

**RAMAKRISHNA MISSION VIVEKANANDA EDUCATIONAL &
RESEARCH INSTITUTE**

(Deemed to be University, declared by Govt. of India under section 3 of UGC Act, 1956)

Po: Belur Math, District – Howrah, West Bengal -711202

**INTEGRATED RURAL DEVELOPMENT & MANAGEMENT (IRDM)
FACULTY CENTRE**

at

Ramakrishna Mission Ashrama, Narendrapur, Kolkata :700 103



One Year PG Diploma in ‘Post Harvest and Food Technology’

PROPOSED COURSE CONTENT (With effect from academic year 2018-19)

POST GRADUATE DIPLOMA

IN

POST HARVEST AND FOOD TECHNOLOGY

COURSE DURATION – 1 YEAR {2 SEMESTERS}

SEMESTER—I

COURSE NO	COURSE DESCRIPTION	CREDIT
PGD PHT 01	PRINCIPLES OF FOOD PROCESSING AND POST HARVEST TECHNOLOGY	3
PGD PHT 02	FOOD CHEMISTRY	2+2
PGD PHT 03	FOOD MICROBIOLOGY	2+ 2
PGD PHT 04	FOOD PROCESSING AND ENGINEERING I	2+2
PGD PHT 05	SEED PROCESSING TECHNOLOGY	3 +0
PGD PHT 06	FOOD QUALITY TESTING EVALUATION & SAFETY	1+1
ABT 107	SPIRITUAL AND CULTURAL HERITAGE OF INDIA	2 +0
	SUB TOTAL	22

SEMESTER II

COURSE NO	COURSE DESCRIPTION	CREDIT
PGD PHT 07	FOOD PROCESSING AND ENGINEERING II	2+1
PGD PHT 08	INDUSTRIAL VISIT AND REPORT	0+6
PGD PHT 09	PROJECTWORK ANDPROJECT REPORT	0+12
PGD PHT 10	ENTERPRENEURSHIP AND MANAGEMENT	1
PGD PHT 11	SEMINAR	1
	SUB TOTAL	23

TOTAL = 45 CREDIT

POST GRADUATE DIPLOMA IN POST HARVEST AND FOOD TECHNOLOGY

Semester-I [Total: 15 (T) + 7 (P) = 22 credits]

PHT 01 : PRINCIPLES OF FOOD PROCESSING AND POST HARVEST TECHNOLOGY (3+ 0) Credits

Theory : 3 credits/ 54 hrs

UNIT I : Introduction to principles and methods of food preservation

Scope and importance of food processing , Principles and methods of food processing and preservation ,canning ,irradiation and Extrusion Cooking ,Dielectric heating and Fermentation. **8hrs**

UNIT II : study on Membrane Technology and its uses

Membrane Technology, Introduction to pressure activated membrane processes micro filtration, UF, NF and RO and their industrial application, Hurdle technology and its application. **8hrs**

UNITIII : high pressure technology ,ultrasonics, high intensity light, ohmic, IR heating **10hrs**

High Pressure processing concept, equipments for HPP treatment ,its application in food processing, Ultrasonic processing, Properties of Ultrasonics, application of ultrasonics as processing technique, Newer techniques in food processing Application of Technologies with high intensity light, Ohmic heating and IR heating. **8hrs**

UNIT IV

OBJECTIVE Post harvest technology of cereals, legumes, oilseeds, spices, vegetables

Principles of Post Harvest Treatment, Post Harvest technology for cereals, legumes, oilseeds, vegetables, and spices {cleaning ,grading, milling}, Hydrothermal treatment, and conditioning of grains, Modern paddy and wheat parboiling system, Drying Principles ,Crop Drying methods, selection criteria for dryers. **12hrs**

UNIT V:Food Packaging

Food Packaging, Packaging functions, Packaging materials, Degradable packing packaging polymers ,CA and MA, Innovation in food packaging, Quality changes during storage of packaged foods sustainable packaging ,packaging waste management. **8hrs**

PHT 02: FOOD CHEMISTRY (2 + 2) Credits

Theory : 2 Credit / 36 hours

UNIT I

Food chemistry-definition and importance, structural ,analytical, physicochemical and functional properties of carbohydrates proteins, and amino acids, and Lipids in foods. **14 hrs**

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 emulsifiers. **10 hrs**

UNIT III

Chemistry of fruits, vegetables, cereals, legumes, oilseeds; essential nutrients- sources, functions, deficiency diseases; requirements and recommended dietary allowances **12 hrs**

Practical : 2 credit / 36 hours

1. Sampling techniques, Spectroscopic techniques, using UV/VIS ,use of HUNTER-LAB color Flex in food analysis, polarimetry, refractometry, dough technology, Chromatographic Techniques, Adsorption,column, partition, affinity , ion exchange ,size exclusion, GC,HPLC, Separation Techniques **4 hrs**
2. Determination of peroxidase and catalase activity. **6 hrs**
3. Comparison of different methods for moisture determination in food samples. **6 hrs**
4. Test for presence of carbohydrates, and proteins. Identification of gums. Estimation of minerals by atomic absorption, spectrophotometer, estimation of minerals by flame photometer. **8 hrs**
5. Determination of fat and protein content, determination of NEB, determination of total carotenoids; determination of reducing and total sugars, determination of extent of rancidity in fats. **6 hrs**
6. Special Techniques, Enzymatic methods of food analysis, thermal methods in food analysis {calorimetry},color and texture measurement techniques. **6 hrs**

PHT 03 : FOOD MICROBIOLOGY (2+2) Credits

Theory : 2 credits/ 36 hours

UNIT I

History of Microbiology of foods, Types of Microorganisms normally associated with food mold, yeast and bacteria newer and rapid methods ,for qualitative and quantitative assay demonstrating the presence and characterization of microbes. **12 hrs**

UNIT II

Microbial growth in food ,intrinsic, extrinsic an implicit factors, Microbial interactions ,Inorganic, organic,and antibiotic additives, .Effect of injury on growth or survival. **12 hrs**

UNIT III

Contaminants of food stuff ,vegetables ,fish ,meat and milk during handling and processing .Food poisoning and microbial Toxins, microbial food fermentation,{yoghurt ,curd, cheese ,beer ,sauer kraut ,dairy products etc} standards for different foods ,Food borne intoxicants and mycotoxins. **12 hrs**

Practical :2 credits / 36 hours

1. Modern methods of cell culture ,synchronous and co-cell culture, continous cell culture in liquid and solid media,Cell mobilization and application Pre and Probiotics in food. **18 hrs**
2. Detection of food and adulteration, Techniques to detect food adulteration ,Immunoassay Technique{ELISA ,Immuno electrophoresis, Ouchterlony double diffusion method, Quality assessment of fermented food products. **18 hrs**

PHT 04 : FOOD PROCESSING AND ENGINEERING I (2+1) CREDITS

Theory: 2 Credits/36 hours

UNIT I : Introduction to Food Engineering and basics study

Introduction to Food Engineering and processes: principles of thermodynamics, and heat transfer applied to food engineering, Engineering properties of foods, Engineering properties of foods {Thermal, Optical, frictional, Aerodynamics, Rheological, Physical } and their significance. **10 hrs**

UNIT II : Food Engineering unit operations I

Basic concepts of fluid flow ,heat transfer, mass transfer and its application in food processing, concept of thermal process evaluation- sterilization and pasteurization. **8 hrs**

UNIT III : Food Engineering Unit operations II

Food Chilling and freezing,- Pre cooling and cold storage, freezing point depression, Cryogenic freezing,and IQF, food freezing, equipment air blast freezers, plate freezers, Immersion, Lyophilisation **10 hrs**

UNIT IV : Food Engineering Unit operations III

Basic concept of Bio separation Technology ,Separation of characteristics of food products{Carbohydrates ,proteins ,fats and enzymes,}- size, stability and food properties,filtration,centrifugation,flocculation,fractionation,absorption,evaporation and dehydrationin downstream food products ,including case studies. **8 hrs**

Practical : 1 Credits/18 hours

1. Application of Computer and IT in Food Industry

Importance of Computerization and IT in food industries Computer operating environment and information system for various types of food industries, Food process modeling and simulation, Project planning and management of food industry in Indian context **18 hrs**

PHT 05: SEED PROCESSING TECHNOLOGY (3 +0) Credits

Theory : 3 Credits/54 hours

1. Introduction to seeds,-structure of seeds Grouping of seed forms ,Physical properties of seeds, chemical composition of foods. **10 hrs**
2. General seed production ,cereal/legume/forage seed production **12 hrs**
3. Seed certification ,and seed quality testing, Management of seed programmes ,Longevity and storage of seeds ,Seed processing-Pre processing seed storage ,seed dryers ,Pre cleaners, and Fine cleaners, Air cleaners and gravity separators, indented cylinders ,spiral separators, magnetic separators Electronic color separators, seed graders. **12 hrs**
4. Vibratory feeders ,seed coaters ,seed polishers, seed conveyors ,and elevators ,seed treater, bagging,weighing and storage equipments **10hrs**
5. General seed processing plant and Modern{computerized}seed processing plant features, selection, operation and maintenance, Mobile seed cleaners visit to local seed industry. **10 hrs**

PHT 06 : FOOD QUALITY,TESTING ,EVALUATION AND SAFETY (1+1) Credit

Theory : 1 Credit / 18 Hours

1. Food safety and Securities Act and testing methods for food quality, testing evaluation and safety **6 hrs**
2. FOOD QUALITY, TESTING AND EVALUATION : Concept of food quality and its monitoring, The principles of quality assurance for the agro industries ,Establishment of decision making process is using official ,{government and industry}instrumental ,chemical and sensory procedures ,the use of statistical tools in quality assurance and their application s, Development of hazard analysis procedures, Rheological techniques and instrumentation for measuring the mechanical properties of foods ,relationship of these properties to food textural qualities, Application of methods to various foods and bio renewable materials, Food specifications ,grades, and standards, Sensory test methods and procedures used to evaluate the flavor ,colour and texture of foods. **8 hrs**
3. FOOD REGULATION AND SAFETY: Food laws and regulations, Food safety issues Food safety system, Food safety system and the environment **4 hrs**

ABT 107 : Spiritual and Cultural Heritage of India-I (2+0) credits

Theory: 2 Credits/ 36 hours

1. Shanti Mantras and some selected vedic hymns-Shraddha Suktam, Sangha mantra etc. **2 hrs**
2. Swami Vivekananda's Message to the Youth: It is youth who will transform this nation, Take up an ideal and give your whole life to it, Stand on your own feet, Awaken the spirit of 'Rajas' within you, Believe in yourself, Be bold and fearless, Expand your heart, Be open to learning from anyone, Develop a gigantic will. **10 hrs**
3. Swami Vivekananda's Message to Reformers: Liberty is the first condition for growth, Affirm; Do not condemn, Don't lead but serve, Act with unselfish motives, create 'sanction' from the people, The Indian Nation will rise only when the self-esteem of the masses is raised, Real social reform will happen when the people learn to help themselves. **12 hrs**
4. Swami Vivekananda's message to Educationists: manifest the infinite knowledge within, man-making education, strengthen faith and pride in ourselves as a nation, focus on character-building assimilation of ideas, enable the student to learn, enable individuals to find solutions to the challenges of life, give ideas and culture, develop the power of concentration. The condition necessary for the teacher, the taught and for effective transfer of learning. **12 hrs**

Semester II {TOTAL 3(T) +20(P)= 23 CREDITS}

PHT 08 : FOOD PROCESSING AND FOOD ENGINEERING II (2+1) Credits

Theory : 2 Credits /36 hours

1. Application of Food Engineering in Heat Transfer, processing of food grains **8 hrs**
2. Various size reduction machineries and energy requirement ,Material handling, equipments, separating equipment based on size shape and surface characteristics of food material Heating and cooling of food products mode of heat transfer different types of heat exchangers Principles of drying and drying equipments **14 hrs**
3. Processing of food grains ,animal feed ,seeds, fruits and vegetables, flowers, spices, dairy products, egg and meat , various milling processes Rice wheat ,maize and pulse milling Parboiling of wheat and paddy ,storage of grains. **14 hrs**

Practical: 1 Credit/18 Hours

Visits to local Rice mill, Flour Mill, Dal Mill ,Oil Extraction Mill. **18 hrs**

PHT 09 : INDUSTRIAL VISIT and REPORT (0+6) Credit

PHT 10 : PROJECT WORK AND PROJECT REPORT (0+2) credit

PHT 11 : ENTREPRENEURSHIP AND MANAGEMENT (1+0) Credit

Theory: 1 Credit /18 Hours

1. Basic introduction to Entrepreneurship and management of enterprise

Entrepreneurship The concept of Entrepreneurship and the legal criteria for small and medium enterprise. The institutional frameworks Various business structures Contacts with a focus on sales contract, contract of entrepreneurship ,labour contract ,Essential labour law ,loans and charges . **6 hrs**

2. Essential elements of intellectual property and unfair competition Legal aspects of entrepreneurship –salient features ,Basic principles of tax Marketing-understanding marketing, the marketing environment information systems and marketing research, customer buying behavior ,segmentation, Target marketing and positioning. **8 hrs**

3. The Marketing mix {Product, Price, Place and Promotion} Strategic Planning **4 hrs**

PHT 13 : SEMINAR (Credit 1 / 18 Hours)

TOTAL CREDIT (THEORY + PRACTICAL) : 45