VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

DEPARTMENT OF P.G. STUDIES AND RESEACH IN MICROBIOLOGY

VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

JNANA SAGARA CAMPUS, VINAYAKANAGAR, CANTONMENT

BALLARI-583105

POST GRADUATE DIPLOMA IN FOOD ANALYSIS, FOOD SAFETY AND STANDARDS SYLLABUS

COURSE CO-ORDINATOR: DR.KRISHNAVENI R

CHOICE BASE CREDIT SYSTEM

WITH EFFECTIVE FROM 2019-2020 onwards

POST GRADUATION DIPLOMA IN FOOD ANALYSIS, FOOD SAFTEY AND STANDARDS

INTRODUCTION:

The Course "Food analysis, food safety and standards at PG Diploma level, acquaints with the national and international food laws and standards to develop an enabling environment to have safe and quality food for everyone. Food Safety is an important public concern and is gaining importance in the backdrop of enforcement of newly enacted Act "Food Safety and Standards Act, 2006".

Food Processing Industries and focus on export of agriculture produce and processed food products are drastically increasing. Hence the new act and its rules and regulations have many new dimensions and special features which include science based umbrella law, shift from regulatory regime to self reliance, embraces health foods, supplements and nutraceuticals; ensuring harmonization between domestic and international food regimes issuing of license in a transparent as well as decentralized mode and within a stipulated time frame period; graded penalty as well compounding and adjudication of cases; monitoring and validation of Food Safety Management Systems in food establishments; and undertaking capacity building as well as information dissemination activities.

Food quality and safety as been important criteria for consumers, retailers, manufacturers and regulators. The programme is to initiate all the post graduates such as science, agriculture, food science or allied disciplines who wish to make career in food industries contemplating a career in Food Quality and Safety Management. It is also intended for Professionals in food Processing and Quality Control for strengthening their proficiency in design and implementations of quality management systems. The programme shall also open new vista for entrepreneurs who intend to diversify in Food Safety and Quality Aspects. This programme is designed to develop a practical "hands on training" in food safety, quality and understands the laws and regulations to be followed in food industries.

The programme incorporates the specialized knowledge and skills required to implement the fundamental principles of 'Quality Assurance.' The students will be beneficial to write food analyst examination and junior analyst examination conducted by fssai (food safety and standards authority of India Mysore).

Eligibility:

Candidate with Degree and Masters Degree in Botany/Applied Botany/ Zoology Biotechnology/Microbiology/ Biochemistry/ Plant Science/ Agriculture/ Sericulture/Food and Nutrition/Home science/ Life Science and allied sciences. Students doing their M.Phil/Doctoral studies can also join the programme to strengthen their analytical skills. Working professionals in government and private sector companies can also pursue this programme through regular/Distance mode of learning.

Duration: Two Semesters of four months each.

Intake: Intake for the course shall be 30. The syndicate shall regulate the intake from year to year. The state government rules in force with respect to reservation of seats shall apply.

Fee structure: The fee structure of the course shall be as decided by the University from time to time. However, the course shall not be self financing as per the conditions stipulated by the UGC.

Selection of Candidates: The selection of eligible candidates for admission to course shall be based on only merit and reservation policy of VSKU, Ballari from time to time.

Course Structure and Scheme of Examination:

The PGFAS is offered under semester pattern. The course is offered for two semesters with papers per semester. The course shall have regular course work, followed by project work and Food analyst and junior analyst exam preparation and placement training, Each semester shall be of 16 weeks duration and placement training shall be of 12 weeks. The placement training shall be given after the completion of second semester examination. Theory papers shall be set by internal and external examiners and approved by the BOE. If the difference between two valuations is 20% or more, then such answer scripts shall be evaluated by the third examiner. The practical shall be conducted by internal and external examiners. The valuation of dissertation and *viva-voce* examination shall be conducted by internal and external examiners actual working periods during the academic session and shall secure the required attendance for all papers.

- The Chairman/Director of the Department/Institute shall certify the students progress and conduct. A student, who does not satisfy the requirements of attendance as per rule, shall not be promoted to the next semester or permitted to take the semester examination as the case may be.

INSTRUCTIONAL DESIGN

The course is of 12 months which includes theory and practicals.

Structure of the Course

Duration : 12 months

Credits : 16

Contact Hours - Theory : 36 hrs

Contact Hours - Practical : 120 hrs

Hours of Instruction per week:

Four hours of lecture for each subject per week.

Minimum marks for a pass is 40% of the marks in each examination paper and 50% of the marks in the aggregate of each semester. Full carry over is permitted from first semester to second semester. Declaration of class shall be done on the basis of aggregate marks secured in first semester.

II semester examinations.	
I Class with distinction	70%
I Class	60% to 69%
II Class	50% to 59%

Internal Assessment: Each paper carries internal assessment marks of 25. Periodical tests, seminars, assignments and oral examination shall be conducted.

Attendance, Progress and Conduct: In each semester a paper shall be taken as an independent unit for the purpose of calculating attendance. The student shall attend not less than ¾ of the number of classes.

COURSE STRUCTURE FOR ONE YEAR POST GRADUATE DIPLOMA DEGREE IN FOOD ANALYSIS, FOOD SAFETY AND STANDARDS.

(APPROVED IN BOS-PG MEETING**)**

I SEMESTER

Paper code	Title of the Paper	Credits	Internal Assessment	Theory/ Practical	Total Marks
PGD.MB.H.1.1	Food chemistry and nutrition	04	30	70	100
PGD.MB.H.1.2	Food Microbiology	04	30	70	100
PGD.MB.H.1.3	Food Analysis	04	30	70	100
Total Hard core credits		**12**			
PGD.MB.S.1.4	Food Packaging and Food Quality Management	04	30	70	100
PGD.MB.S.1.5	Analytical quality assurance in food laboratories	04	30	70	100
Total Soft core credits		**04**			
PGDMBP1.6	Food Microbiology (Practical I)	02	15	35	50
PGDMBP1.7	Food analysis (Practical II)	02	15	35	50
Total Credits		**20**			**500**

II SEMESTER

Paper code	Title of the Paper	No. of Hours/ Week	Internal Assessment	Theory/ Practical	Total Marks
PGDMBH2.1	Basics of food safety	04	30	70	100
PGDMBH2.2	Introduction to food laws and standards	04	30	70	100
PGDMBH2.3	**Chemical safety of foods or training in food industries**	04	30	70	100
Total Hard core credits		**12**			
PGDMBS.2.4	Food saftey and standards regulations	04	30	70	100
PGDMBS.2.5	Food safety assessment	04	30	70	100
Total Soft core credits		**04**			
PGDMBP2.6	Project work and viva-voce	04	Both internal and external examiners shall evaluate the Project Work Project Guide and external examiner shall conduct the viva-voce examination		100
Total Credits		**20**			**500**
Total Marks for One year					**1000**

COURSE SYLLABUS

PGD.MB.H.1.1. FOOD CHEMISTRY AND NUTRITION CREDIT4

Preamble: *This paper enables the students to study food chemistry, nutrition and its components and significance.*

Unit-I 14h

Importance of food. Scope of food chemistry. Introduction to different food groups: their classification and importance. Water in food, water activity and shelf life of food.
Carbohydrates-chemical reactions, functional properties of sugars and polysaccharides in foods chemical make-up, properties, nutritional and industrial importance.

Unit-II 14h

Proteins: nutritional aspects– amino acids, essential amino acids, biological value, PER (Protein Efficiency Ratio), and industrial importance.
Lipids: classification, and use of lipids in foods, physical and chemical properties, essential fatty acids, Polyunsaturated Fatty Acids hydrogenation, rancidity and industrial importance.

Unit-III 10h

Vitamins and Minerals, Effect of processing on vitamins and minerals. Effect of processing and storage of Vitamins. Principles of microbial assay of b group Vitamins. Food additives:- Vitamins, amino acids, minerals, Aroma substance flavour enhancersmonsodium glutamate, 5-nucleotides. Sugar substitutes, sorbital. Sweeteners-saccharin, cyclamate..

Unit-IV 14h

Food pigments and synthetic dyes. Natural pigments, their occurrence and characteristic properties, their changes during processing and storage, industrial applications. Food colour. Anti-nutritional factors and food contaminant: Toxic-trace elements, radio nuclides
Enzymes used in food industry: Definition, importance, sources, nomenclature, classification and their applications in food processing.

References:

1. Food Microbiology Adams M. A and Moss M. O.Third edition.(2008) ISBN978-0- 85404-284-5 .
2. Vanderheijden. 1999. International Food safety hand book: Science, International Regulation and control Food Science & Technology).
3. Semih Otles. 2011. Methods of Analysis of Food Components and Additives. 2nd Edition. CRC Press, Taylor & Francis Group.
4. S. Suzanne Nielsen. 2010. Food Analysis.

PGD.MB.H.1.2.FOODMICROBIOLOGY CREDIT-4

Preamble: *This paper enables the students to study food a substrate, food contamination, food spoilage and food preservation. This paper deals with food borne diseases and their content measures fermented foods, probiotics and prebiotics. It encourages microbiology of milk contamination spoilage and preservation of milk and milk products.*

Unit-I 14h

Introduction: Origin, Concept, Scope and historical developments. Food as substrate for microorganisms: Hydrogen ion concentration (pH), Moisture requirement, Water activity, Oxidation-Reduction potential, Nutrient content, Inhibitory substances and Biological structure.

Unit-II 14h

Food contamination and Food spoilage: General principles of food spoilage, Causes of food spoilage, Factors affecting kind and number of microorganism. Chemical changes caused by microorganisms. Spoilage of Meat and Meat products, Egg and Egg products, Fish and Marine products, Cereal and Cereal products, Fruits and Vegetables.

Unit-III 10h

Food Preservation: Physical, Chemical and Biological methods of food preservation. Food borne diseases and their control: Food Infection and Intoxication.

Unit-IV 14h

Fermented foods Traditional fermented foods of India and other Asian countries, Fermented foods based on milk, meat and vegetables, Fermented beverages. Probiotics and Prebiotics.

Concept and importance of nutraceuticals and nutraceutical products. Milk: Composition, Nutritive value and Properties. Microbiology of milk. Testing of milk quality. Contamination, spoilage and preservation of milk and milk products.

References:

1. Joshi VK & Pandey Ashok; Biotechnology of Food Fermentation, Asia tech Publ. Delhi, India.
2. Frazier WC & Westhof DC; Food Microbiology, 3rd Ed., Tata McGraw Hill.
3. Doyle PM et al; Food Microbiology – Fundamentals & Frontiers, 2nd Ed., ASM Press.
4. Pitt J & Hocking. (1985); Fungi & Food spoilage, Academic Press.
5. Sandeep Sareeen; Food Preservation, Sarops & Soni, New Delhi.
6. Ananthakrishnan CP. Et al. (1994); Dairy Microbiology, Sreelakshmi Publ. Chennai.

PGD.MB.H.1.3. FOOD ANALYSIS **4 CREDITS**

Preamble*: This course covers the basic analytical tools for determination of moisture, proteins, carbohydrates, lipids, minerals and vitamins in food systems.*

Unit-I **14h**

Analytical techniques in Microbiology. Screening and Enumeration of spoilage from microorganisms. Detection of pathogens in food, Rapid detection technique for microorganisms – Total ATP measurement, PCR based, Biosensor based, Immunological, Bacteriophage based markers etc.

Unit-II **14h**

Proximal Analysis, Moisture Analysis, Carbohydrates Analysis, Protein Analysis, Lipid Analysis, Enzyme Analysis. Modern Food Analysis, Sampling and Data Analysis, Buffers and Titratable Acidity.

Unit-III **14h**

Principles of Ultraviolet and Visible Spectroscopy, Mass Spectrometer (MS) in Food Analysis, NIR spectroscopy, MS, LC-MS/MS, FT- IR and NMR Instruments, Atomic Absorption spectroscopy. Interpretation of MS and NMR Data. Principles and Practice of GC, HPLC, and HPLC in Food Analysis with demonstration using selected food samples. Pesticide Residue Analysis using GC ECD/GC-MS.

Unit-IV **10h**

Role of sensory science in defining the food quality. Sensory Science in food industry. Sensory evaluation methods, Flavor perception and measurement Consumer analysis.

References:

1. Food Analysis: Third Edition, S. Suzanne Nielsen. (2003). Official Methods of Analysis. Association of Official Analytical Chemists, 15th ed. (1990). Food Analysis: Theory and Practice. Pomeranz and Meloan, 3rd. ed., (1994).
2. Fennema's Food Chemistry, Fourth Edition; Srinivasan Damodaran, Kirk L. Parkin and Owen R. Fennema (Editors). (2007).
3. Kirk, R.S and Sawyer, R. (2005) Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England.

PGD.MB.S. 1.3 .FOOD PACKAGING AND FOOD QUALITY MANAGEMENT

4 CREDITS

Preamble: *The course includes food packing and food quality management which is important aspect in food industries.*

Unit-I **14h**

Food packaging: Definitions, objectives and functions of packaging and packaging materials. Packaging requirements and selection of packaging materials; Types of packaging materials. Food packaging systems: Different forms of packaging such as rigid, semi-rigid, flexible forms and different packaging system for (a) dehydrated foods (b) frozen foods (c) dairy products (d) fresh fruits and vegetables (e) meat, poultry and sea foods.

Unit-II **10h**

Packaging equipment and machinery: Vacuum, CA and MA packaging machine; gas packaging machine; seal and shrink packaging machine; form and fill sealing machine; aseptic packaging systems; bottling machines: carton making machines.

Unit-III **14h**

Food Quality: importance and functions of quality control. Methods of quality, assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry, egg and processed food products. Sanitation and hygiene, GMP, GLP, Statistical quality control. Food laws and standard, PFA, AGMARK.

Unit-IV **14h**

Sampling and specification of raw materials and finished products, Concept of Codex Alimentarious/USFDA/ISO 9000 series, rules and regulations for waste disposals.Food adulteration and food safety. HACCP, Sensory evaluation-introduction, panel screening, Sensory and instrumental analysis in quality control, IPR and Patents, ISO system – 9001, 14001, 17025 and 22000.

References:

1. Food Packaging Materials: Testing & Quality Assurance Hardcover – Import, 2017 by Preeti Singh , Ali Abas Wani , Horst-Christian Langowski.
2. Food Packaging: Principles and Practice, Third Edition

PGD.MB.S.1.5. ANALYTICAL QUALITY ASSURANCE IN FOOD LABORATORIES

CREDIT 4

Preamble

UNIT I **10 h**

Food laboratories : need for food analysis, accreditation of food laboratory, referral laboratories, functions of food analysts, hierarchy of food safety authorities, analysis of food samples and reports, other regulatory provisions pertaining to analysis of food

UNIT II **14 h**

Validation of analytical methods: Good Laboratory Practices (GLP)- history of GLP, areas of application, facilities, test systems, test and reference items, Standard Operating Procedure (SOP), study performance and reporting.

UNIT III **14 h**

Analytical method used for quality determination: chemical and physical, microbiological, biochemical and sensory analysis. Analytical methods of determination of basic food components: protein, saccharides, lipids, vitamins, water, minerals and trace elements, sensory active compounds, anti-nutritive and natural toxic compounds, food additives and food contaminants.

UNIT IV **14 h**

Advanced laboratory techniques: principle, working and application of GC, HPLC, HPTLC, LC/MS, inductively coupled Plasma Mass Spectroscopy and PCR, real time PCR, ELISA, Triple Quadrapole system.

References

1. The training manual for Food Safety Regulators. Vol.II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi.
2. AOAC International. (2005) Official methods of analysis of AOAC International. 17th Ed., current through 1st revision. Gaithersburg, MD, USA, Association of Analytical Communities.

PGD.MB.P.1.5-Practical I: Food Microbiology

1. Introduction to basic microbiology, laboratory practices.
2. Cultivation and sub-culturing of Microbes.
3. Direct microscopic examination of foods.
4. Estimation of total microbial count of yeast and molds.
5. Estimation of total microbial bacterial plate count of food sample by direct microscopic and SPC method.
6. Assessment of air using Surface Impingement method.
7. Detection of efficacy of surface sterilisation using swab and Rinse method.
8. Enumeration of Coliforms and indicator organisms (Most Probable Number)
9. Detection of Coliforms and indicator organisms by confirmed and completed tests, and using membrane filter techniques.
10. Study of the growth curve of micro-organisms.
11. Study of the microbiological quality of milk by MBR test.
12. Estimation of total microbial count of (a) milk products (b) fruits and vegetable products (c) meat, fish and poultry products (d) canned foods.

References:

1. Aneja, K.R. (2001). Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology, 3rd Edition, New Age International (P) Ltd., New Delhi.

2. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology, S. Chand & Co., New Delhi.

PGD.MB.P.1.6-Practical II: Food analysis, Food Packaging and Quality

1. Determination of moisture in a given food sample.
2. Determination of protein and carbohydrates in a given food sample.
3. Determination of ash in a given food sample.
4. Determination of crude fat in a given food sample
5. Estimation of acidity of given food sample/beverage
6. Estimation of total non reducing and reducing sugars.
7. Estimation of vitamin C in given food sample.
8. Determination of diastase enzyme activity
9. Determination of pigments in a given food sample.
13. Determination of water vapour transmission rate for different materials.
14. Estimation of toxins and pesticides in food.
15. Detection of adulteration in foods.

References:

1. Aneja, K.R. (2001). Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology, 3rd Edition, New Age International (P) Ltd., New Delhi.
2. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology, S. Chand & Co., New Delhi.

II SEMESTER

PGD.MB.H.2.1.BASICS OF FOOD SAFETY 4 CREDITS

Preamble: *Handling food with safety measures is an important task for all food and industrial sectors. Hence the course on understanding basics of food safety is needed which includes food sanitation, food safety and quality assurance.*

Unit-I 14h

Food Sanitation and safety: Factors contributing to physical, chemical and biological contamination in food chain, prevention and control of food borne hazards, definition and regulation of food sanitation, sources of contamination, personal hygiene-food handlers, cleaning compounds, sanitation methods, waste disposal strategy (solid and liquid waste) and pest control

Unit-II 10h

Food adulteration: common adulterants, simple tests for detection of adulteration. Food additives classification, functional role and safety issues, types of adulteration and recent trends in food adulteration.

Unit-III 14h

Food Safety and Quality Assurance: quality control of raw materials, in –process food control, quality control of finished products, quality assurance of therapeutic, functional, nutraceutical and novel foods.
Food quality systems and Good Manufacturing Practices (Code of GMP), Fair Packaging and Labeling Act (1966), Federal Meat Inspection Act (1906), International Food, Standards and Codex Alimentarius, HACCP and ISO 9000 series. Hazard Analysis Critical Control Point planning and Implementation 3 (3-0-0)

Unit-IV 14h

Food Safety Assessment, The importance of food safety, Food safety management procedures, Terms relating to quality, management and organization Terms relating to process and product, characteristics and conformity Terms relating to documentation, examination and audit. Developing of quality and quality cycle Quality attributes and their evaluation.
Food quality management: structures, policies and Responsibilities: Quality benefits Quality control department and its responsibilities Quality control department interrelations with research and product development, production, and marketing departments

References :

1. Early, R. (2006) Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
2. Gould, W.A and Gould, R.W. (2005) Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
3. Pomeraz, Y. and MeLoari, C.E. (2008) Food Analysis: Theory and Practice, CBS publishers and Distributor, New Delhi.
4. Bryan, F.L. (2007) Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva.
6. Mortimre, S., and Wallace, C., (2005) HACCP: A practical approach, 2nd Ed, Aspen Publication

PGD.2.2. INTRODUCTION TO FOOD LAWS AND STANDARDS 4 CREDITS

Preamble: *The course on Food laws and standards is one of the essential aspects to understand to start entrepreneurship in food and beverage industries and also in order to work in industries the students must know the course on food laws and standards.*

Unit-I **10h**

History of food regulations in India. Legislations- Prevention of Food Adulteration act 1954, Food product order (1955), Solvent Extracted Oil, De-oiled Meal and Edible Flour (Control) Order, 1967, Meat Food Products Order (1973),Edible Oils Packaging, 1998, Edible Oils Packaging, 1998, Vegetable Oil Products Order, 1998, Milk & Milk Product Amendment Regulations – 2009.

Unit-II **14h**

Food Laws and Standards in India
a. Food Safety and Standards (FSS) Act, 2006, FSS Rules and Regulations,
b. Agricultural Produce Act, 1937 (Grading and Marketing)
c. Export (Quality Control & Inspection), Act, 1963 and Rules
d. Bureau of Indian Standards relevant to food safety
e. Legal Metrology Act f. International Food Control Systems/ Laws, Regulations and Standards/ Guidelines with regard to Food Safety: CODEX (SPS/TBT), OIE, IPPC

Unit-III **14h**

Planning Organization and set up of Food Analyst Laboratory including NABL/ ISO/IEC-17025:2005
a. Accreditation systems and their general requirements
b. Measurement of uncertainty - Handling of testing and calibration materials -Testing and calibration methods - Validation of methods
c. Reporting and interpretation of results - Data and document control in accreditation process / accredited laboratory

Unit-IV **14h**

Principles of Food Preservation, Processing and Packaging, Labeling/Claims and Principles of Nutrition. Labelling requirements as per Food Safety Standards (Packaging and Labelling) Regulations 2011. International food Legislation & Standards 2 (2-0-0) Concepts and trends in food legislation. International and federal standards: Codex alimentarious, ISO series, food safety in USA. Legislation in Europe: Directives of the official journal of the EU, council regulations, food legislation in UK. Regulating methods for food analysis, case studies. Enforcers of Food Laws Approval Process for Food Additives Nutritional Labeling.

References: The training manual for Food Safety Regulators. Vol.II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi .

PGDMB.H.2.3- PROJECT WORK AND VIVA- VOCE ON RESEARCH TOPIC (CREDIT-4)

The students shall work on research topic for 90 days as mentioned under course structure. He / She shall prepare a dissertation based on the results indicating the nature of work carried out. This shall be duly certified by the official of the organization where the student has under gone training. This shall be evaluated for 80 marks. Further a viva-voce carrying 20 marks shall also be conducted.

PGD.MB.S.2.4.FOOD SAFTEY AND STANDARDS REGULATIONS 4 CREDITS

Preamble *The course on Food Saftey and standards regulations is one of the essential aspects to understand to start entrepreneurship in food and beverage industries and also in order to work in industries the students must know the course on foodsaftey and standards regulations.*

Unit-I 14h

Food Safety and Standards (Licensing and Registration of Food Businesses) Regulation, 2011.Compendium of Food Safety and Standards (Licensing and Registration of Food Businesses) Regulation.Food Safety and Standards (Food Product Standards and Food Additives) Regulation, 2011.*Compendium of Food Safety and Standards (Food Product Standards and Food Additives) Regulation*. Food Safety and Standards (Prohibition and Restriction on Sales) Regulation, 2011. *Compendium of Food Safety and Standards (Prohibition and Restriction on Sales) Regulation*.

Unit-II 10h

Food Safety and Standards (Packaging and Labelling) Regulation, 2011.*Compendium of Food Safety and Standards (Packaging and Labelling) Regulation*. Food Safety and Standards (Contaminants, Toxins and Residues) Regulation, 2011.*Compendium of Food Safety and Standards (Contaminants, Toxins and Residues) Regulation*. Food Safety and Standards (Laboratory and Sampling Analysis) Regulation, 2011. *Compendium of Food Safety and Standards (Laboratory and Sampling Analysis) Regulation*.

Unit-III 14h

Food Safety and Standards (Food or Health Supplements, Nutraceuticals, Foods for Special Dietary Uses, Foods for Special Medical Purpose, Functional Foods and Novel Food) Regulations, 2016.

Food Safety and Standards (Food Recall Procedure) Regulation, 2017.Guidelines for Food Recall (PDF, 355 KB). (Uploaded on: 28.11.2017). Food Safety and Standards (Import) Regulation, 2017.*Compendium of Food Safety and Standards (Import) Regulation*.Food

Safety and Standards (Approval for Non-Specified Food and Food Ingredients) Regulations, 2017.Food Safety and Standards (Organic Food) Regulation, 2017.

Unit-IV **14h**

Food Safety and Standards (Alcoholic Beverages) Regulations, 2018.Food Safety and Standards (Fortification of Foods) Regulations, 2018.Compendium of Food Safety and Standards (Fortification of Foods) Regulation. Food Safety and Standards (Food Safety Auditing) Regulations, 2018. Food Safety and Standards (Recognition and Notification of Laboratories) Regulations, 2018. Food Safety and Standards (Advertising and Claims) Regulations, 2018. Food Safety and Standards (Packaging) Regulations, 2018.

PGD.MB.S.2.5. FOOD SAFETY ASSESSMENT **CREDITS** 4

Preamble: Food safety assessment is useful tool to understand safety issues in food industries. It includes both microbial biological and chemical safety of foods.

Unit-I **14h**

The importance of food safety, Food safety management procedures, The principal causes and symptoms of food borne illness. How food borne illness affects consumers and retailers, How poor safety practices affect food products, Food safety procedures in retail stores, Preventing food borne illness, Food hazards, The four c's, Record keeping, Due diligence, Reporting procedures, Legal responsibilities,

Unit-II **14h**

The food business, the responsibilites of the managers, Penalties applicable to poor food handlers, Enforcement officers, Enforcement powers, The importance of personal hygiene, The principal food safety hazards on the human body, Basic rules regarding personal hygiene, Appropriate protective clothing, When to change protective clothing, Effective personal hygiene practices Good Manufacturing Practice.

Unit-III **14h**

Metal contaminants, Sources of health hazard of metallic contaminants, Assessment of food safety, General and acute toxicity includes mutagenicity and carcinogenicity. Additives Preservatives, antioxidants, sweeteners, flavors, colours, vitamins, stabilizers – indirect additives, organic residues, inorganic residues and contaminants.

Unit-IV **10h**

Food allergy, food intolerance, contaminants of processed foods, solvent residue, contaminants of smoked foods. Cleaner production is food industry-fruit and vegetable processing, sea food processing, brewing and wine processing.

Refeences:

1. Food Regulation: law, Science, Policy and Practice .
2. Thomas J. M. and Karl R. M. 2008. Food Microbiology An Introduction.
3. Bibek R. and Arun k. B. 2008. Fundamental Food Microbiology.
4. James M. J., Martin J. L. and David A. G. 2005. Modern Food Microbiology.
5. Microbiology of Animals and Animal products. J.B. Woolcock. World Animal Science. New York, Volume 6, ISBN 0444430105
6. Food Microbiology Adams M. A and Moss M. O.Third edition.(2008) ISBN978-0- 85404-284-5 .
7. Vanderheijden. 1999. International Food safety hand book: Science, International Regulation and control Food Science & Technology).

PGD.MB.S.2.3.CHEMICALSAFETYOFFOODS **CREDIT 4**

Preamble: *The course includes the chemical residues involve in contaminations of food and the solution for safety of foods from chemicals.*

UNIT I **10 h**

Pesticides and veterinary drugs: Detection and quantification of carbamates, organochlorine and organosuplhur, organohalogens, nitrites, herbicides, hormones, antibiotics, steroids, environmental chemicals - heavy metals, toxic residues, radioactive isotopes.

UNIT II **14 h**

Processing contaminants: Detection, quantification and health hazards of direct contaminants – acrylamide, PAHs, oxyhalides, and haloacetic acids, preservatives, flavor enhancers, color additives. Indirect contaminants- boiler water additives, peeling aids, defoaming agents, building and equipment contaminates: lubricants, paint and coatings, contaminants during packaging, storage and transport: cleaners, sanitizers and cross contaminants.

UNIT III **14 h**

Food additives: Detection, quantification and health hazards of hydrogenated or partially hydrogenated oils, high-fructose corn syrup, artificial colorants, artificial sweeteners such as aspartame, sucralose and saccharin, BHA or BHT, monosodium glutamate, hydrolyzed vegetable protein or autolyzed yeast extract, potassium bromate, propyl gallate, sulfites, sodium nitrate, sodium benzoate.

UNIT IV **14 h**

Food colorants and sweeteners: Detection, quantification and health hazards of brilliant blue, Indigo, carmine, citrus red , fast green, erythrosine, allura red ,tartrazine, sunset yellow, lake pigments and non certified colorants, food sweeteners- neotame, sorbitol and non certified sweeteners.Emulsifiers, stabilizers, thickening and gelling agents: tara gum, soyabean hemicelucose, sucroglycerides, stearyltartarate, talc, gluconic acid, candelilla wax, carbamide, argon, salt of aspartame and other non certified agents- detection, quantification and health hazards.

References

1. Branen, A.L., Davidson, P.M. & Salminen, S. (2007) Food Additives, 2nd Ed., Marcel Dekker.
2. George, A.B. (2006) Encyclopedia of Food and Color Additives, Vol. III, CRC Press, LLC. Boca Raton, FL
3. George, A.B. (2008) Fenaroli's Handbook of Flavor Ingredients, 5th Ed, CRC Press, LLC. Boca Raton, FL
4. Madhavi, D.L., Deshpande, S.S., & Salunkhe, D.K. (2006) Food Antioxidants: Technological, Toxicological and Health Perspective, Marcel Dekker
5. Morton, I.D., & MacLeod, A.J. (2008) Food Flavors, Part A, B & C. Elsevier.
6. Nakai, S., & Modler, H.W. (2007) Food Proteins. Processing Applications. Wiley VCH.

PGD.MB.T.2.3- FOOD, DAIRY, BEVERAGE INDUSTRIAL TRAINING AND VISIT REPORT

The students shall undergo training for 15 days in food industries as mentioned under course structure. He / She shall prepare a Professional work diary indicating the nature of work/training carried out. This shall be duly certified by the official of the organization where the student has under gone training. This shall be evaluated for 100 marks.

QUESTION PAPER FORMAT FOR CBCS POST GRADUATE DIPLOMA IN FOOD ANALYSIS, FOOD SAFTEY AND STANDARDS SEMESTER EXAMINATION

I/II Semester

POST GRADUATE DIPLOMA IN FOOD ANALYSIS, FOOD SAFTEY AND STANDARDS (CBCS)

Paper Code (PGDFASS): Course Title

Time: 3 Hours **Max. Marks: 70**

Instruction: Answer all sections

SECTION-A

I. Write a short note any **Five** of the followings: (05x03=15)

1.
2.
3.
4.
5.
6.
7.

SECTION-B

II. Answer any **Five** of the followings: (05x05=25)

8.
9.
10.
11.
12.
13.
14.

SECTION-C

III. Answer any **Two** of the followings: (15x02=30)

15.
16.
17.
18.