UNIVERSITY OF MUMBAI

No.UG/248 /2016-17
Mumbai-400 032
7th February, 2017

The Principal,
Sant Rawool Maharaj College,
At Post , Kudal,
Taluka Kudal,
Dist; Sindudurg-416520.

Sir,

I am to invite your attention to the Ordinances, Regulations, and Syllabi relating to the Post Graduate Diploma in Food Science and Technology and to inform you that the proposal received from the Principal, Sant Rawool Maharaj College, Kudal has been accepted by the Academic Council at its meeting held on 14th July, 2016 **vide** item No.4.92 and subsequently approved by the Management Council at its meeting held on 18th November, 2016 **vide** item No.29 and that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 54 (1) and 55 (1) of the Maharashtra Universities Act, 1994 and the Ordinances 6334 and 6335 and Regulations 9053, 9054 and 9055 and the syllabus for the Post Graduate Diploma in Food Science and Technology has been introduced, which is available on the University's web site (www.mu.ac.in and that the same has been brought into force with effect from the academic year 2016-17.

Yours faithfully

(Dr.M.A.Khan)
REGISTRAR

A.C/4.92 /14/07/2016
M.C/29/18/11/2016

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No. UG/248 -A of 2016 MUMBAI-400 7th February, 2017

Copy forwarded with compliments for information to:-

1) The Director, Board of College and University Development.
2) The Offg. Controller of Examinations.
3) The Principals of the affiliated Colleges in Science and the Head recognized Institutions concerned.
4) The Co-Ordinator, Faculty of Technology,
5) The Co-Ordinator, University Computerization Centre.

(Dr.M.A.Khan)
REGISTRAR

PTO...

New (2)

Cover Page

AC 14/07/2016
Item No. 4.92

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	Post Graduate Diploma in Food Science and Technology
2	Eligibility for Admission	B.Sc. degree of University of Mumbai or any recognized University [Please refer 2nd Page of the syllabus for further details]
3	Passing Marks	NA [Total credits offered for the programme = 60]
4	Ordinances / Regulations (if any)	NA
5	No. of Years / Semesters	03 semesters
6	Level	P.G. Diploma
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic Year	From Academic Year 2016-2017

Date: Signature:

Name of BOS Chairperson / Dean: _____

AC 14-07-2016

ITEM NO. 4.92

UNIVERSITY OF MUMBAI

Syllabus

For

Post Graduate Diploma in Food Science and Technology

(Theory and Practical)

From

Academic year 2016-17

Eligibility

The minimum qualifications required for admission to the course are as follows The applicant should possess a B.Sc. degree of University of Mumbai or any recognized University and should have offered the following subjects at the various examinations as shown below :-

1) He /She must have offered Chemistry as one of the subject at any one level of the three year degree course.
2) He /She must have offered one of the following subjects at least at the T.Y.B.Sc. level of the three year degree course
   i) Physics, ii) Botany, iii) Zoology, iv) Life Sciences, v) Micro-biology, vi) Bio-Chemistry
3) Possessing Bachelor's degree of Fisheries Sciences, Bachelor's degree in Horticulture/Agriculture from any Statutory University.

Conduct of Course

The workload per paper for theory and practical workload per batch, batch size for practical and passing standards will be as per the existing norms / regulations and University Guidelines.

Semester – I			**Semester – II**		
Paper	Credit	Lect. /Pract	Paper	Credit	Lect. /Pract
Paper - I **Food Microbiology and Food Chemistry**	08	45L 30P	Paper – I **Food Quality, Packaging and Marketing**	08	45L 30P
Paper – II **Fruits, Vegetables, Cereal and Oil Seeds Technology**	08	45L 30P	Paper – II **Milk, Meat and Fish processing Technology**	08	45L 30P
Paper – III **Food Hygiene and Sanitation**	08	45L 30P	Paper – III **Fermentation and Bakery Technology**	08	45L 30P
	24	225		24	225

Semester – III		
Paper	Credit	Lect.
Internship program	12	125
Total	12	125

Per Year	
Total Credits	Total Lectures
60	575

For Semester I & II

Total Courses = 03

Lecture per Course = 75 (Theory 45 & Practical 10 x 3Lectures) for each semester.

Semester – I		
Paper	Credit	Lect. /Pract
Paper - I **Food Microbiology and Food Chemistry**	08	45L 30P
Paper – II **Fruits, Vegetables, Cereal and Oil Seeds Technology**	08	45L 30P
Paper – III **Food Hygiene and Sanitation**	08	45L 30P
	24	225

Paper – I: Food Microbiology and Food Chemistry

Unit – I	**Principles of food processing** Scope and importance of food processing. National and international perspectives. Principles and methods of food preservation-freezing, heating, dehydration, canning, additives, fermentation, irradiation, extrusion cooking, hydrostatic pressure cooking, dielectric heating, microwave processing, aseptic processing, hurdle technology, Juices and concentrates/membrane technology. Storage of food, modified atmosphere packaging. Refrigeration, freezing and drying of food, minimal processing, radiation processing.	**15**
Unit – II	**Food microbiology** History of microbiology of food. Microbial growth pattern, physical and chemical factors influencing destruction of micro-organisms. Types of micro-organism normally associated with food-mold, yeast, and bacteria. Micro-organisms in natural food products and their control. Contaminants of foods-stuffs, vegetables, cereals, pulses, oilseeds, milk and meat during handling and processing. Biochemical changes caused by micro-organisms, deterioration of various types of food product. Food poisoning and microbial toxins, microbial food fermentation, standards for different foods.	**15**
Unit – III	**Food chemistry** Food chemistry-definition and importance, water in food, water activity and shelf life of food. Carbohydrates-chemical reactions, functional properties of sugars and polysaccharides in foods. Lipids: classification, and use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical and chemical properties, distribution, amount and functions of proteins in foods, functional properties, classes of vitamins, types of minerals, effect of processing on loss of vitamins and minerals. Pigments in food, food flavours, browning reaction in foods. Bio-deterioration of foods and additives.	**15**
Practical	1) Preparation of intermediate moisture food, clarified juice, candy and micro waved (cooked) foods. 2) Canning of fruits and vegetables **3)** Study of pre-cooling unit and cold storage, Extrusion cooking **4)** Study of drying techniques	

	5) Studies on use of additives for food preservation 6) Preparation of nutrient media, Sterilization, inoculation techniques 7) Microbial examination of natural food products **8)** Production of alcohol (cereal based), Microbial production of acetic acid and lactic acid. 9) Determinations of proteins/starch/sugars/ash content/crude fat/ moisture content in foods & minerals- calcium/phosphorus/iron **10)** Estimation of ascorbic acid, preservatives and antioxidants	

Paper – II: Fruits, Vegetables, Cereal and Oil Seeds Technology

Unit - I	**Fruit & Vegetable technology** Principles and methods of fruit and vegetable preservation. Composition and related quality factors for processing. Principles of storage of fruits and vegetables. Types of storage: natural, ventilated low temperature storage, DA and MA storages. Preservation of fruits and vegetables by heat, chemicals, sugar, salt, fermentation, drying etc. Canning of fruits and vegetables, tin cans, glass containers seaming technology, aseptic canning technology. Fruit and vegetable juices, preparation of syrups, cordials and nectars, juice concentrates, pectin and related compounds, jams, jellies, marmalades, preserves. Theory of gel formation, quality control, pickles, chutneys and vinegar production, tomato products. Drying and dehydration of fruits and vegetables, problems related to storage of dehydrated products. Freezing and freeze-drying of food and frozen products, Fruit product order and quality control.	15
Unit - II	**Cereal and legume technology** General introduction to cereals, new varieties, production trends of wheat, rice, barley, oat, corn, sorghum, pearl millet and minor millets in India. Structure and nutrient distribution in cereals, wheat types, milling of wheat, quality of flour and flour treatment, dough chemistry and rheology, manufacturing of bread, biscuits, cakes, durum wheat and pasta products. Rice milling, milling machine, effect of different factors on milling yield and rice quality, parboiling of rice, effect of aging of rice, rice products-enrichment with vitamin and minerals, byproduct utilization. Chemical constituents, processing, pearling and malting of barley. Corn-wetland dry milling, corn flakes, starch, its derivatives syrup, germ oil, preparation of extruded products. Structure and composition of pulses, their importance in Indian diet. Types of cakes, ingredients and their functions in cake, manufacturing of cake. Recent development in cereal technology.	15
Unit - III	**Technology of oil seeds and fats** Oil seeds: Conditioning and oil extraction, importance of oil seeds processing in India, expeller pressing and solvent extraction of oil, oil refining, preparation of protein concentrates and isolates and their use in high protein foods, fermented and traditional products. Importance of fats and oils in human nutrition. Chemical, physical and functional properties of fats and oils. Commercial oil resources. Basic processing of fats and oils - oil extraction, degumming, refining, bleaching, hydrogenation, fractional crystallization, inter-esterification, glycerolysis, molecular distillation, plasticizing and tempering. Chemical adjuncts-lecithins, monoglycerides and derivatives,	15

	propylene glycol esters, polyglycoesters. Shortening-introduction, manufacturing and uses of shortening, types of shortening. Margarine-manufacturing and uses of shortening, types of shortening. Margarine-manufacturing process and its uses. Mayonnaise and salad dressings. Confectionery coatings. Immitation dairy products - peanut butter and vegetable ghee. Packing and storage of fats and oils, cocoa butter, fat substitutes.	
	Practical 1) Study of equipment's for fruits and vegetable processing, plant-layout, can seaming operation 2) Preparation of fruit juices, squashes, syrups and ready-to-serve beverages, Canning of fruits and vegetables. 3) Preparation of jams, jellies, marmalade and candies, pickles, chutneys, and tomato products 4) Drying of fruits and vegetables, freezing of foods, Processing of mushroom. 5) Quality control testing of processed food items 6) Physico-chemical tests for flour quality of wheat 7) To study the rheological properties of dough, Physico-chemical tests of rice and evaluation of cooking quality, Milling and parboiling of paddy 8) Extraction of oil from different sources using different techniques. 9) Manufacture of margarine & Kokum/Peanut butter. 10) Testing of storage stability of fats and oils, Detection of adulteration of fats and oil 11) Visit to Oil extraction refining units.	

Paper – III: Food Hygiene and Sanitation

Unit – I	**Human Nutrition & Health** Introduction to nutrition: food as a source of nutrients, functions of foods, Definition of nutrition, nutrients, adequate nutrition, Optimum nutrition, malnutrition, inter-relationship between nutrition and health Visible symptoms of good health, Use of food in body: digestion, absorption, transportation, utilization of Nutrients in the body. water as a nutrient function, requirement, water Balance, effect of deficiency Proteins, Composition, source, essential functions, amino, Acids and protein deficiency, Energy, unit of energy, energy value of food, bomb, Calorimeter, body's need for energy, b.m.r., factors affecting, Energy requirementMinerals, functions, sources, bioavailability, r.d.a. and deficiency of following minerals: Calcium, phosphorus, iron, sodium, potassiumVitamins, classification, units of measurement, sources, r.d.a., functions and deficiency of following fat, Soluble vitamins – vitamin a, vitamin d,Vitamin e, vitamin k., water soluble vitamins – ascorbic acid, thiamin,Riboflavin, niacin, other members of b complex, B6 and b12	**15**
Unit – II	**Food Hygiene and Sanitation** **General principles of hygiene:** Importance of food hygiene and sanitation, General principles of food hygiene viz. aseptic, processing, packaging and	**15**

	storage, personal, hygiene and its evaluation – health check-ups, cleanliness measures and their implementation, food handling habits, etc. **Water:** Sources, purity requirements, physical and chemical methods of treatments and storage **Plant sanitation:** Definition and terminology related to sanitation viz., sanitation processes, Layouts, construction and design of plant and machinery, washing sanitation, sanitizers commonly, used and their properties, Consideration to insect and rodent control, sanitization of equipment, steam sanitization for closed system **Sanitization practices and Procedures:** Sanitization practices and procedures in food plant operations, legal aspects of food hygiene and sanitation, HACCP and GMP, Planning layouts and sanitation in fruit and vegetable industry, meat and poultry industry, cereal and bakery industries **Waste disposal and treatment:** Terminology – Industrial waste, sewage, effluent, waste water, sludge, D.O., B.O.D., C.O.D. etc. Pollution hazards, Solid and liquid wastes, Physical, chemical and biochemical methods of waste treatment, Legal aspects for waste	
Unit - III	**Food Borne Diseases, Food Poisoning and Food Spoilage** Bacteria, Viruses, rickettsia, Mycotoxins, parasites, contaminants – pesticides, insecticides, herbicide, etc, toxic metals, food spoilage due to bacteria, protozoa, fungi, etc.	**15**
	Practical: 1. Preparation of various dishes with calculation of their cost – a) Various dishes using protein rich foods or mixture of protein rich foods b) dishes with rich source of calcium c) dishes with rich source of iron d) dishes using vitamin A/Carotene rich food 2. Dishes with high, moderate and low energy 3. Serving of carotene or 125 mcg Of retinal per serving a) dishes with rich source of thiamin (about 0.12 mg per serving) b) dishes with rich source of riboflavin (minimum 0.15 mg per serving) c) dishes with rich source of niacin (minimum 2 mg per serving) d) dishes with rich source of vitamin c foods (about 20 mg per serving) e) dishes rich in many nutrients (multi-nutrient rich dishes)	

Semester – II		
Paper	Credit	Lect. /Pract
Paper – I **Food Quality, Packaging and Marketing**	08	45L 30P
Paper – II **Milk, Meat and Fish processing Technology**	08	45L 30P
Paper – III **Fermentation and Bakery Technology**	08	45L 30P
	24	225

Paper – I: Food Quality, Packaging and Marketing

Unit – I	**Food quality control and assurance** Objectives, importance and functions of quality control. Methods of quality assessment, GMP, GLP, assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry, egg and processed food products, sampling and specification of raw materials and finished products, sorting and grading. Food laws and standards, food regulations, grades and standards, Concept of Codex / FPO / FSSAI / HACCP / USFDA / ISO 9000 / AGMARK /MPO/ MMPO /MFPO series etc. Food adulteration and food safety. Sensory evaluation-introduction, panel screening, selection methods. Interaction and thresholds. Sensory and instrumental analysis in quality control. IPR and patents.	15
Unit – II	**Food packaging** Introduction to packaging. Packaging operation, package-functions and design. Principle in the development of protective packaging. Deteriorative changes in foodstuff and packaging methods for prevention, shelf life of packaged foodstuff, methods to extend shelf-life. Food containers-rigid containers, corrosion of containers (Tin plate). Flexible packaging materials and their properties. Food packaging materials and their properties. Food packages-bags, pouches, wrappers, carton and other traditional package. Containers-wooden boxes, crates, plywood and wire bound boxes, corrugated and fibre board boxes, textile and paper sacks. Special problems in packaging of food stuff, consideration in the packaging of perishables and processed foods. Evaluation of packaging, material and package performance, packaging equipment, package standards and regulation. Shrink packaging. Bar coding, aseptic and retortable pouches. Flexible and laminated pouches, aluminium as packaging material. Biodegradable packaging. Active packaging.	15
Unit - III	**Marketing and business administration** Principles of marketing and business administration, parents and trademarks, statutory rules, health regulations, Indian and foreign regulations. Export regulations. Trade Act regulations relating to maintaining hygienic conditions. Export and inspection agencies. Nature, objectives and scope of financial management, financial planning and control, capital structure, recent developments in financial management.	15

	Practical: 1) Techniques of quality assessment of fruits, vegetable, cereals ,dairy products, meat, Poultry, milk and other processed products, 2) Hedonic rating of food. 3) Identification and ranking of food product attributes 4) Sensory and instrumental methods for measuring food attributes 5) Strength properties of packaging materials. 6) Water vapour and gas transmission rate of flexible packaging materials. 7) Study of packaging of vegetables. 8) Estimation of shelf-life of packaged food stuffs (Meat, Fish, Jam and Jelly, sauces and ketchups, pulp, milk and milk products, vegetables and dry fruits). 9) Familiarization of types of packaging material. 10) Preparation of cans for industrial purposes.	

Paper II: Milk, Meat and Fish processing Technology

Unit – I	**Technology of milk and milk products** Sources, and composition of milk, processing of market milk, standardization, toning of milk, homogenization, pasteurization, sterilization, storage, packaging, transportation and distribution of milk. Milk product processing-cream, butter, ghee, cheese, cheese spread, condensed milk, evaporated milk, whole and skimmed milk powder, ice cream, khoa, channa, chakka, paneer, pedha, fermented milk products - Youghurt, *dahi*, *shrikhand*and similar products. Instantization of milk and milk products. Judging and grading of milk and its products. In-plant cleaning system.	15
Unit – II	**Technology of meat and poultry products** Sources and types of meat, meat products in India, its importance in national economy. Chemical composition and microscopic structure of meat. Effect of feed, breed and management on meat production and quality. Slaughtering of animals and poultry, inspection and grading of meat. Factors affecting post-mortem changes, properties and shelf-life of meat. Meat quality evaluation. Mechanical deboning, meat tenderization. Aging, pickling and smoking of meat. Meat plant sanitation and safety, Byproduct utilization. Recent trends in meat processing. Structure, composition, nutritive value and functional properties of eggs and its preservation by different methods. Factor affecting egg quality and measures of egg quality. Recent development in eggs processing.	15
Unit - III	**Fish Processing Technology** Types of fish, composition, structure, post-mortem changes in fish. Handling of fresh water fish. Canning, smoking, freezing and dehydration of fish. Fish sausage and home making. Radiation processing, meat safety.	15
	Practical 1) Testing of raw milk, Chemical analysis of milk and milk products 2) Milk pasteurization and sterilization and homogenization. 3) Preparation of cream, butter, paneer, milk sweets and ice cream. 4) Dairy industry management and project feasibility, plant layout, cost benefit analysis 5) Preparation of eggless and egg containing cakes	

	6) Manufacturing of Slaughtering and dressing of meat animals, Meat cutting and handling, 7) Evaluation of meat quality, Shelf-life studies on processed meat products 8) Preparation of meat/fish/egg products 9) Visit to fish processing industry 10) Visit to any Dairy plant	

Paper – III: Fermentation and Bakery Technology

Unit – I	**Fermentation technology** Introduction to fermentation, types of alcoholic beverages, manufacturing of beer, wine & vinegar, fermenter design, operation, measurement and control in fermentation. Aeration and agitation in fermentation: Oxygen requirement, measurement of adsorption coefficients, bubble aeration, mechanical agitation, correlation between mass-transfer coefficient and operating variables. Fermenter design, operation measurement and control and types of fermentation sub-merged/solid state. Sterilization-air sterilization, media sterilization. Batch/continuous fermentation, scale up in fermentation. Product recovery. Principle and use of biosensor. Tea and coffee processing.	**15**
Unit – II	**Bakery & Confectionary** Raw materials used for bread making & their functions: Essential & optional.Stages in processing bread: Weighing, Mixing fermentation , Knock-back, Dividing & Rounding, Intermediate proofing, Moulding & Panning, Final Proofing, Baking, Booking, Slicing, Packaging, Bread making Method: Straighy dough method, Salt delayed method, No thime dough method, Ferment & dough method, Continuous bread making process, Chorleywood process, Advantages & disadvantages Characteristics of good bread: External characteristics & Internal characteristicsBread faults: External faults, Internal faults, Reasons & remedies. Bread diseases: Rope, Mould, Detect on, Prevention Scoring of Baked Goods: External characteristics, Internal characteristics, score card, Stadeness of Bread: Definition, Types, Prevention. Bread, improvers: Physical improvers, Enriching agent 2, Bakery layout: To set up a bakery unit for producing breads & confectionary goods, Principles of sanitation in Layout, Layout of bakery: bakery, design, Washing up. Confectionary: Cake making ingredients & functions: Essential, optional, Functions, 15Structurebuilders, Tenderizers, Moisteners, Drivers; Flavour Enhance, Confectionary flours: Types, Functions, Sugar: Types, Function, Egg: Structure, Nutritive Valve, and Functions, Banking Facts & their role: Types, Functions 1, Moisturizing agent: Milk Types, Cream, Function, Eggs, Water. Colour & Flavour: Uses, Colour-types, Flavours, Additives: Natural,	**15**

	Processed, Fruits & Nuts: Fruits-Fresh Glance & Preserved, Nuts, Nut Pastes 2, Sundry Materials Used in Confectionary: Filling-Setting agent 1	
Unit - III	**Entrepreneur and Writing of Project Report :** Introduction: Entrepreneur, Entrepreneurship, Entrepreneurial process, Information gathering techniques, Product and service theory: Product specification, Market research, survey, Functions of marketing, Research and development activity, Procedure for estimation ofresources required for establishmententerprise or starting servicebusiness: Space, Human resource, Equipment, Financial resources, Budgeting: Concept of budgeting, Budget preparation, Different types of budgets, Procedure of report writing forgetting approval from financialAgencies: Financial resources, Financial Corporation	**15**
	Practical: 1. Manufacturing of beer and wine 2. Manufacturing of vinegar & production of citric acid 3. Study of fermenter operation and measurement 4. Production of starter, baker yeast culture, 5. Preparation of extruded products (noodles), bread 6. Preparation of cookies & biscuits 7. Preparation of Chocolates and candies 8. Visit to liquor / bakery industry. 9. Market / industrial survey for different food products 10. Skills in writing of project report	

Suggested Readings

1. Lawrie, R.A. 1975. Meat Science, 2nd Edn. Pergamon Press, Oxford UK.
2. Robinson, R.K. (2 vol. set). 1986. Modern Dairy Technology Elsevier Applied Science, UK.
3. Rosenthal, I. 1991. Milk and Milk Products. VCH, New York.
4. Arsdel W.B., Copley, M.J. and Morgen, A.I. 1973. Food Dehydration, 2nd Edn. (2 vol. Set). AVI, Westport.
5. Bender, A.E. 1978. Food Processing and Nutrition. Academic Press, London.
6. Fellows, P. and Ellis H. 1990. Food Processing Technology: Principles and Practice, New York.
7. Jelen, P. 1985. Introduction to Food Processing. Prentice Hall, Reston Virginia, USA.
8. Lewis, M.J. 1990. Physical Properties of Food and Food Processing Systems. Woodhead, UK.
9. Aurand, L.W. and Woods, A.E. 1973. Food Chemistry. AVI, Westport.
10. Birch, G.G., Cameron, A.G. and Spencer, M. 1986. Food Science, 3rd Ed. Pergamon Press, New York.
11. Branson, R.E. and Norvell, D.G. 1983. Introduction to Agricultural Marketing McGraw Hill Book Comp., New York.
12. Chowdhry, N.K. and Aggarwal, J.C. 1994. Dunkel Proposals. Vol. III. Shipra Pub., New Delhi.
13. Darrah, L.B. 1971. Food Marketing. The Ronald Press Comp. New York.
14. Kacker, M. Ed. 1982. Marketing and Economic Development, Deep and Deep Pub., New Delhi.
15. Rich, S.U. 1970. Marketing of Forest Products: Text and Cases, McGraw Hill Book Comp., New York.
16. Shepherd, G.S. 1947. Marketing of Farm Products. The Lows State College Press, Ames, Lowa.
17. Painy, F.A. and Painy, H.Y. 1983. A Handbook of Food Packaging. Leonard Hill, Glasgow, UK.
18. Charalambous, G. and Inglett, G. 1981. The Quality of Foods and Beverages. (2 vol. set). Academic Press, New York.
19. Furia, T.E. Ed. 1980. Regulatory Status of Direct Food Additives. CRC Press, Florida. Krammer, A. and Twigg, B.A. 1970.
20. Stanburry P.P. and Whitaker, A. 1984. Principles of Fermentation Technology. Pergamon Press, Oxford UK.
21. Steinkraus, K.H. 1983. Handbook of Indigenous Fermented Foods. Marcel Dekker, New York.
22. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
23. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
24. Wills, R.B.H., McGlasson, W.B., Graham, W.B., Lee, T.H. and Hall, E.G. 1981.
25. Hamilton, R.J. and Bharti, A. Ed. 1980. Fats and Oils: Chemistry and Technology.Applied Science, London.

Scheme of Evaluation

Semester - I

Sr. No.	Subject	Assessment Pattern				
		Internal Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Paper - I **Food Microbiology and Food Chemistry**	25	75	100	3	8
2	Paper – II **Fruits, Vegetables, Cereal and Oil Seeds Technology**	25	75	100	3	8
3	Paper – III **Food Hygiene and Sanitation**	25	75	100	3	8
Total No of Credits - 24						

Semester - II

Sr. No.	Subject	Assessment Pattern				
		Internal Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Paper – I **Food Quality, Packaging and Marketing**	25	75	100	3	8
2	Paper – II **Milk, Meat and Fish processing Technology**	25	75	100	3	8
3	Paper – III **Fermentation and Bakery Technology**	25	75	100	3	8
Total No of Credits - 24						

Semester – III

After completion of semester I & II, student has to complete internship equivalent to 125 lectures. The student has to produce relevant certificate from the concerned industry. This internship will be of 12 credits.