 1974
5. Introductory Food Chemistry. Comstock Publishing Associates John W. Brady Cornell University Press, Ithaca, USA. 2013
6. Food Chemistry H.-D. Belitz, W.Grosch and P. Schieberle 4th Ed. Springer-Verlag Berlin Heidelberg. 2009
7. Biochemistry of Foods Eskin NAM, Henderson HM and Townsed RJ Academic Press, New York 1971
8. Food Biochemistry and Food Processing Benjamin K. S.Wiley-Blackwell, London ISBN: 978081380874
9. Food Chemistry Daavid NewtonFacts on File, Inc. New York ISBN: 0816052778

BFOEL111

CHEMISTRY OF FOODS -II

Credits: 2+0

University: MGM University, Aurangabad Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Chemistry of Foods II

Course Code- BFOEL111

Credits- 2+0 (Theory)

Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 2 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year 1/ Semester II

Course Outcome: -

Students will learn the understanding of the chemical bases of food flavours, pigments, colorants, vitamins and minerals.

Learning objectives

To provide an optimum environment for students to gain an understanding of the chemical bases of food Flavors, pigments, colorants, vitamins and minerals

COURSE CONTENT (THEORY): (30 Lecture)

UNIT -I VITAMINS AND MINERALS: (7 Lecture)

Requirements, allowances, enrichment, restorations, fortifications, losses of vitamins and minerals, optimization and retention of vitamins and minerals; Chemistry of anti-nutritional factors.

UNIT -II FOOD FLAVORS (7 Lecture)

Philosophy and definitions of flavour, flavoring compounds, sensory assessment of flavour, technology for flavour retention.

UNIT -III PIGMENTS AND COLOURS (7 Lecture)

Heme pigments, chlorophyll, carotenoids, phenolic and flavonoids, betalins, effect of processing on pigment behaviour; technology for retention of natural colours of food stuffs. Regulatory use of regulatory dyes; Colour losses during thermal processing. Nutraceuticals in food: major nutraceuticals viz. antioxidants, phenols, tannins, etc

UNIT -IV FOOD TOXICOLOGY: (9 Lecture)

Inherent toxicants – antinutritional factors, their occurrence, effects and methods of elimination or inactivation- protease inhibitions, lectins, lathrogens, phytates and flatulence factors; Terms in toxicology Food Safety: Safety evaluation using traditional and modern approach; Food Contaminants; Pesticide residues – permitted limits; Toxicology and public health

REFERENCES / TEXTBOOK

- 1 Food Chemistry Owen R, Fennema 3rd Ed. Marcel Dekker, Inc., New York, USA. 1996
- 2 Food Chemistry Meyer L.H. CBS Publishers & Distributors, New Delhi (India) 2004
- 3 Food Chemistry Lillian Hoagland Meyer The AVI Publishing Co Inc., Connecticut, MA, USA. 1974
- 4 Introductory Food Chemistry. John W. Brady Cornell University Press, Ithaca, USA. 2013
- 5 Food Chemistry H.-D. Belitz, W. Grosch and P. Schieberle 4th Ed. Springer-Verlag Berlin Heidelberg. 2009
- 6 Biochemistry of Foods Eskin NAM, Henderson HM and Townsed RJ Academic Press, New York 1971

BFOEL112 DEFENCE AND SUSTAINIBILITY IN FOOD Credits: 2+0

University: MGM University, Aurangabad Faculty: Basic and Applied Sciences

Institute: Institute of Biosciences and Technology

Degree: B.Sc. (Hons.) Food Technology & Processing (UG)

Course Unit Title: Defence and Sustainability in Food Course Code- BFOEL112

Credits- 2+0 (Theory) Level of Study: UG

Mode of delivery planned learning activities and teaching method: Lecture 2 hrs/weekly

Recommended Year /Semester: B.Sc. (Hons.) Food Technology & Processing (UG), Year 1/ Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Objective:

During this course, students will: Study the characteristics, outcomes, objectives, and values of different contemporary food systems and food sustainability in different regions.

Learning Outcomes:

Understand the food groups and their functions. 2. Acquire knowledge on different methods of cooking 3. Apply process of different foods 4. Use combination of foods in the development of food products. 5. Identify and control adulterants in various foods and evaluate food quality.

COURSE CONTENT THEORY: (30 Lecture)

UNIT I SUSTAINABLE FOOD SYSTEMS (7 Lecture)

Food System- Concept of Food Systems, Introduction to food system, History of food system, Types of food systems- Global, regional, national and local, Food system in the context of other systems Concept of sustainable food system.

UNIT II FOOD SUSTAINIBILITY AND HEALTHY DIETS (7 Lecture)

Introduction to food sustainability, Importance of food sustainability, Sustainability Issues, Threats; such as drought, wind, flood, temperature, and fire, Different food groups, Importance of healthy diet, Nutritional components of healthy diets, Recommended dietary allowances (RDA), Formulation of the healthy diet for an individual.

UNIT III AGROBIODIVERSITY AND FOOD (7 Lecture)

Agrobiodiversity and food security, Soil system and critical fertility factors, Agricultural production systems, conventional agriculture, Sustainable agricultural goals, Environmental impacts from cultivation practices, Global context for agrobiodiversity management, Genetic

resources for food and agriculture, Agrobiodiversity products and services, Sustainable management of agrobiodiversity.

UNIT IV FOOD POLICY & PLANNING (9 Lecture)

Introduction to Food Policy, National Food Policy (NFP)- Goal and Objectives of the National Food Policy, Conceptual Framework of the Comprehensive Food Security System, Objectives, Strategies, Instruments and Activities of the National Food Policy, Food Policy Research, Analysis and Co-ordination.

REFERENCES / TEXTBOOKS:

1. Technology of Food Preservation, Desroiser N.W. AVI Pub. Co., 1997
2. Nature and Properties of Soils, The, 14/E Nyle C. Brady, Raymond Weil Publisher: Prentice Hall, 14th edition 2008
3. Elements of the Nature and Properties of Soils, 3/E Nyle C. Brady, Raymond Weil Publisher: Prentice Hall, 3rd edition 2010
4. Agroecology: The Science of Sustainable Agriculture, Miguel A Altieri Publisher: Westview Press; 2nd edition