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Syllabus

Post Graduate Diploma in Food Safety & Controls

This report is produced under TRTA II Component 2 implemented by UNIDO

Post Graduate Diploma Course in Food Safety and Controls will be conducted under EU funded TRTA II Programme in collaboration with University of Veterinary and Animal Sciences (UVAS), University of Agriculture, Faisalabad (UAF), and University of Karachi (UoK).

CURRICULUM

POST GRADUATE DIPLOMA IN FOOD SAFETY & CONTROLS

1 Year		
First Semester		
Course No.	Title of Course	Credit Hours
FSAC-1001	Food of Animal Origin	3(2-1)
FSAC-1002	Food of Plant Origin	3(2-1)
FSAC-1003	Food Microbiology	3(2-1)
FSAC-1004	Food Safety Science	3(2-1)
FSAC-1005	Food Sampling Techniques and Analysis	3(1-2)
FSAC-1006	Food plant Sanitation and Hygiene	3(2-1)
	Total Credit Hours in 1 st Semester	18(11-7)
Second Semester		
FSAC-1007	Food Quality Management Systems	3(3-0)
FSAC-1008	<i>Food Related Legal System</i>	2(2-0)
FSAC-1009	<i>Food Inspection, Investigation and Judgment</i>	4(3-1)
FSAC-1010	Food Safety, Standards and Trade	2(2-0)
FSAC-1011	Compliance Strategies and Effective Enforcement	2(2-0)
FSAC-1012	Food Toxicology & Adulteration	3(2-1)
FSAC-1013	Specialist visit, report writing & professional skills	3(0-3)
	Total Credit Hours in 2 nd Semester	19 (14-5)
Total Credit Hours		(18+19)=37

FSAC-1001 3(2-1) Food of Animal Origin

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 1.1 Describe the functional anatomy of the major systems within human and comparative anatomy and physiology of food animals, including the ability to differentiate organs & carcasses of food animals, including red, white, game, exotic & fish.
- 1.2 Recognise gross post-mortem evidence of pathological conditions of food animals common to the Pakistan at a retail level, along with post mortem quality deterioration and contamination.
- 1.3 Articulate the causes and effects of common pathological conditions found in the Pakistan and EU food market, from 'farm to fork', along with deterioration and contamination of animal carcasses and animal products.
- 1.4 Discuss the aetiology, morphology and pathology of a range of common zoonoses affecting food along with the action and impact of a range of microbiological and chemical contaminants.
- 1.5 Explain the role of food production methods in the distribution and prevalence of common zoonoses.
- 1.6 Articulate the causes and effects of common spoilage and other conditions found in the Pakistan food market, from 'farm to fork', including red & white meat, along with eggs and dairy products.
- 1.7 Identify a range of fish and shellfish common to the Pakistan market at retail level.
- 1.8 Describe the physiology of fish and shellfish common to the Pakistan retail market.
- 1.9 Articulate the causes and effects of common pathological conditions of fish and shellfish found in the Pakistan food market, at retail level, along with deterioration and contamination of fish, fish products and shellfish.
- 1.10 Discuss the aetiology, morphology and pathology of common zoonoses and other conditions affecting fish and shellfish along with the action and impact of a range of microbiological contaminants.
- 1.11 Explain the role of food inspectors in the prevention of illness associated with the consumption of shellfish.

Practical:

- Introduction to meat inspection, Duties of meat inspector.
- Ante mortem inspection of various animals.
- Post mortem inspection of the thoracic and abdominal viscera including lungs, heart, kidneys, liver and digestive tract of various animals.
- Lymphatic system in meat inspection.
- Physical and anatomical differentiation of meat of various animals.
- Visit to slaughter house.
- Meat grading-tenderness, juiciness, carcass maturity, firmness, texture, marbling and colour of lean
- Chemical tests for differentiation of meat.
- Differentiation b/w meat of different species on molecular basis.
- Biochemical and bacteriological methods for examination of meat.
- Putrefaction test for meat.
- Antemortem and post mortem inspection, meat of poultry.
- Inspection of drug residues in meat.
- Visit to slaughter house.
- Modern techniques in meat inspection.
- Sampling and dispatch of sick fish for laboratory investigation.
- Blood changes associated with diseases.
- Recognition and differential diagnosis of gross and histopathological lesion in various organs.
- Visit to fish farm.
- Determination of minerals in seafood
- Identification of various species of fish and shellfish in our region
- Assessment of fish quality-sensory methods
- Assessment of fish quality-Chemical and biochemical methods, physical methods and microbiological methods
- Assessment of freshness of fish-Quality index method
- Meat specification-DNA/PCR

Recommended Books:

1. Barbra, K., Steven L. H. and Camille K. 2007. Animal, Vegetable, Miracle: A Year of Food Life. Harper Collins Publishers. New York.
2. Gracey, J.F. 1999. Meat Hygiene. 10th Edition. The English Language Book Society, Bailliere Tindal , London U.K.
3. Herenda, D.C. and D.A. Franco. 1991. Food Animal Pathology and Meat Hygiene. Mosby year Book . London.
4. FAO, 2000. Manual on meat inspection for developing countries. 2nd Ed., Vol. 119, Food and Agriculture Organization of United Nations, Rome, Italy.
5. Wilson W.G. 1998. Wilson's Practical Meat Inspection. 6th Ed., Blackwell Publication, Ltd.
6. Herenda, D.C. and D.A. Franco.1996. Poultry Diseases and Meat Hygiene. The Iowa State University Press, Ames, Iowa, USA.
7. Bremner, A.S and M. Johnston. 1996. Poultry meat hygiene and Inspection. W.B. Saunders company, Ltd.
8. Grist, A., 2004. Poultry Inspection: Anatomy, Physiology and Disease condition, Nottingham University Press.
9. Nogra, E.J., 2000. Fish Diseases, Diagnosis and treatment. The Iowa State University Press, Ames, Iowa, USA.
10. Hoole, d., D. Bucke, P. Burgess, I. Wellby, 2000. Diseases of Carp and other Cyprinid Fish, Blackwell Publishing, Ltd.
11. Wildgoose, W.H. 2001. BSAVA Manual of Ornamental Fish, 2nd Ed., Blackwell Publishing.
12. OIE, 2003. Manual of diagnostic tests for aquatic animals, 4th Ed., Office des International Epizootics, Paris.
13. Whitman, D.A., 2003. Finfish and Shellfish Bacteriology Manual, Blackwell publishing, Ltd.
14. Adams, A., K.D. Thompson, D.J. Morris, R. Wootten, 2004 Immunodetection methods in aquaculture, Blackwell Publishing, Ltd.

FSAC-1002 3(2-1) Food of Plant Origin

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 2.1 Identify a range of food products including pulses, cereals, vegetables, fruit, herbs and spices and dry products.
- 2.2 Recognise spoilage and other contamination of foods and ingredients common to the Pakistan food market, at a retail level.
- 2.3 Articulate the causes and effects of common spoilage and other conditions found in the Pakistan food market, from 'farm to fork', including cereals, vegetables, fruit, herbs, spices and dry products.
- 2.4 Explain the role of Codex in the control of standards for size, appearance and quality of a range of foods.
- 2.5 Explain the role of food production methods in limiting the occurrence of food spoilage and other contaminants.
- 2.6 Product evaluation – sensory analysis, viscosity, colour, texture, size, shape, symmetry, with reference to Codex, FSA, EU directives and other systems of control.

Practical:

- Proximate analysis (Crude fat, crude protein, crude fiber, crude ash, moisture).
- Aflatoxins of wheat.
- Manufacture of noncarbonated beverages (squashes/ jam)
- Fortification, product evaluation.
- Grading and analysis of certain rice with reference to standards
- Grading and analysis of certain pulses with reference to standards
- Grading and analysis of certain spices with reference to standards
- Preparation of dehydrated horticultural products
- Safety/quality evaluation of dehydrated horticultural products
- Preparation of canned fruits and their products
- Safety/quality evaluation of canned fruits and their products
- Preparation of canned vegetables and their products

- Safety/quality evaluation of canned vegetables and their products
- Minimal processing of different vegetables
- Safety and quality evaluation of minimally processed vegetables
- Use of edible coatings for fruits and vegetables
- Safety and quality evaluation of fruits and vegetables preserved by edible coating
- Outline maturity indices of fruits and vegetables
- pH of food
- Powder Finesse
- Titratable acidity
- Total Solids
- Viscosity
- Viscosity (Rheology)
- Texture analysis: Firmness, Flexibility, Tensile strength/extensibility, Stickiness, Cutting force, Ripeness, Bruising , Crispness
- Water Activity (aW)
- Moisture - Karl Fisher
- Moisture, 100 C vacuum oven
- Moisture, 60C vacuum oven
- Colour measurement
- Microscopic Examination (Extraneous Material)
- Report writing & presentation

Recommended Books:

1. J. G Vaughan & C.A Geissler. Illustrations by Elisbath Dowle, B.E. Niichoson & Elizabeth Rice. 2009. The new oxford book of Food Plant origin. Oxford University Press. Inc. New York.

FSAC-1003 3(2-1)**Food Microbiology**

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 3.1 Advanced food microbiology including microbial analysis, growth, physiology and survival.
- 3.2 Interpret the Codex & ICMSF microbiological criteria regulations for foodstuff.
- 3.3 Discuss the role and ability of antimicrobial agents and their role in cleaning science.
- 3.4 Comprehend results relating to the detection, enumeration, identification and prediction of micro-organisms.
- 3.5 Explain the aetiology of common food borne illnesses/diseases.
- 3.6 Interpret data on trends in food borne microbiology and explain the role of epidemiology in monitoring the distribution and determinants of food borne illness/disease.
- 3.7 Discuss sterilisation and disinfection and appropriate preventative and remedial environmental interventions including cleaning and disinfection strategies.
- 3.8 Detail the role of microbes in disease, food spoilage, food production, food preservation methods and biotechnology.
- 3.9 Explain the importance of water quality, water chlorination (chemistry, methods, testing and interpretation of results) in food production.

Practicals:

- *Demonstration of safety regulations for microbiology*
- *Introduction to microbiological lab and equipment and material used in microbiology*
- *Use of microscope and microscopy*
- *Utilization of aseptic technique*
- Sterilization and disinfection
- Preparation and sterilization of culture media
- Streak plate and pour plate method
- Isolation of pure culture
- Enumeration and viable plate count of bacteria
- Aerobic Plate Count (APC)

- Total Yeast & Mold population
- Total Coliforms & E. coli
- Coagulase Positive Staphylococcus
- Salmonella (Presence / Absence)
- Listeria (Presence/Absence)
- Pathogen Confirmation
- Pseudomonas aeruginosa
- Enterobacteriaceae
- Campylobacter (Presence / Absence)
- Bacillus cereus
- Anaerobic Plate Count
- Aerobic Spore Former Count
- Lactic Acid Bacteria Count
- Lactobacillus species Count
- Isolate Identification - Bacterial
- Isolate Identification – Fungal
- Outline biochemical test for bacterial identification
- Bacterial characterization
- Bacterial morphology and staining techniques
- Microbial testing of water
- Microbial testing of food stuff
- Identification of pathogens
- Canner's Test
- Anaerobic Spore Former Count
- Thermophilic Aerobic Spore Former Count
- Thermophilic Anaerobic Spore Former Count
- Collection, transportation and processing of samples (Isolation and lab confirmation of microbial pathogens)
- Evaluation of antimicrobial agents and disinfectants
- Permissible level of organisms in food
- Field Trips to Food industry and Dairy plant.

Recommended Books:

1. Thomas J. M. and Karl R. M. 2008. Food Microbiology An Introduction.
2. Bibek R. and Arun k. B. 2008. Fundamental Food Microbiology.
3. James M. J., Martin J. L. and David A. G. 2005. Modern Food Microbiology.
4. Microbiology of Animals and Animal products. J.B. Woolcock. World Animal Science. New York, Volume 6, ISBN 0444430105
5. Modern Food Microbiology. J.M. Jay, M.J. Loessner and D.A. Golden (2006). Springer Science, Inc., USA. 7th Edition
6. Food Microbiology Adams M. A and Moss M. O.. Third edition.(2008) ISBN978-0-85404-284-5

FSAC-1004 3(2-1) Food Safety Science

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 4.1 Describe the production methods of primary foodstuffs common to Pakistan and how these affect food safety, quality, composition of foodstuffs commonly found in Pakistan.
- 4.2 Examine food production, processing, catering and distribution methods and determine compliance with legal standards.
- 4.3 Explain the role of preservation, temperature control, moisture and water activity, and formulation control in a food safety and food quality context.
- 4.4 Apply the legal requirements for sampling food products for compositional, chemical and microbiological analysis including additives used in the food industry and their labelling.
- 4.5 Plan and conduct sampling programmes, interpret the results from sampling programmes and take appropriate action.
- 4.6 Evaluate the causes of, and hazards associated with physical, biological and chemical contamination of food and the proliferation of micro-organisms in food at all stages of production and retail.

Practical:

- Sampling techniques.
- Organoleptic and visual examination to assess the safety and quality of animal based foods: Meat, milk and raw fish
- Detecting the radioactivity in foods by using advance analytical instruments
- Determination of heavy metals like Cd, Ni, Pb, and Cu
- Determination of pesticide residues through HPLC
- Determination of aflatoxins through different analytical techniques
- Determination of detergents through different analytical techniques
- Determination of grease through different analytical techniques
- Determination of other contaminants through different analytical techniques Determining the chemical composition of milk
- Assessment of microbial foodborne pathogens in meat
- Assessment of microbial foodborne pathogens in milk
- Detection of protein adulterants in meat and meat products
- Detection of adulterants in milk and milk products
- Detection of antibiotic residues in milk and muscle tissues of edible animal products.
- Water analysis.
- Non carbonated beverage analysis.
- Microbial analysis of raw and processed meat
- Organise, develop and manage a cleaning schedule for any food industry
- Industrial visits to assess the safety standards and protocols applied
- Result interpretation.
- Implementation of HACCP in different situations.

Recommended Books:

1. Vanderheijden. 1999. International Food safety hand book: Science, International Regulation and control Food Science & Technology).
2. Heid, J. L. and Joslyn, M. A. 1967. Fundamentals of Food Processing Operations. Ingredients, Methods and Packaging. AVI Publishing Co. Westport. Connecticut.

3. Potter N. N. 2006. Food Science, 5th edition, Springer NY. USA
4. Geoffrey Campbell-Platt (editors), 2009. Food Science and Technology, Wiley-Blackwell Publishing. United Kingdom.
5. Awan, J. A. 2007. Food processing and preservation. Unitech Communications. Faisalabad – Pakistan.

FSAC-1005 3(1-2) Food Sampling Techniques and Analysis

- 5.1 Transportation, handling, processing, record keeping, results, interpretation of results
- 5.2 Food sampling (SOPs)
- 5.3 Basic laboratory analysis & instrumentation techniques including UV-VIS, atomic emission, atomic absorption, fluorescence, IR, chromatography (paper, thin layer, GC, HPLC, LC-MS, GC-MS etc.
- 5.4 Basic food analysis, sampling and food preservation.
- 5.5 Fundamentals of statistics including use of different statistical packages such as EPI INFO, MINI TAB & SPSS.

Practical:

- Lab safety requirements
- Sampling; procedures, transportation and preservation
- Food analysis (total carbohydrate, Total sugars, reducing sugars, non reducing sugars, crude fiber, oil testing, free fatty acids, iodine no. acid no. peroxide value, volatile acids, cholesterol, total protein, total nitrogen, total free a.a, a.a analysis, gluten, vitamins, minerals, pigments, ph, color, total soluble solids, total count, quality certificate for rice/wheat).
- Proximate analysis
- Fatty acids profile
- Omega-3 fatty Acids
- Omega-6, Omega-9 Fatty Acids
- Fatty acids, free (by titration)
- Milk Fat
- Total (crude) fat by acid hydrolysis

- Fat (Soxhlet)
- Antioxidants- BHA/BHT
- Total phenols
- Reducing Sugars
- Artificial sweeteners
- Total proteins
- Percent moisture
- Rancidity- Fatty acids, free (by titration), Oxidative Stability Index, p-Anisidine value, Peroxide value, TBA
- Permitted food colours
- Non permitted food colours
- Natural food dyes
- Total Vitamin A (retinol and beta-carotene)
- Vitamin C
- Vitamin D
- Sensory evaluation of foods

Recommended Books:

1. Semih Otles. 2011. Methods of Analysis of Food Components and Additives. 2nd Edition. CRC Press, Taylor & Francis Group.
2. S. Suzanne Nielsen. 2010. Food Analysis.
3. Food and Agriculture Organization of the United Nations. 1993. Manual of Food Quality Control: Imported Food Inspection. Issue No. 14, Volume 15.
4. AOAC International OMA Program Manual. 2002. pp 1-25

FSAC-1006 3(2-1)**Food plant sanitation and hygiene**

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 6.1 Identify a range of common food pests, including insects, avian and mammalian pests, vectors and parasites.
- 6.2 Discuss the significant of these pests in terms of food safety and food quality.
- 6.3 Explain the biological and environment factors that affect pest populations.
- 6.4 Recommend appropriate controls by means of physical, biological, chemical or environmental methods.
- 6.5 Organise, administer, develop and manage a food sanitation program
- 6.6 Clear understanding of the Pakistan regulations affecting food industry
- 6.7 Comprehensive understanding of risk reduction, hazard avoidance and quality management.
- 6.8 Chemistry of detergents and sanitisers including use of quality assurance.
- 6.9 Design, construction and sanitation of buildings and equipment.
- 6.10 Design, construction and sanitation of food equipment.
- 6.11 Water, waste and waste water treatment.
- 6.12 Personal hygiene and training of food handlers.
- 6.13 Evaluate building and layout designs and recommend improvements to improve food safety and food quality.
- 6.14 Appraise constructional and maintenance defects and recommend remedial measures for rectification.

Practical:

- Design of various plants
- Construction materials
- Evaluation of detergents
- Swab tests
- Identification of pathogenic organisms from different processing operations
- Identification of common pests by visual inspection, insect collection,

- Placement of electronic fly killers and baits in plant layouts.
- Safety measures while using pesticides / fumigation.
- Training of personal hygiene.
- Potable water analysis. Waste water analysis (BOD & COD).
- Analysis of detergents and sanitizers.
- Germicidal efficiency of various disinfectants
- Efficiency of various sanitizers
- Identification of common food pests, vectors and parasites
- COD, BOD, total solids in waste water
- Pesticides, N-Methyl Carbamates
- Pesticides, Organochlorinated
- Pesticides, organonitrogen other than triazines and N-Methyl Carbamates
- Pesticides, Organophosphates
- Organise, develop and manage a food sanitation program for any food industry
- Industrial visits

Recommended Books:

1. Micheal M. C. 2006. Food Plant Sanitation (Design, Maintenance &GMP).
2. Norman G. M. and Robert B. G. 2006. Principles of Food Sanitation. Springer Science + Business Media. Inc.
3. Rajinder P. And A.K. Dhawan. 2009. Integrated Pest Management.
4. Clive de W. Blackburn and Peter J. M. Food Borne Pathogen Hazards, Risk Analysis and Control. Wood Head Publishing.

FSAC-1007 3(3-0) Food Quality Management Systems

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 7.1 Evaluate quality control systems and in product and end product quality control measures in the context of food safety and control (including ISO 22,000, GMP, internal & external audit, HACCP & CWA 15793 – bio risk management etc)
- 7.2 Explain the principles underlying food safety management systems and be able to audit such systems.
- 7.3 Apply hazard analysis principles and identify critical control points in relation to food safety and food standards throughout the food chain, including vehicle and mobile vendors, and be able to communicate the principles of hazard analysis in a range of food settings. [NB – this will need to include allergen control]
- 7.4 Judge the efficacy of product recall and traceability systems in relation to a range of food products common to the Pakistan market, including standard traceability and that applied to food animals.
- 7.5 Examine and judge the appropriateness of labelling and packaging of food to ensure compliance with Pakistan and European law, including ingredient labelling, and nutritional details, and be able to judge the status of claims and misleading descriptions.

Recommended Books:

1. Ludwig T., Achim S., Martina P. and Gabriele J. 2007. Quality Management in Food Chains. Wageningen Academic Publishers The Netherland.
2. Ioannis S. A. 2009. HACCP and ISO 22000. Application to Foods of Animal Origin. Black Well Publishing.
3. Sara E. M., Carol W. and Christos C. 2001. HACCP (Food industry briefing).

FSAC-1008 2(2-0) Food Related Legal System

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 8.1 Outline sources and classification of Pakistan Law and other law applicable within the EU & USA (may include others).
- 8.2 Recount the constitutional position of the executive, judiciary and legislature and the executive agencies.
- 8.3 Explain the main features of legislation as a source of law, including primary and secondary legislation and quasi-judicial guidance and outline the judicial reasoning in relation to statutory sources of law.
- 8.4 Discuss the role, function and impact of the Pakistan Government on food safety and food safety standards.
- 8.5 Relate the relationships between central government and their agencies, local government and non-governmental organisation in relation to food safety.
- 8.6 Define the role of members and officers within a local government context.
- 8.7 Describe the role and function of the institutions responsible for food safety control in Pakistan and the equivalent for the EU & USA (e.g. EFSA/FDA).
- 8.8 Undertake basic legal interpretation and show the ability to update legal knowledge in light of new case law, guidance or directives in the context of the constitution of Pakistan.
- 8.9 Find and extract relevant law from both printed and electronic sources.
- 8.10 Recognise the role of precedence in the judicial system.
- 8.11 Explain the main features of the case law system, the system of law reporting and the process of judicial reasoning in relation to case law.
- 8.12 Outline the legal position in relation to burden of proof in criminal and civil trials.
- 8.13 Discuss the major offences and defences created by the Relevant Pakistani legislation.
- 8.14 Express the legislation relating to powers of inspectors and in particular those relating to powers of entry, sampling, seizure and detention in relation to food.
- 8.15 Evaluate the main principles of criminal law, including rules of evidence, burden of proof, preparing cases for court.

8.16 Construct a case for legal proceedings and present a case in the magistrates court (or equivalent).

Recommended Books:

1. Food Regulation: law, Science, Policy and Practice
2. Food Import and Export Inspection & Certification System(Codex Alimentarius)

FSAC-1009 4(3-1) Food Inspection, Investigation and Judgement

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 9.1 Justify the need for appropriate equipment, clothing and record keeping for undertaking inspections in a range of food premises and during the food production cycle.
- 9.2 Demonstrate the ability to collect and record information in a food safety and control context, and show the ability to interpret the results of an inspection investigation or audit.
- 9.3 Identify hazards and assess risks in a range of food safety and control settings and justify solutions or remedial measures to remove, reduce or control the risks.
- 9.4 Determine the need and priorities for an inspection, including Halal foods and its certification.
- 9.5 Conduct an investigation; manage a range of information and evidential sources and determine appropriate options on completion.
- 9.6 Recognise the importance of the laws of evidence and formulate appropriate statements and other forms of admissible evidence.
- 9.7 Identify and utilise a range of measurement and monitoring techniques within a food safety and control context.
- 9.8 Explain the reasons for and purpose of administrative systems and procedures and their link to the quality management system of an enforcement body.
- 9.9 Basic and advanced food inspection techniques (including appropriate equipment).

- 9.10 Determine the fitness for human consumptions in a range of foods, including fruits, vegetables, cereals, fish, shellfish, stored products (dry, vacuum, canned etc.), poultry, red meat commonly available in Pakistan at retail and production level.
- 9.11 Draft appropriate letters/reports/notices following the completion of inspections and make recommendation on relevant action to be taken to achieve desired outcome and improvement in food safety and control systems.
- 9.12 Discuss the importance of administrative systems and procedures and their link to QMS of an enforcement body.

Practical:

- Food inspection for different physical parameters
- Collection techniques for sampling
- Sample preparation
- Sample identification and sealing
- Sample dispatching
- Sample handling and storage procedures
- Food Investigation analysis: Microbial
- Food Investigation analysis: Aflatoxins
- Food Investigation analysis: Heavy metals
- Food Investigation analysis: Pesticide residues
- Food Investigation analysis: Adulterants
- Food Judgment: Sensory evaluation
- Food Judgment: Consumer preference
- Food Judgment: Advance analytical techniques

Recommended Books:

1. Food Regulation: law, Science, Policy and Practice
2. Food import and export inspection & certification system(Codex Alimentarius)

FSAC-1010 2(2-0) Food Safety, Standards and Trade

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 10.1 Discuss the role of food inspectors in the regulation of imported and exported foods both of animal origin both inland and at points of entry.
- 10.2 Explain the role of Health marking and other methods of quality monitoring in food importation and exportation.
- 10.3 Discuss the role food importation controls relating to products of non-animal origin for both Pakistan and foods imported from outside Pakistan both inland and at points of entry.
- 10.4 Halal food compliance and certification.

Recommended Books:

1. Sara E. M., Corol W. and Christos C. 2001. HACCP (Food industry briefing).
2. Vanderheijden, 1999. International Food Safety Hand Book: Science, International Regulation and control Food Science & Technology
3. ludwig T., Achim S., Martina P. and Gabriele J. 2007. Quality Management in Food Chains. Wageningen Academic Publishers The Netherland.
4. Goodburn, Kaarin. 2001. EU Food Law. Wood Head Publishing Limited.

FSAC-1011 2(2-0) Compliance Strategies and Effective Enforcement

At the end of this module and following completion of an appropriate amount of independent study, a student will be able to:

- 11.1 Determine the likely co-operation of food proprietors and others in a food safety context.
- 11.2 Justify effective compliance strategies for a range of food safety context based on proportionality to risk.
- 11.3 Explain the underlying principles of an enforcement strategy, including consistency of approach, proportionality and public interest.

- 11.4 Explain the constraints that small, medium and large enterprises operate under and its impact on compliance and of compliance on business operation.
- 11.5 Examine the influence of culture on food safety standards and incorporate cultural differences into compliance strategies.
- 11.6 Identify the ability to perform food safety duties with tact, discretion and honesty and show the ability to work with colleagues and others to improve food safety.
- 11.7 Show the ability to communicate effectively at all levels and to constructively resolve differences of opinion.
- 11.8 Illustrate the principles of decision making in a food safety context and demonstrate the ability to contribute positively to the decision making process to achieve improvement in food safety standards.
- 11.9 Investigate appropriate sources and apply European standards for size, appearance and quality.

Recommended Books:

- 1. FAO/WHO Assuring Food Safety and Quality: Guidelines for strengthening National Food Control System.

FSAC-1012 3(2-1) Food Toxicology and Adulteration

- 12.1 Toxicants in food – an overview including intrinsic & extrinsic toxins, naturally occurring toxicants, accidental chemical contamination (natural and additives)
- 12.2 Toxicants in the body: absorption, distribution, translocation, biotransformation, excretion. De-toxication mechanisms.
- 12.4 Nutritional quality and safety
- 12.4 Food adulteration, identification and controls.
- 12.5 Wholesomeness of processed foods: heat treatment, irradiation, new foods - GM foods
- 12.5 Outline the key adulterations associated with food products common to Pakistan retail market (e.g. adulteration of milk (and other foods) use of unapproved colours, aflotoxins in spices, grains and dried fruits/nuts).
- 12.6 Explain the current legislative position in relation to allergens and in relation to the labelling of specified food in relation to potential allergens.

12.7 Be able to assess procedures for controlling allergen contamination to ensure accurate allergen labelling, including voluntary labelling.

Practical:

- Sample preparation for determination of toxicants: Sampling, extraction, cleanup, chromatography
- Toxicity testing: Preliminary steps for toxicity testing, acute toxicity, chronic toxicity
- Measurement of toxicants in plant foods: Haemagglutinins
- Measurement of toxicants in plant foods: Goitrogens
- Measurement of toxicants in plant foods: Cyanogens
- Measurement of toxicants in plant foods: Lathyrogens
- Measurement of toxicants in plant foods: Others
- Measurement of toxicants in animal foods
- Determination of adulterants in milk
- Determination of adulterants in spices
- Determination of adulterants in pulses
- Determination of adulterants in cereals
- Determination of toxins and adulterants in food samples by using advance analytical techniques: GC-MS
- Determination of toxins and adulterants in food samples by using advance analytical techniques: HPLC
- Determination of toxins and adulterants in food samples by using advance analytical techniques: Other techniques
- Milk Adulterants.
- Milk Antibiotics.
- Milk Aflatoxin M1.
- Meat antibiotics/drug residues.
- Meat pesticides residues.
- Meat toxin residues.
- Pesticides/ Toxin residues of food of plant origin.

Recommended Books:

1. Takayuki, S. and Leonard F. B. Introduction to Food Toxicology.2009. Library of Congress Cataloguing –in- Publication Data.
2. AOAC. Manual EDN: 2000/2004
3. Dabrowski M. Waldemar. 2005. Toxins in Food.

FSAC-1013 3(2-1) Specialist Visits, Report Writing & Professional Skills

- 13.1 Carry out a number of guided food safety visits (8-10) to a range of premises.
- 13.2 Produce comprehensive food safety reports on each visit looking at production, systems, controls, HACCP. Identify good and bad practices and make suggestions/recommendations for improvements
- 13.3 Using the reports as a basis, construct a reflective portfolio of your experiences.

Practical:

- Food inspection for different physical parameters
- Collection techniques for sampling
- Sample preparation
- Sample identification and sealing
- Sample dispatching procedures
- Sample handling and storage
- Food Investigation analysis: Microbial
- Food Investigation analysis: Aflatoxins
- Food Investigation analysis: Heavy metals
- Food Investigation analysis: Pesticide residues
- Food Investigation analysis: Adulterants
- Food Judgment: Sensory evaluation
- Food Judgment: Consumer preference
- Food Judgment: Advance analytical techniques