POST GRADUATE DIPLOMA IN
FOOD SCIENCE & TECHNOLOGY

SYLLABUS
2012-2013

CENTRE FOR FOOD SCIENCE AND TECHNOLOGY
DEPARTMENT OF HOME SCIENCE
SAMBALPUR UNIVERSITY
POST GRADUATE DIPLOMA IN FOOD SCIENCE & TECHNOLOGY
Effective from the Academic session 2012-2013

COURSE SHHEME

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|            | Total                                             | 20CH |
FIRST SEMESTER
PGDFST-411. Food Chemistry and Analysis:

UNIT-I
Food chemistry- definition and importance, Structural, analytical, physicochemical and functional properties of carbohydrates, Protein and amino acids and Lipids in foods,

UNIT-II
Shelf life of food, Water activity and its impact on shelf life of food, effect of processing.- Losses of vitamins and minerals due to processing, food additives, browning reaction in foods. Enzymes in foods, and food industry. Food emulsion and emulsifier.

UNIT-III
Sampling techniques; Spectroscopic techniques using UV/Vis, use of hunter-Lab ColorFlex in food analysis, polarimetry, refractometry, dough rheology.

UNIT-IV
Chromatographic techniques: Adsorption, column, partition, affinity, ion exchange, size exclusion, GC, HPLC, Separation techniques: Gel filtration, dialysis, electrophoresis, sedimentation, centrifugation, isoelectric focusing.

UNIT-V
Special techniques: Enzymatic methods of food analysis; thermal methods in food analysis (calorimetry) colour and texture measurement techniques.

Suggested Readings
PGDFST-412. Food Microbiology:

UNIT I

History of microbiology of food, Types of micro-organism normally associated with food-mold, yeast, and bacteria, newer and rapid methods for qualitative and quantitative assay demonstrating the presence and characterization of microbes.

UNIT II

Microbial growth in food: intrinsic, extrinsic and implicit factors, Microbial interactions, Inorganic, organic and antibiotic additives, Effect of injury on growth or survival.

UNIT III

Contaminants of foods-stuffs, vegetables, milk and meat during handling and processing. Food poisoning and microbial toxins, microbial food fermentation (Yogurt, cheese, beer, sauerkraut, dairy product etc.) standards for different foods. Food borne intoxicants and mycotoxins

UNIT IV

Modern methods of cell culture: synchronous and co- cell culture, continuous cell culture in liquid and solid media, Cell immobilization and applications, Pre and probiotics in food.

UNIT V


Suggested Readings

PGDFST-413. Principles of Food processing and Post harvest Technology:

UNIT I
Scope and importance of food processing. Principles and methods of food processing and preservation: Canning, Irradiation, Extrusion cooking, Dielectric heating and fermentation.

UNIT-II
Membrane technology: Introduction to pressure activated membrane processes: micro- filtration, UF, NF and RO and their industrial application. Hurdle technology: concept of hurdle technology and its application.

UNIT-III
High Pressure processing: Concept, equipments for HPP treatment, its application in food processing. Ultrasonic processing: Properties of ultrasonic, application of ultrasonic as processing techniques. Newer techniques in food processing: Application of technologies of high intensity light, Ohmic heating and IR heating.

UNIT-IV
Principles of Post-harvest treatments, Post harvest technology for cereals, legumes, oilseeds, vegetable and spices(cleaning, grading, milling), Hydrothermal treatment & conditioning of grains, Modern paddy and wheat parboiling-systems, Drying principles, Crop Drying methods, selection criteria for dryers.

UNIT-V
Food Packaging: Packaging functions, Packaging materials, Degradable packaging polymers, CA & MA, Innovation in food packaging (active, passive, intelligent), Quality changes during storage of packaged foods, sustainable packaging, packaging waste management.

TEXT BOOKS
6. S. A. Udipi, Food processing and preservation, New age publ.
7. S. Sood, Food preservation & processing, Kalyani publ.

Suggested Readings
4. Potter NN & Hotchkiss 1997. Food Science. 5th Ed. CBS.

**PGDFST-414. Food Engineering and Management 4CH**

**UNIT I**
Introduction to food engineering & processes: principles of thermodynamics and heat transfer applied to food engineering; Engineering properties of foods (Thermal, Optical, Frictional, Aerodynamic, Rheological, Physical), and their significance.

**UNIT-II**
Basic concept of fluid flow, heat transfer, mass transfer and its application in food processing, Concept of thermal process evaluation – sterilization and pasteurization.

**UNIT III**
Food chilling and freezing – Precooling and cold storage, freezing point depression; Cryogenic freezing and IQF; food freezing equipment; (air blast freezers, plate freezers and immersion freezers), Lyophilization.

**UNIT IV**
Basic concept of Biosepration technology, Separation of characteristics of food products (Carbohydrates, proteins, fats and Enzymes) – size, stability and food properties, filtration, centrifugation, flocculation, fractionation, absorption, evaporation and dehydration in downstream food products including case studies.

**UNIT V**
Importance of Computerization and IT in Food Industries Computers operating environments and information systems for various types of food industries; Food Process Modeling and Simulation; Project planning and management of food industry in Indian context.

**TEXT BOOKS**

**Suggested Readings**
SECOND SEMESTER

PGDFST – 421 ELECTIVE PAPERS / TERMPAPER

(A) Beverages & Snack food Technology; (Theory)

UNIT I
Types of beverages and their importance; Manufacturing technology for juice-based beverages, still, carbonated, low-calorie beverages; and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks. Specialty beverages based on tea, coffee, cocoa, plant extracts, dairy and imitation dairy-based beverages.

UNIT II
Alcoholic beverages- types, manufacture and quality evaluation; the role of yeast in alcoholic beverages, manufacturing technology of beer, distilled spirits, wine and related beverages.

UNIT III
Packaged drinking water- definition, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled water; and mineral water

UNIT IV
Technology for grain-based snacks: whole grains – roasted, toasted, puffed, popped and flakes, coated grains-salted, spiced and sweetened; flour based – batter and dough based products

UNIT V
Technology for fruit and vegetable based snacks: Chips, wafers; Technology for coated nuts – salted, spiced and sweetened; chikkis. Manufacturing technology of extruded snack foods. Basic principles of unit operations such as frying, baking and drying, toasting, roasting and flaking, popping, blending, Coating, chipping in snack food processing industries.

TEXT BOOKS
1. Edmund WL. Snack Foods Processing. AVI Publ.
2. Gordon BR. 1997 Snack Food. AVI Publ

Suggested Readings
3. Priest FG & Stewart GG. 2006. Handbook of Brewing. 2nd Ed. CRC.
(B) Technology of Dairy Products: (Theory)

UNIT-I

UNIT-II
Definition, Classification, Composition and physico-chemical properties of cream. Production processes and quality control. Butter: Definition, Classification, Composition and methods of manufacture, Packaging and storage. Butter oil/Ghee.

UNIT-III
Ice cream: Definition, Classification and Composition, Constituents and their role. Preparation of mixes and freezing of Ice cream, Overrun, Judging, Grading, and defects of Ice cream.

UNIT-IV

UNIT - V
Cheese: Definition, composition, classification, methods of manufacture, cheddar, Gouda, cottage and processed cheese, evaluation, defects in cheese. Manufacturing methods of. Indigenous milk products such as *yoghurt*, *dahi*, *khoa*, *burfi*, *gulabjamun*, *rosogolla*, *chhana*, *paneer*, *ghee*, *lassi* etc; probiotic milk products.

TEXT BOOKS


Suggested Readings


(C) **Term Paper**:  
A candidate has to select a topic related to any area of the course and write a review paper on the same and submit the hard copy in the end of the semester. The candidate has to present the review paper in the form of a seminar before the students, faculty members and examiners. This will be evaluated by both internal & external examiners.

**PGDFST – 422- SEMINAR PRESENTATION**  
A candidate has to select two topics related to any area of the course and present the same in the seminar before the students and faculty members. The candidates have to submit the write up of the seminar (Hard copy) before the presentation of the seminar. This will be evaluated by internal examiners appointed for the purpose.

**PGDFST – 423- INDUSTRIAL VISIT REPORT**  
A candidate has to visit one industrial establishment on his/her own and submit a report on the specifying the technological aspects and other important activities of the Industry. This will be evaluated by internal examiners appointed for the purpose.

**PGDFST – 424- PROJECT REPORT**  
A candidate has to select a topic for the research based project work and work under the supervision of a suitable guide (decided by the academic committee). He/she has to submit the dissertation in the end of the semester. The candidate has to present her dissertation in the form of a seminar before the students, faculty members and examiners. This will be evaluated by both internal & external examiners.

**PGDFST – 425- COMPREHENSIVE VIVA VOCE**  
The comprehensive viva voce will be conducted in the presence of all faculty members, internal & external examiners.