



ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus

(From Academic Session 2020-21 onwards)

M.Voc

Food Processing and Quality Management

2nd Semester



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Guwahati

Course Structure

(From Academic Session 2020-21 onwards)

M.Voc: Food Processing and Quality Management

2nd Semester: Course Structure

Theory/ Practical	Sl. No.	Sub Code	Subject	Hrs/Week			Credit C	Marks	
				L	T	P		CE	ESE
Core									
Theory	1	MFP202201	Food Microbiology	3	0	0	3	30	70
	2	MFP202202	Food Product Development and Sensory Evaluation	3	0	0	3	30	70
	3	MFP202203	Food Packaging	3	0	0	3	30	70
	4	MFP202204	Nutraceuticals and Functional Foods	3	0	0	3	30	70
Practical	1	MFP202215	Lab –I	0	0	4	2	30	70
	2	MFP202216	Lab –II	0	0	4	2	30	70
	3	MFP202227	Industrial Internship and Presentation	0	0	0	1	30	70
Elective-2 (Any One)									
Theory	1	MFP202E201	Technology of Meat, Fish, Poultry and Egg	4	0	0	4	30	70
Theory	2	MFP202E202	Bakery Science and Technology	3	0	0	3	30	70
Practical		MFP202E212	Bakery Science and Technology Practical	0	0	2	1	30	70
Theory	3	MFP202E203	Technology of Spices and Plantation Products	4	0	0	4	30	70
Total				16/ 15	0	8/10	21	240/ 270	560/ 630
Total Contact Hours per Week: 23/26									
Total Credit: 21									

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202201	Food Microbiology	3-0-0	3

MODULE 1:

History of microbiology; Classification/groups of microorganism; Morphology and structure of bacteria, fungi and algae; Nutritional and physical requirements for growth of bacteria; Bacterial spores and their significance in food microbiology; Microbial growth curve

MODULE 2:

Importance and significance of microorganisms in food science; Micro-organisms importance in food - Factors affecting the growth of micro organisms in food - Intrinsic and Extrinsic parameters that affect microbial growth

MODULE 3:

Sources of microorganism in food (contamination from plants, animals, sewage, soil, water, air, etc.); Food as substrate for microbial growth; Physical, chemical and biological method of microbial destruction; Thermal Death Time, Thermal Death Point, D, Z and F values; Method of microbial examination of foods Beneficial uses of microorganism in foods

MODULE 4:

Principles of food spoilage; Chemical changes caused by microorganisms; Spoilage of milk and milk products, cereals and cereal products; meat and meat products, fish and fish products, poultry and eggs, sugars, spices and salt, canned foods; Indicators of microbial food spoilage

MODULE 5:

Food borne illnesses: Food borne infections, Food borne intoxications, Mycotoxins (sources and prevention); Food sanitation and public health; Control of Food Borne Pathogen

TEXT/REFERENCE BOOKS:

1. Willey, J. M., Sherwood, L., & Woolverton, C. J. (2011). *Prescott's microbiology* (Vol. 7). New York: McGraw-Hill.
2. Pelezar, M.I and Reid, R.D. (2007) *Microbiology* McGraw Hill Book Company, New York, 5th Edition.
3. James, M.J. (2000) *Modern Food Microbiology*, 2nd Edition. CBS Publisher
4. Adams, M.R. and M.G. Moss (2009): *Food Microbiology*, 1st Edition, New Age International (P) Ltd.
5. Frazier, W.C. (2007) *Food Microbiology*, Mc Graw Hill Inc. 4th Edition.
6. Doyle, P., Bonehat, L.R. and Mantville, T.J (2010): *Food Microbiology, Fundamentals and Frontiers*, ASM Press, Washington DC.

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202202	Food Product Development and Sensory Evaluation	3-0-0	3

MODULE 1:

Food needs and consumer preference, Needs and types of food consumption trends, economic, psychological, anthropological and sociological dimensions of food consumption

MODULE 2:

Designing new products: concepts and definitions, factors in fluency new product development – social concerns, health concerns impact of technology and market place influence (Corporate, market place, technological and governmental influences). Types of new food products: line extension, innovative –creative products, existing products – repositioned, reformulated, new form, new size and new package.

MODULE 3:

Stages in food product development- idea generation, screening –objectives and criterion, development of product prototype- market research , concept testing approaches , product formulation and specification, product optimization, process development and optimization , product attributes, scale up requirements ; product prototype testing – consumer testing , packaging testing, shelf life testing, marketing plans – price structure , place and distribution system , promotional program , market positioning , test marketing, result evaluation

MODULE 4:

Sensory attributes of foods; planning and conducting sensory evaluation, physical setup for conducting sensory analysis, panel development for sensory evaluation – selection and training, , preparation and presentation of samples , score card development, role of sensory analysis in product development and quality control

TEXT/REFERENCE BOOKS:

1. Lyon, D.H.; Francombe, M.A.; Hasdell, T.A.; Lawson, K. (eds) (2002): Guidelines for Sensory Analysis in Food Products Development and Quality Control. Chapman and Hall, London.
2. Lawless, H.T. and Klein, B.P. (2001): Sensory Science Theory and Applications in Foods. Marcel Dekker Inc. New York.
3. Piggott, J.R. (ed) (2008): Sensory Analysis of Foods. Elsevier Applied Science, London
4. Ranganna S. 2006. HandBook of Analysis and Quality Control for Fruits and Vegetables Products 2nd Ed. Tata McGraw- Hill Publishing Company Limited. New Delhi

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202203	Food Packaging	3-0-0	3

MODULE 1:

Definition; Package environment; Functions of packaging; Importance and scope of packaging; Classification of packages; Food Labeling and laws

MODULE 2:

Glass as packaging material: Composition; Physical properties of glass; Advantages and disadvantages of glass packaging materials; Types of glass containers; Parts of glass container; Manufacture, annealing and surface treatments.

Metal packaging materials: Tin plate; Chromium coated steel; Aluminium containers and foil; Corrosion of metal containers; Corrosiveness of foods; Effect of processing on corrosion of cans; External corrosion of cans

MODULE 3:

Paper and paper-based packaging materials: Manufacture (pulping, digestion, bleaching, beating, refining, paper making and converting); Types of paper; Physical properties of papers; Paper bags; Cartons; CBB, Advantages and disadvantages of paper and paper-based packaging materials

Plastic and plastic-based packaging materials: Classification of polymers; Properties and application of different plastics; Laminates: Types and properties. Coating on paper and films; Types and methods of coating

MODULE 4:

Aseptic packaging, Vacuum packaging, Intelligent packaging, MAP, CAP, Sterilization of packages and food contact surfaces; Packaging of microwavable foods; Retortable pouch technology, Use of nanomaterials in food packaging

Mechanical and functional tests on packages: Measurement of thickness, weight, water absorption, compression strength, bursting strength, tear resistance, puncture resistance, OTR, WVTR and tensile strength of packaging materials, GSM, moisture content of CBB.

MODULE 5:

Packaging of specific foods: Fruits and vegetables; Dairy products; Cereal products; Snacks; Whole eggs; Meat and meat products; Water; Fruit juices; Beer; Wine; Carbonated beverages

TEXT/REFERENCE BOOKS:

1. Robertson, G.L. 2006 Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis
2. NIIR. (2003). Food Packaging Technology Handbook, National Institute of Industrial Research Board, Asia Pacific Business Press Inc
3. Ahvenainen, R. (Ed.) 2003 Novel Food Packaging Techniques, CRC Press,
4. Han, J.H. (Ed.) 2005 Innovations in Food Packaging, Elsevier Academic Press,
5. Coles, R., McDowell, D. and Kirwan, M.J. (Eds.) 2003 Food Packaging Technology, CRC Press

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202204	Nutraceuticals and Functional Foods	3-0-0	3

MODULE 1:

Concept on Nutraceuticals: Nutraceuticals and functional foods, nutraceutical as new dietary ingredients, biological significance of Nutraceuticals, Nutraceuticals and dietary supplement, world market for nutraceuticals, regulatory issues Nutrigenomics: nutrigenomics an introduction and its relation to nutraceuticals.

MODULE 2:

The role of nutraceuticals/functional foods in disease prevention: angiogenesis and cardiovascular diseases, cancer, diabetes, cholesterol management, obesity and inflammation dosage levels,

MODULE 3:

Health benefits of nutraceuticals, natural pigments (chlorophyll, chlorophyllin, carotenoids) anthocyanins, glucosinolates, isoflavonoids, phytoestrogens, omega-3 and omega-6 fatty acids, antioxidants, phytosterols; dosage for effective control of disease or health benefit with adequate safety

MODULE 4:

Definition, development of functional foods, isolation, storage, processing and stability of phytochemicals/bioactive compounds; Prebiotics and probiotics: usefulness of probiotics and prebiotics in gastro intestinal health and other benefits, beneficial microbes; prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes, resistant starch, fructo-oligosaccharides as probiotic food components

TEXT/REFERENCE BOOKS:

1. Wildman, R.E.C. (2007) Handbook of Nutraceuticals and Functional Foods, second edition. CRC Press.
2. Gibson GR & William CM. Functional Foods - Concept to Product. 2000.
3. Goldberg I. Functional Foods: Designer Foods, Pharma Foods. 2004.
4. Brigelius-Flohé, J & Joost HG. Nutritional Genomics: Impact on Health and Disease. Wiley VCH. 2006.
5. Cupp J & Tracy TS. Dietary Supplements: Toxicology and Clinical Pharmacology. Humana Press. 2003

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202215	Lab-I	0-0-4	2

PRACTICAL

1. Introduction to the instruments, glass wares and accessories used in microbiological study
2. Preparation of serial dilution, common laboratory media and special media.
3. Microbiological plating techniques, slant preparation and representation of microbial population.
4. Staining: Gram's staining, staining of yeast and molds.
5. Microbiology of hand, area and effect of sanitation
6. Isolation and culture of microorganism

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202216	Lab-II	0-0-4	2

Practical

1. New product development, Quality evaluation, Presentation of a new product development.
2. Identification of different packaging materials and their representation.
3. Quality analysis of packaging material.

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202227	Industrial Internship and Presentation	0-0-0	1

Each student will undergo internship in Food industries for 15 to 20 days. He/She has to obtain the certificate of internship from the industries. A report and power point presentation will be given by the students at the end of the internship.

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202E201	Technology of Meat, Fish , Poultry and Egg	4-0-0	4

MODULE 1:

Status and scope of meat industry in India; Structure and physico-chemical properties of muscle meat: composition and nutritive value, conversion of muscle into meat, post mortem changes in meat, rigor mortis, cold shortening, pre-rigor processing; stunning and slaughtering methods. Aging of meat, meat tenderization- natural and artificial methods; cooking methods for meat: roasting, frying and braising; storage and preservation of meat: chilling, freezing, curing, smoking, dehydration, freeze-drying, irradiation, canning.

MODULE 2:

Cooking, palatability and eating quality of meat, microbial spoilage of meat; restructured meat products (sausages), meat analogs; meat industry by products: importance and applications; intermediate moisture and dried meat products; meat plant hygiene and good manufacturing practices; packaging of meat products.

MODULE 3:

Egg: Structure, composition and nutritive value of eggs, Storage and shelf life problems
Quality evaluation of eggs: international and external quality evaluation, candling, albumen index, Haugh unit, yolk index etc. Egg preservation: grading of eggs, whole egg preservation, pasteurization, dehydration, freezing, egg products: egg powder, value added egg products (e.g., Meringues and Foams etc.), packaging of egg and egg products
Poultry products: types, chemical and nutritive value of poultry meat, slaughtering and evaluation of poultry carcasses; poultry cut-up parts and meat/bone ratio; preservation, grading and packaging of poultry meat.

MODULE 4:

Fish processing: factors affecting quality of fresh fish, fish dressing, chilling, freezing, glazing, salting and canning of fish; manufacturing of fish paste, fish oil, fish protein concentrate and fish meal; by-products of fish industry and their utilization.

TEXT/REFERENCE BOOKS:

1. Joshi, B. P. (1994). Meat Hygiene for Developing Country, Shree Almora Book Depot, India.
2. William J. & Owen J., (1977). Egg Science & Technology, AVI Publishing Company, INC. Westport, Connecticut.
3. Lawrie, R.A. (1998). Meat Science. Woodhead Publishers.
4. Mead, G. (2004). Poultry Meat Processing and Quality. Woodhead Publishers.
5. Panda, P.C. (1992). Text Book on Egg and Poultry Technology, Vikas Publishers
6. William J. & Owen J. (1977). Egg Science & Technology, AVI Publishing Company INC. Westport, Connecticut

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202E102	Bakery Science and Technology	3-0-0	3

MODULE 1: Introduction

Raw materials required for bread making and their functional properties. Essential ingredients: Flour, yeast, water, salt. Other ingredients: Sugar, color, flavor, fat, milk and milk powder and bread improvers. Functions of various raw materials used in baking industries Materials of Baking. Leaveners and yeast foods, shortenings, emulsifiers and antioxidants, Sweeteners and, water and salt, Ingredients from milk and eggs. Fruits, vegetables, and nuts, Spices, flavors and colors; Preservation methods

MODULE 2: Bakery Equipment

Introduction to utensils and equipments used in bakery unit and their uses, small equipments, big equipments and oven. Bulk handling of ingredients, Dough mixing and mixers, dividing, rounding, sheeting, and laminating, fermentation; Ovens and Slicers, Packaging materials and equipment

MODULE 3: Bread Manufacturing Process

Straight dough fermentation, Sponge and dough, Accelerated processing. Chorley wood bread process, Dough retarding and freezing, Stages in processing of bread and bread making methods and advantages and disadvantages of various methods of bread-making. Characteristics of good bread: Internal characters; external characters. Bread defects/faults and remedies. Spoilage of bread Causes, detection and prevention.

MODULE 4: Biscuits and Cookies

Production of cakes and cookies/biscuits. Types of biscuit dough's – Developed dough, short dough's, semi-sweet, enzyme modified dough's and batters – importance of the consistency of the dough.

Cake making: Ingredients and their function structure builders. Tenderizers, moisteners and flavor enhancers – Selection and preparation of mould Temperature and time required for different type of cake, problems of baking.

MODULE 5:

Good manufacturing practices (GMP) in baking industries; Computerization in plant and laboratory, Sanitation and safety

TEXT/REFERENCE BOOKS:

1. Matz, Samuel A., "Bakery Technology and Engineering", Third Edition, Chapman & Hall, London,
2. Cauvain, Stanley P, and Yound, Linda S., "Technology of Bread Making", Second Edition Aspen publication, Maryland, 2005.
3. Pomeranz. Y. "Modern Cereal Science and Technology". MVCH Publications, New York.2003.
4. Samuel A., Matz., "Equipment for Bakers", Pan Tech International Publication, 2009.
5. Manley, Duncan., "Biscuit Doughs Manual 2", Woodhead Publishing Ltd., England. 2009

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202E212	Bakery Science and Technology Practical	0-0-2	1

Practical:

1. Study of ingredients (major and minor): Characteristics of flour, yeast, shortening, sugar, egg and salts.
2. Experiment on leavening action of baking powder, sodium-bicarbonate and ammonium-bi-carbonate.
3. Estimation of gluten content
4. Estimation of water absorption power
5. Determination of yeast-ferment test and dough rising capacity
6. Preparation of bread and quality evaluation
7. Preparation of biscuits and quality evaluation
8. Preparation of cookies and quality evaluation
9. Preparation of cake and quality evaluation
10. GMP in bakery processing

Subject code	Subject	Hours per week L-T-P	Credit C
MFP202E203	Technology of Spices and Plantation Products	4-0-0	4

MODULE 1:

Coffee: Occurrence, chemical constituents; harvesting, fermentation of coffee beans; changes taking place during fermentation; drying; roasting; process flow sheet for the manufacture of coffee powder; instant coffee technology; chicory chemistry; quality grading of coffee.

MODULE 2:

Tea: Occurrence, chemistry of constituents; harvesting; types of tea – green, oolong and CTC; chemistry and technology of CTC tea; manufacturing process for green tea and black tea manufacture; instant tea manufacture; quality evaluation and grading of tea.

MODULE 3:

Cocoa: Occurrence, chemistry of the cocoa bean; changes taking place during fermentation of cocoa bean; processing of cocoa bean; cocoa powder; cocoa liquor manufacture; chocolates–types, chemistry and technology of chocolate manufacture; quality control of chocolates

MODULE 4:

Major spices: Pepper, cardamom, ginger, chili and turmeric–Oleoresins and essential oils; method of manufacture; chemistry of the volatiles; enzymatic synthesis of flavor identical; quality control; fumigation and irradiation of spices.

MODULE 5:

Other plantation crops processing: vanilla, coconut, cashew, Oil palm.

TEXT/REFERENCE BOOKS:

1. Banerjee B. 2002. Tea Production and Processing. Oxford Univ. Press.
2. Minifie BW. 1999. Chocolate, Cocoa and Confectionery Technology. 3rd Ed. Aspen Publ.
3. NIIR. 2004. Handbook on Spices. National Institute of Industrial Research Board, Asia Pacific Business Press Inc
