VIKRAMA SIMHAPURI UNIVERSITY::NELLORE
DEPARTMENT OF FOOD TECHNOLOGY

Syllabus for M.Sc. Food Technology (2 Year Course) for V.S. University Constituent College(s) and Affiliated Colleges under the jurisdiction of Vikrama Simhapuri University, Nellore with effect from the Academic Year 2020 – 21

Program Outcomes of M.Sc Food Technology after completion of the program of M.Sc. in Food Technology, every student will know the following attributes

Program Outcomes	
PO1	**Knowledge**: Course imparts knowledge and understanding of Biology, Biochemistry, Food Chemistry, Food Microbiology, and Food Science, Food processing, Food safety, Food Engineering, Food quality, Food product storage, Food product preservation, Food product packaging and Food product distribution.
PO2:	Student amphasize different bioanalytical techniques applied in various food analysis concepts.
PO3:	**Design and Discover:** Student able to design and discover new technological formulated foods for satisfying the demand of consumer market.
PO4:	**Research**: Use research based knowledge and research methods in food processing world including design of experiment, analysis and interpretation of the data
PO5:	**Usage of Noval Techniques**: Create, select and appropriate noval techniques for analyzing, identify and solving the critical problems in food industry.
PO6:	Student will able to understand the ancient food or traditional food habitats' to carry forward the traditional food processing methods to the younger generations for the sustainable environment stability.
PO7:	Function efficiently as an individual, and as a member or a leader in diverse teams and in multidisciplinary settings in self help groups, women entrepreneur and MSME.
PO8:	Able to control food safety and food adultration apart from that he may help for the society good food for good health
Programme Specific Outcomes	
PSO1	**Knowledge:** Able to learn basic Impart knowledge in various aspects of Food Technology through Theory and Practical knowledge.
PSO2:	Student expertise in improving the food product shelf lives different hurdle technologies
PSO3	**Entrepreneurship:** The students are able to establish entrepreneurship to create employability for himself. physically visiting different food industries

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Programme Structure with Course titles:

S. No.	Course code	Course/Subject	No. of credits	Internal Marks	External Marks	Total
		SEMESTER-1				
1	20RMSCFTT101	Food Chemistry	4	30	70	100
2	20RMSCFTT102	Fundamentals of Food Science	4	30	70	100
3	20RMSCFTT103	Food Microbiology	4	30	70	100
4	20RMSCFTT104	Human Nutrition	4	30	70	100
5	20RMSCFTP101	Food Chemistry (Practical)	2	-	50	50
6	20RMSCFTP102	Fundamentals of Food Science (Practical)	2	-	50	50
7	20RMSCFTP103	Food Microbiology (practical)	2	-	50	50
8	20RMSCFTP104	Human Nutrition (Practical)	2	-	50	50
		SEMESTER-2				
1	20RMSCFTT201	Techniques in Food Analysis	4	30	70	100
2	20RMSCFTT202	Food Biotechnology	4	30	70	100
3	20RMSCFTT203	Food Processing and Preservation Technology	4	30	70	100
4	20RMSCFTT204	Food Engineering	4	30	70	100
7	20RMSCFTP202	Food Biotechnology (Practical)	2	-	50	50
8	20RMSCFTP203	Food Processing and Preservation Technology (Practical)	2	-	50	50
9	20RMSCFTP204	Food Engineering (Practical)	2	-	50	50

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SEMESTER-3						
1	20RMSCFTT301	Dairy Technology	4	30	70	100
2	20RMSCFTT302	Bakery and Confectionary Technology	4	30	70	100
3	20RMSCFTT303	Cereal Grains, legumes and Oil Seed Technology	4	30	70	100
4	20RMSCFTT304	Meat, Poultry and Sea Food Technology	4	30	70	100
5	20RMSCFTP301	Dairy Technology (Practical)	2	-	50	50
6	20RMSCFTP302	Bakery and Confectionary Technology (Practical)	2	-	50	50
7	20RMSCFTP303	Cereal Grains, legumes and Oil Seed Technology (Practical)	2	-	50	50
8	20RMSCFTP304	Meat, Poultry and Sea Food Technology (Practical)	2	-	50	50

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SEMESTER-4						
1	20RMSCFTT401	Food Product Development and Marketing	4	30	70	100
2	20RMSCFTT402	Food Safety standards and Quality control	4	30	70	100
3	20RMSCFTT403	Research Methodology, Biostatistics and Bioinformatics	4	30	70	100
4	20RMSCFTT404	Food Packaging Technology	4	30	70	100
5	20RMSCFTP401	Food Product Development, Marketing, Food Safety standards and Quality control (Practical)	2	-	50	50
6	20RMSCFTP402	Research Methodology, Biostatistics,Bioinformatics and Food Packaging Technology (Practical)	2	-	50	50
7	20RMSCFTP403	Project Work cum Implant Training (including the Study tour/Industrial Visits)	6	40	60	100

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT101: FOOD CHEMISTRY**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To familiarize students with the classification of different foods andnutrients and their characteristic features and properties. 2. To acquaint students with the chemical constituents of food, their interactions during cooking, and evaluation of taste characteristics of food		

UNIT	CONTENT	NO. OF HOURS
I	**Water and Dispersed Systems:** Water Chemistry-Chemistry of Water, Free, Bound and Entrapped Water, Water Activity and Moisture Determination; Dispersed Systems - Liquid dispersions, Gels, Emulsions, Foams.	
II	**Carbohydrates and Lipids:** Carbohydrates - Classification, Structure, Physico - Chemical properties of monosachharides, Oligosaccharides, reducing sugars and Polysaccharides. Starch – chemistry. Dietary fiber. Lipids-Nomenclature, classification-Milk fats, Animal fats, vegetable fats. Physical properties – crystallization, plasticity. Chemical properties - Saponification number, Iodine value, Reichert –Meissl number, Free fatty acid value. Processing methods - thermal decomposition, hydrogenation and inter- esterification.	
III	**Proteins, Amino Acids and Nucleic Acids:** Proteins and amino acids-classification, structure, physical properties. Functional and chemical properties-protein hydration, solubility interfacial properties - Emulsification foaming, Gelation, Dough formation. Nucleic acids - Structure of nucleic acids – primary – purine and pyramidine bases, nucleosides, nucleotides, polynucleotides; Secondary and Tertiary structure of DNA; structure of RNAs, Nucleic acid sequencing, Gene analysis – southern blot technique and its variance; Proteomics and genomics.	
IV	**Food Enzymes and Pigments:** Food enzymes – Types, functions and enzyme activity. Factors affecting food enzyme Activity, Applications of enzymes in food Industry. Maillard Browning reaction. Food pigments and characteristics – Fruit and vegetable pigments, cell sap and water soluble pigments.	

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REFERENCES

1. Andrew L. Winton and Katebarber Winton, "Techniques of food analysis", agrobios, Jodhpur, (2001).
2. Deman JM, "Principles of Food Chemistry", AVI Publishing,1980.
3. Fennema OR," Food Chemistry", Marcel Dekker Publishers,1996.
4. Lowe B., "Experimental Cookery", John Wiely & Sons Inc, New York, 1965. Mahindru SN," Food Additives - Characteristics, Details and Estimation", Tata Mc. Graw-Hill Publishing Company Ltd., New Delhi –2000.
5. Meyer LH, "Food Chemistry", Affiliated East West Press Pvt. Ltd. Bombay –1987.
6. Norman N Potter Joseph H and Hotchkirs, "Food Science", 5thedition, CBS, Publishers & Distributor, NewDelhi, 1996.
7. Oser BL, Hawk's," Physiological Chemistry", TATA, McGraw-Hill Publishing Co.,Ltd., Bombay –1965.
8. Fennema Owen R, "Principles of Food Science Part – I". "Food, Chemistry", Marcel Dekker Inc, New York, 1976.
9. Ranganna S; "Handbook of Analysis and Quality Control for Fruit and Vegetable Products" 2nd Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi – 1986.
10. Shakuntala Manay N and Shadakshara Swamy M, "Foods, Facts and Principles", New Age International Publishers (P) Ltd., New Delhi,1987.

COURSE OUTCOME

On the successful completion of course students will be able to		**Knowledge**
CO1	Able to relate the metabolic pathways of macro nutrients like carbohyadrates, proteins and lipids in the metabolic function in the body	K4
CO2	Will be understood in the macro and micro nutrient sources and functions.	K2
CO3	Can understand the water chemistry, known original structure and different types of emulsions and foams	K6
CO4	Can analyze the factors affecting the food enzymes during the food processing	K4

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	2	3	3	2	2	3	2	2
CO2	2	2	2	3	2	1	1	1	3	1
CO3	3	2	2	3	2	1	1	2	3	2
CO4	3	2	2	3	3	1	0	1	2	2

Low:1, Medium:2, High:3

PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT102: FUNDAMENTALS OF FOOD SCIENCE**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	To learn about the basic information in different foods and their structure and composition		

UNIT	CONTENT	NO. OF HOURS
I	**Cereals and Millets:** Cereals - Introduction, structure, composition and uses and by-products of cereals (rice, wheat, rye, oats, corn) and coarse cereals –jowar bajra, maize; Millets – Structure, Varieties, composition and uses of maize, sorghum, barley, rye, oats, triticale, pearl millet and finger millet – Changes during cooking.	
II	**Pulses, Legumes and Oil Seeds:** Pulses - Introduction, common names and scientific names of different pulses. Chemical composition of pulses. Toxic constituents in pulses and its detoxification processes. Legumes-Composition, nutritive value, anti-nutritional factors, changes during cooking. Germination and changes during Germination; Oil seeds - Composition, sources of proteins and oil, Processing of oil seeds - Soya bean, coconut, Protein isolates, Texturised vegetable protein.	
III	**Milk, Meat, Fish, Egg and Poultry:** Milk and milk products – Composition, nutritive value, effect of acid, heat enzyme, salt on milk; Meat – Structure, composition, nutritive value, post-mortem changes, changes during Cooking, ageing; Fish – Composition and nutritive value, fish products – fish meal, fish flour and fish oils; Egg – Structure, composition, nutritive value, grading, changes during storage, role of egg in food industry.	
IV	**Fruits and Vegetables:** Fruits and Vegetables - Classification, composition, nutritive value, changes during cooking of vegetables, Climacteric, Non-climacteric fruits, ripening of fruits, Harvesting indices, Ascorbic acid drip.	

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2. De S, Outlines of Dairy Technology, Oxford Publishers,1980
3. Deman JM, Principles of Food Chemistry, 2nd ed. Van Nostrand Reinhold, NY,1990
4. Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, New Delhi,2004
5. Jenkins WA and Harrington JP, Packaging Foods with Plastics, Technomic Publishing Company Inc., USA, 1991.
6. Manay NS and Shadaksharaswamy M, Food-Facts andPrinciples,New Age International (P) Ltd. Publishers, New Delhi,1987
7. Meyer LH, Food Chemistry, CBS Publication, New Delhi,1987
8. Potter NH, Food Science, CBS Publication, New Delhi, 1998

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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Knowledge on value of cereals come to understand the what are the types of cereals and millets and their nutritional value	K2
	CO2	Students can summerized about pulses and legumes and oil seeds	K2
	CO3	Student get the knowledge advanced processing techniques of milk, meat, fish and egg and poultry	K3
	CO4	Student can determine the nutritional values and changes during cooking of fruits and vegetables	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	3	3	1	0	1	3	2
CO2	2	1	1	2	2	2	2	3	2	2
CO3	3	2	2	3	3	2	1	3	3	2
CO4	2	1	1	2	3	1	1	2	3	1
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT103: FOOD MICROBIOLOGY**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	To acquaint the students with different groups of microorganisms associated with food and their sctivities destruction and detection of food		

UNIT	CONTENT	NO. OF HOURS
I	**Introduction to Food Microbiology:** Scope of food microbiology. Food as a substrate for microorganisms. Intrinsic and extrinsic factors affecting microbial growth. Microorganisms in atmosphere, soil, water, plants and animals in food contamination. General concepts of Prebiotics and Probiotics.	
II	Bacteria, Molds, Yeasts and Viruses: General characteristics, classification – structure – growth – morphological characteristics – cultural characteristics. Bacteria, molds and yeast of industrial Importance.	
III	**Basic Microbial Techniques:** Microscopy – Light and electron microscopy, Staining techniques. Culture media – types. Sterilization methods. Pure culture methods – microbial growth and measurement, preservation and maintenance of microbial cultures.	
IV	**Food Spoilage, Prevention, Poisoning and Intoxication:** Microorganisms causing spoilage – principles underlying spoilage – Factors affecting spoilage, spoilage of different groups of foods and prevention - cereals and cereal products, vegetable and fruits, egg and poultry, fish, milk and milk products, canned foods. Food and water borne diseases by Salmonella, Staphylococcus, Clostridium, Listeria, Shigella, E.coli, Bacillus, Camphylobacter, Vibrio.	

REFERENCES

1. Jay, J.M. "Modern Food Microbiology" 4th edition – Van Nostrand Reinhold company,NewYork,1996.
2. Miller BMandLitsky W, "Industrial Microbiology", Mc Graw Hill book company,New York,1996.
3. Rainbow, C. and A.H.Rose (eds) "Biochemistry of Industrial Micro Organisms" –Academic Press Inc., New York,1986.
4. Robberts, T.A., & Skinner F.A. (Eds) "Food Microbiology advances and prospects" –Academic press Inc, N.York,1992.
5. Weiser H.H. and Mountney G.J. and of Gould A., "Practical Food Microbiology and Technology" 3rd edi., AVI publishing company Inc West Post, Conn, 1985.
6. William C.Frazier & Dennis C West HOFF "Food Microbiology" 4thedition, TataMcGraw-Hill Publishing Company Ltd – New Delhi, 1995.
7. Modern Food Microbiology:J.M.Hay, CBS publication and Distribution
8. Microbiology-M.I.Pelezar and R.D.Reid Mc Graw Hill Book Company, New York
9. Basic Food Microbiology-G.banwart, CBS publishing and Distribution
10. Food fact and Principles – N Shakuntala Manay & M.Shadaksharaswamy, New Age

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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students can recall the important genera of microorganisms associated with food and their characteristics.	K1
	CO2	Explain the role of microbes in fermentation, spoilage and foodborne diseases.	K2
	CO3	Student analyze the basic microscopic techniques involved in food science and technology.	K4
	CO4	Student come to know importance of food spoilage, prevention of food spoilage and intoxication of different foods.	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	1	2	2	0	3	2	0
CO2	3	1	2	1	2	3	0	2	2	1
CO3	3	3	1	3	3	2	0	3	3	1
CO4	3	2	1	2	1	1	1	3	2	0
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT104: Human Nutrition**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To familiarize students with the classification of foods and nutrients, andtheir metabolism in the human body. 2. To acquaint students with the chemical constituents of food, theirrequirements and nutritional status of food		

UNIT	CONTENT	NO. OF HOURS
I	**Food Groups:** Concept of Balanced Diet, Food Groups, Food Pyramid, Food Exchange List. Principles of meal planning.	
II	**Macro and micronutrients:** Food as a source of nutrients: classification of nutrients; functions, recommended dietary allowances, BMR, SDA. Vitamins: (A, B complex, C, D, E and K) and all major and minor mineral elements with their role in body.	
III	**Nutritional requirements of different age groups:** Nutritional Needs: Nutrition during infancy, childhood, adolescence and adult, nutrition during pregnancy and lactation, nutrition in old age.	
IV	**Nutritional Status Assessment Methods:** Nutritional Assessment: Assessment of nutritional status by direct and indirect methods, use of various methods for the assessment of nutritional status - Anthropometric assessment, Bio- physical measurement, Clinical signs and symptoms, Dietary assessment	

REFERENCES

1. Davidson and Passmore R., Brock,J.F., and Truswell A.S. "Human Nutrition and Dietetics". 7th ed. New York . Churchill Living stone1979.
2. Gopalan, C (Editor) – "Basic Issues in Combating malnutrition" – NFIPublication.
3. Gopalan, C . (Editor) – "Women Nutrition in India". NFIPublication.
4. Jelliffe, D.B. "Assessment of Nutritional Status of the Community", WHO Monograph. Series No. 53 WHO Geneva 1966.
5. Mehatab S. Bamji, "Text book of Human Nutrition"
6. Measuring change in nutritional status – WHO 1981 (NCHSStandards)
7. Monograph on "Integrated Training on National Programmes for Mother and Child", Department of Women and Child Development, Government of India, NewDelhi.
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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Understanding of the basic processes involved in the preparation, transformation and conservation of foods of both animal and vegetable origin.(understandingk2	K1
	CO2	Make use of the microbiology, parasitology and toxicology of food in Examining and evaluating the relationship between food and nutrition in health and/or illness.(k3)	K2
	CO3	Student applying acquired knowledge in assessment of Dietary allowances, BMR, SDA(applyingk3).	K4
	CO4	Student can analyze the physiology, pathophysiology, nutrition and food to individual or group diet planning and counselling, both in healthy (dietetics) and ill (diet therapy) clients, at every stage of life.(K4)	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	1	2	3	1	0	3	1	1
CO2	2	3	1	2	2	1	0	2	2	1
CO3	3	2	2	2	3	0	0	3	2	1
CO4	2	3	2	2	3	0	0	3	3	1
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	SEMESTER	I
COURSE CODE & TITLE	**20RMSCFT101P:** FOOD CHEMISTRY (PRACTICAL)		
NUMBER OF CREDITS	2	HOURS/WEEK	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Determination of Moisture 2. Quantitative analysis of carbohydrates, lipids, proteins and amino acids 3. Determination of Starch 4. Estimation of reducing sugars 5. Estimation of protein- micro kjeldal method 6. Determination of fat in solid and liquid foods. 7. Determination of Iodine number 8. Determination of Saponification Value 9. Determination of Reichert- Meissl number 10. Determination of Polenske number	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Student can develop knowledge and skills for estimation of important compositions of food such as protein, carbohydrates, fats etc.	K3
	CO2 Student can determine the moisture , proximate components in given food samples.	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	3	3	2	3	1	0	1	2	1
CO2	1	3	3	2	3	1	0	1	3	0
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT102P: FOOD SCIENCE (PRACTICAL)**		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Cereal cookery, starch, factors, affecting gelatinization of starch 2. Pulse cooking – effect of different processing and cooking methods 3. Vegetable cookery – different cooking methods, enzymatic browning –effect. 4. Fruit preparations: processing – effect of browning and cooking on pigments – pectin – Jams and Jellies. 5. Milk cooking : preparation of milk products 6. Egg cookery: Egg white foams: preparation of the eggs acting as binding, emulsifying and thickening agent. 7. Meat cookery : Effect of different cooking methods 8. Fish cookery, and other marine foods 9. Visit to food industries for observation of different steps in industrial activities. International (P) Limited, New Delhi. 10. Modern Food Microbiology-Jay, James, Aspen publishers.	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Student can formulate different types of plant based food preparations.	K6
	CO2	Student can interpret theoretical knowledge by visiting the food industries with clean and good observations.	K2

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	2	3	1	2	1	3	3
CO2	1	1	1	2	3	0	3	2	1	3

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	SEMESTER	I
COURSE CODE & TITLE	20RMSCFT103P: FOODMICROBIOLOGY (PRACTICAL)		
NUMBER OF CREDITS	2	HOURS/WEEK	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Study of microscope 2. Examination of microbes under microscope 3. Different media preparation 4. Inoculation 5. Different types of streaking 6. Identification of microorganisms – staining methods (Simple Staining, Gram Staining, Negative Staining) 7. Isolation of microbes from sea/ meat foods – salmonella, shigella 8. Microbial population enumeration in water samples and food samples – TVC 9. Antibiotic sensitivity test	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Students can examine the microorganisms by using the compound microscope.	K4
	CO2 Student can analyze different types of staining techniques Like Gram Staining,Negative Staining).	K4
	CO3 Students can estimate the microbial population in water samples and food samples	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	1	3	2	1	0	1	2	0
CO2	1	1	1	3	2	1	0	1	2	0
CO3	1	2	3	3	2	1	0	1	3	1

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	I
COURSE CODE & TITLE	**20RMSCFT104P: HUMAN NUTRITION (PRACTICAL)**		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Balanced Diet 2. Calculating the nutritive values of different foods. 3. Food Exchange List 4. Planning of diets to meet RDA of different age groups 5. Calculating nutritive value of different recipes and diets – Iron rich, Calcium rich and Protein rich recipe. 6. Calculation of Nutritional Assessment 7. Measurement of height, weight, BMI. Classification in children and adults 8. Estimation of hemoglobin levels 9. Clinical signs and symptoms 10. Dietary Assessment – Nutritive value, 24hour recall method, oral questionnaire method 11. Visit to food industries /Research Institutes/Labs (CFTRI, DFRL, NIFPT, NIN etc.,), 12. Visit to ICDS and NRC (Nutritional Rehabilitation Centre) Programs.	

REFERENCES -

COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Student can formulate the different types of balanced Diets for different aged and diseased people.	K6
	CO2 Student can evaluate the nutritive value of different recipes and diets – Iron rich, Calcium rich andProtein rich recipe	K5
	CO3 Student can interpret theoretical knowledge by visiting the food industries like ICDS and NRC (Nutritional Rehabilitation Centre) Programs, Visit to food industries /Research Institutes/Labs (CFTRI, DFRL, NIFPT, NIN etc.,), with clean and good observations.	K2

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	3	2	1	1	0	1	3	0
CO2	1	3	1	2	1	1	0	1	3	0
CO3	1	1	1	1	2	1	3	1	2	3

Low:1, Medium:2, High:3

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Department of Food Technology
College of Science & Technology
VIKRAMA SIMHAPURI UNIVERSITY
NELLORE - 524 001. A.P. INDIA.

PROGRAMME	M.Sc. Food Technology	**SEMESTER**	II
COURSE CODE & TITLE	**20RMSCFT201:** TECHNIQUES IN FOOD ANALYSIS		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To enable students work towards analyzing foods for their nutritional content. 2. To familiarize students with laboratory procedures required for determining the nature and quality of foods		

UNIT	CONTENT	NO. OF HOURS
I	**Nature and Concept of Food Analysis:** Basic Instrumentation : Principle of pH meter. Centrifugation – Principle, Applications, Sedimentation Coefficient and types of rotors, Ultra centrifugation. Calorimetry- Bomb Calorimeter – Instrumentation and applications.	
II	**Spectroscopy and Microscopy:** Spectroscopic techniques using UV/Vis, fluorescence, IR, FTIR, NIR, NMR, atomic absorption, ICP, polarimetry, refractometry, microscopic techniques in food analysis (light microscopy, SEM, TEM, XRD, particle size analysis, image analysis etc.)	
III	**Chromatographic techniques:** Adsorption, column, partition, affinity, ion exchange, size exclusion, GC, GLC, HPLC, HPTLC, GCMS, LCMS.	
IV	**Separation techniques:** Gel filtration, dialysis, electrophoresis, sedimentation, ultra filtration, solid phase extraction, supercritical fluid extraction, isoelectric focusing, isotopic techniques, manometric techniques.	

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8. Ranganna S. 2001. Handbook of Analysis and Quality Control for Fruit and VegeProducts. 2nd Ed.Tata-McGraw-Hill.
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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Explain the the Basic Instrumentation working Principle and Instrumentation and applications in food industry	K2
	CO2	Define the concepts of the Spectroscopy and Microscopy, particle size analysis, image analysis etc	K2
	CO3	Make use of chromatographic techniques in food industries.	K4
	CO4	Explain about the different separation techniques in food science	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	3	2	2	1	2	2	3	2
CO2	2	3	2	3	1	1	1	2	3	1
CO3	2	3	3	2	2	1	2	2	3	2
CO4	2	3	2	3	1	1	1	2	3	1

Low:1, Medium:2, High:3

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VIKRAMA SIMHAPURI UNIVERSITY::NELLORE
DEPARTMENT OF FOOD TECHNOLOGY

Syllabus for M.Sc. Food Technology (2 Year Course) for V.S. University Constituent College(s) and Affiliated Colleges under the jurisdiction of Vikrama Simhapuri University, Nellore with effect from the Academic Year 2020 – 21

PROGRAMME	M.Sc. Food Technology	**SEMESTER**	II
COURSE CODE & TITLE	**20RMSCFT202: FOOD BIOTECHNOLOGY**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the fundamentals of Biotechnology and its application in food processing, nutrition and fermentation. 2. To gain the knowledge on mushroom and spirulena cultivation and functional and healthy foods.		

UNIT	CONTENT	NO. OF HOURS
I	**Introduction to Biotechnology:** History and development of biotechnology, Application of genetic to food production. Methods of molecular cloning, immobilization.	
II	**Fermentation, downstream processing and Fermented Foods:** Fermentation process –Batch culture, Continuous culture Fed batch culture. Bacterial starter culture, Methods of inoculums and medium preparation, slurry processing. Principles of downstream processing. Technological aspects of industrial production of beer, wine, enzyme-amylase, pectinase, protease, organic acids, vitamins, antibiotics, baker's yeast, single cell protein. Traditional fermented foods – idly, dosa, fermented milk products-cheese, yoghurt, butter, fermented foods based on cereals and legumes – Bread, beer, soy sauce.	
III	**Plant tissue culture and Genetic modified food (GMF):** Regulatory and social aspects of biotechnology of foods, plant tissue culture, genetically modified foods (GMF), application of enzymes in food industry.	
IV	**Mushroom cultivation and Spirulina and Healthy Foods:** Mushroom cultivation : Types, cultivation, Harvesting, mushroom forming in India, Nutritive values of mushroom. Spirulina - Nutritive value and health benefits Healthy Foods – Nutraceuticals and functional foods.	

REFERENCES

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2. Crueger. W, and Crueger A, 1984. Biotechnology: A textbook of Industrial Microbiology. Science Tech. Madison, USA.
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5. U.Satyanarayana 2005,Basic Biotechnology, India
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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students will be familiar with biotechnological tools used in food industries	K1
	CO2	Students know the applications of ferementation techniques in different types of food industries.	K3
	CO3	Students can distinguish between the GM and Normal food commoditives	K4
	CO4	Student can develop the Mushroom cultivation and Spirulina and Healthy Foods on their hand on experience by getting knowledge	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	3	2	3	2	1	0	1	1	2
CO2	2	2	3	3	2	2	0	2	3	0
CO3	2	1	3	3	1	0	1	1	3	1
CO4	2	2	3	3	2	1	3	2	3	3

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	II
COURSE CODE & TITLE	**20RMSCFT203:** FOOD PROCESSING AND PRESERVATION TECHNOLOGY		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the industrial techniques used to preserve and process foods, extend their shelf-life and improve their palatability characteristics. 2. To familiarize students with advances in food processing techniques 3.		

UNIT	CONTENT	NO. OF HOURS
I	**Methods of Processing:** Selection, sorting, grading , cleaning, peeling and preparation methods. Processing of foods- Fruits, vegetables, Condiments, Spices.	
II	**Need and purpose of Food Preservation:** Traditional Methods of food preservation – General Principles. Types of Preservation – Heating, Freezing, formulation, Chemical preservatives and effect on microbial growth.	
III	**Preservation using high and low temperatures:** Preservation Using High Temperatures – Factors affecting Heat resistance – Thermal death time curves – Heat resistant microorganisms – Canning – Heat Treatments. Refrigeration, Freezing- Introduction to refrigeration and freezing, definition, principle of freezing, types, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, effects on physico chemical properties of foods.	
IV	**Preservation by Dehydration and Novel Methods:** Drying and Dehydration- Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry. Food Irradiation- Introduction, kinds of ionizing radiations used in food irradiation, uses of radiation processing in food industry, concept of cold sterilization. Microwave processing and ohmic heating, inductive heating, pulse electric field, minimal processing Novel methods like hurdle technology and nano-technology	

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REFERENCES

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COURSE OUTCOME

On the successful completion of course students will be able to		**Knowledge**
CO1	To can make use of basic Methods of food Processing tools	K3
CO2	Students came to know how to preserve the Food	K1
CO3	Understand the Preservation using high and low temperatures Drying and Dehydration and Food Irradiation	K2
CO4	Student can develop the new preservation methods for future food processing	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	2	3	2	1	0	2	2	0
CO2	2	3	2	2	3	0	0	2	3	0
CO3	2	3	3	3	1	0	1	2	3	1
CO4	3	2	3	3	2	1	0	3	3	1
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	II
COURSE CODE & TITLE	**20RMSCFT204:** FOOD ENGINEERING		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the principles and processes of food engineering. 2. To familiarize students with basic operations and calculations of importance in the food industry		

UNIT	CONTENT	NO. OF HOURS
I	**Basic principles of Food Engineering:** Food Engineering Operations – Unit dimensions and Conversions: Unit operations, design, food processing equipment, elements of measuring instruments – Machine elements and electrical elements, Fluid flow, fluid statics, fluid dynamics, fluid flow applications.	
II	**Basics of vapor Compression Cycles:** Thermal properties of food modes of heat transfer. Properties of Steam and Moist air – Boiler operation – Pressure vessels, evaporators – Boiler house and workshop	
III	**Refrigeration and Freezing in Food Industry:** Types of refrigeration systems – Refrigerants properties – Cold Storage – Design and Maintenance /freezers, application of Refrigeration and freezing in plants and animals food processing; Cryogenic freezing and IQF.	
IV	**Equipment in Food Industry:** Dries, cleaning equipment – graders and sorters – blending, blending, pelletization and emulsification equipment-Material handling equipment – Maintenance of food processing equipment; Agro processing equipment – pasteurizers, Cream Separators, Spray driers and filling, scaling and packaging equipments	

REFERENCES

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2. Batty. J.C and Folkman.S.L. "Food engineering Fundamentals", Wiley, New York, 1983,
3. Care Mc and Smith. E: "Unit Operations of Chemical Engineering", 4th edn., Mc Graw Hill Company, 1985.
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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students can recall the Unit dimensions and Conversions: Unit operations, design, and food processing equipment	K1
	CO2	Student can illustrate thermal properties of food materials	K2
	CO3	Student interpret refrigeration and freezing techniques in food preservation	K5
	CO4	Can evaluate the skills for determination of viscosity of various fluids	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	2	2	0	1	2	3	0
CO2	3	3	2	2	2	0	0	2	3	0
CO3	3	3	2	2	2	0	0	2	3	1
CO4	2	1	3	3	3	1	0	3	2	1
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	SEMESTER	II
COURSE CODE & TITLE	20RMSCFT201P: TECHNIQUES IN FOOD ANALYSIS (PRACTICALS)		
NUMBER OF CREDITS	2	HOURS/WEEK	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Sorption isotherms by measuring water activity in any hygroscopic food material (for instance - biscuits/potato chips/coffee powder). 2. Estimation of tannin/phytic acid by spectrophotometric method 3. Moisture and fat analysis. 4. Separation of amino acids by paper chromatography. 5. Identification and determination of sugars by HPLC. 6. Analysis of dietary fiber/glucose by enzymatic method. 7. Heavy metal analysis using atomic absorption spectrometry. 8. Residue testing. 9. Visit to MPEDA Lab and other research Institutes (CFTRI, DFRL, NIFPT, NIN etc.,)	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Analzed class 1 class 2 preservatives and heavy metals by using different analytical techniques	K4
	CO2 Can determine volatile compounds from natural plant foods	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	3	2	2	1	2	2	3	2
CO2	2	3	2	3	1	1	1	2	3	1

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	SEMESTER	II
COURSE CODE & TITLE	20RMSCFT202P: FOOD BIOTECHNOLOGY (PRACTICALS)		
NUMBER OF CREDITS	2	HOURS/WEEK	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Methods of plant culture 2. Preparation of starter culture 3. Preparation of beer, wine, tempeh, youghurt, vinegar 4. Production of amylase 5. Immobilization of enzymes 6. Mushroom cultivation 7. Spirulina products 8. Visit to different industries (Mushroom, Spirulena, Honey, Jam and Jellies etc) 9. Visit to Beverages Industries/Cool drinks industries	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Adapat new experimental techniques in plant tissue , microbial cultures.	K6
	CO2 Hands on experience in Methods of plant culture Preparation of starter culture.	K3
	CO3 Designing and cultivation of mushroom and Spirulina and designing of enzyme production methods. Preparation of beer, wine, tempeh, youghurt, vinegar, Production of amylase, Immobilization of enzymes.	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	1	0	3	3	1
CO2	3	2	3	3	3	1	1	2	3	2
CO3	3	2	2	3	2	1	1	2	3	1

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	II
COURSE CODE & TITLE	**20RMSCFT203P:** FOOD PROCESSING AND PRESERVATION TECHNOLOGY (PRACTICALS)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Market survey 2. Estimation of water activity 3. Study of processing and preservation equipments 4. Preservatives of food by traditional methods using sugar - marmalade , jams, jellies,syrups, squashes, juices 5. Ready to serve beverages, fruit toffees 6. Preservation of food using salt pickles, brine fruit, vegetable preservation 7. Drying and dehydration –fruits and vegetables 8. Freezing of fruits, vegetables, flesh foods 9. Visit to different industries (Pickles, Sea food Processing, Dairy and Fruit juice etc.)	

REFERENCES -

COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Can be able to estimate proximate constituents	K6
	CO2 Apply the techniques for preserve the food by traditional methods	K3

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	3	2	1	1	2	3	2	1
CO2	1	3	3	3	2	1	3	2	1	2

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	SEMESTER	II
COURSE CODE & TITLE	20RMSCFT204P: FOOD ENGINEERING (PRACTICALS)		
NUMBER OF CREDITS	2	HOURS/WEEK	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Blue Print readings and drawing, layout of an industry 2. Boiler operation 3. Installation of refrigeration plants. 4. Design and maintenance of cleaners. 5. Working, operation and maintenance of a) Cleaners b) Graders c) Dryers and spray driers d) Distillers, e) Evaporators, f) Emulsifiers, g) Blenders, h) Palletizers, i) Freeze driers, j) Pasteurizers, cream separators in food industries. 6. Visit to several Food Industries for each of the segments (Rice mills, Oil industries, etc.)	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Able to understand the basic unit operations	K2
	CO2 Can improve the maintains of unit operations and cleaning of machineries	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	1	3	2	1	2	3	3	1
CO2	2	1	1	2	2	1	1	2	3	2
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT301:** FOOD PROCESSING AND PRESERVATION TECHNOLOGY		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the types of dairy products 2. To familiarize students with processing techniques specific to the dairy industry		

UNIT	CONTENT	NO. OF HOURS
I	**Milk:** Milk – Definition, Types of milk, Composition, Nutritive value, collection of milk, transportation of milk, milk reception in dairies, quality and quantity tests at reception. Factors affecting composition of milk, milk constituents. Microbiology of milk-quality test –uses of milk.	
II	**Milk Products**: Processing and product formulation – Sterilized milk-Homogenized milk-soft curd milk- Flavoured milk-Vitaminized milk/Irradiated milk-Frozen concentrated milk-Fermented milk-Standardized milk-Reconstitued/Rehydrated milk-Recombined milk-Toned milk-Double toned milk-Humanized milk-Fermented milk-Cheese, Butter, Butter oil etc. Dairy products-Kheer- Khoa/Mawa-Khurchan-Rabri-Kulfi/Malai-baraf-Dahi-Srikhand-Paneer-Chhana-Makkhan- Ghee-lassi.	
III	**Advances and Unit Operations of Milk Processing:** Advances in fluid milk Processing-Application of Ultra filtration-Mono filtration – Microfiltration-Reverse osmosis-Ion exchange and Electro dialysis processes, Advances in heat treatment of milk, spray drying, UHT processing Irradiation of milk and microwave processing.	
IV	**Ice cream – Fermented Products:** Manufacture of Ice cream-Chemistry and technology, Fermented Products-Yoghurt, Curd, butter milk, Dairy plant sanitization-cleaning in place –bottle and can washing, cleaning of tankers and sites-detergents and sanitizers.	

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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students can understand the different processing technics of grains and millets.	K2
	CO2	Student interpret the knowledge to develop milling processing techniques of pulses	K2
	CO3	Can develop the animal fat processing techniques with value addition	K3
	CO4	The student can discuss the new post harvesting technology developing aspects	K4

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	3	1	1	0	2	2	1
CO2	2	2	3	1	2	1	1	2	2	1
CO3	2	3	2	3	3	1	1	2	3	3
CO4	3	2	2	3	1	1	1	2	2	1
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT302:** BAKERY AND CONFECTIONARY TECHNOOGY		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the principles of bakery and confectionery 2. To familiarize students with processing techniques, quality parameters,and nutritional comparisons of baked products		

UNIT	CONTENT	NO. OF HOURS
I	**Bakery and confectionary industry:** Raw materials and quality parameters; dough development, methods of dough mixing, dough chemistry, rheological testing of dough-Farino-graph, Mixo-graph, Extenso-graph, Amylo- graph/ Rapid Visco Analyzer, Falling number, Honey's dough stickiness tester and interpretation of the data.	
II	**Technology for the manufacture of bakery products:** Bread, biscuits, cakes and the effect of variations in formulation and process parameters on the quality of the finished products; quality consideration and parameters; staling and losses in baking, machineries used in bakery industry.	
III	**Quality characteristics of confectionary ingredients:** Technology for manufacture of flour, fruit, milk, sugar, chocolate and special confectionary products, colour, flavor and texture of confectionary.	
IV	**Types of confectionary products** Hard candy, Toffee, Carmel, confectionary products-Chocolate processing, boiled Sweet, Gelatin Sweets, Crystallized confectionary, standards and regulations, machineries used in confectionary industry.	

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3. Manley D.2000 Technology of Biscuits, Crackers 2nd Ed.CRC Press.
4. Plyer EJ. Bakery Science and Technology 3rd Ed.Vols I,II Sosland Publ
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11. Lee BH.1996.Fundamentals of Food Biotechnology.VCH
12. Perlman D.1977-1979.Annual Reports of fermentation processes

COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students can understand and gain knowledge of different properties of the ingredients and processes of bakery products	K2
	CO2	Students will have the ability to understand the working of various machineries used for the development of bakery products (K2)	K2
	CO3	Students will have the fundamental knowledge of confectionary products	K2
	CO4	Students will have the knowledge of different functional properties of the ingredients and processes	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	2	3	1	1	2	3	2
CO2	2	3	2	1	3	1	1	2	3	1
CO3	2	2	3	2	1	1	1	2	3	1
CO4	2	1	3	3	3	1	2	2	2	2
Low:1, Medium:2, High:3										

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VIKRAMA SIMHAPURI UNIVERSITY::NELLORE
DEPARTMENT OF FOOD TECHNOLOGY

Syllabus for M.Sc. Food Technology (2 Year Course) for V.S. University Constituent College(s) and Affiliated Colleges under the jurisdiction of Vikrama Simhapuri University, Nellore with effect from the Academic Year 2020 – 21

PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT303:** CEREAL GRAINS, LEGUMES AND OIL SEED TECHNOLOGY		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with major agricultural crops of India and theirprocessing techniques 2. To familiarize students with nutritional value differences as a result ofcrop processing		

UNIT	CONTENT	NO. OF HOURS
I	**Cereal grains and Millets:** Introduction, production – different grain drying methods, different milling methods of wheat, rice, millets parboiling. Baking, Malting, value addition and use of byproducts.	
II	**Legumes and Pulses:** Introduction, production, Milling of pulse, Milling methods, Anti nutritional factors-Methods eliminating anti nutritional components, Soy bean Technology, Value addition, germination and fermentation.	
III	**Oil seeds:** Introduction production-animal fats-vegetable oils-processing –Rendering-pressing-solvent extraction-Refining – Hydrogenation, value addition and use of byproducts-utilization of rice bran.	
IV	**Post harvest Technology:** Postharvest losses-Insect and pest control-Rodent control-fumigation-convenience and Ready to eat foods, Quality standards of grains and products.	

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1. Change L.M. (1992) "Food Machinery" for the production of cereal foods, snack foods and confectionary" Ellis Horwood, New York.
2. Chriestenson CM (1982), "Storage of cereal grains and their products" 3rd ed., American Association of cereals chemist. St puel M.N.
3. Fast R.B. and Caldwell E.F. (1990) "Breakfast cereals and how they are made?" American Association of cereals chemist. St puel M.N.
4. Horan F.E. (1974) Nutrition cereal blends from conception to consumption – cereals science today
5. Horseny R.C. "Principles of cereals science and Technology" American Association of cereals chemist. St puel M.N.
6. Matz S.A. (1993) snack food technology 3rd Chapman and hall London NY.Norman N. Potter-Joseph H Hotchkirs (1996) "Food Science.

COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Understand the different processing techniques of grains and millets.	K2
	CO2	Interpret the knowledge to develop milling processing techniques of pulses	K2
	CO3	Develop the animal fat processing techniques with value addition	K3
	CO4	Discuss the new post harvesting technology developing aspects	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	1	0	2	2	2
CO2	1	2	1	1	3	1	2	3	1	2
CO3	1	1	2	3	3	1	2	2	2	2
CO4	1	1	2	3	3	1	1	1	3	3
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT304:** MEAT, POULTRY AND SEA FOOD TECHNOLOGY		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with types and grades of meat, poultry, and sea foods 2. To familiarize students with processing techniques used for the production of commercial meat, poultry, and sea foods		

UNIT	CONTENT	NO. OF HOURS
I	**Selection:** Grading of livestock for meat, Buffaloes, sheep, goat, pigs, rabbit and avian species-poultry, ducks and quails etc- Quality grades-Economics and Marketing's	
II	**Meat Industry:** Meat production – structure of Muscle – composition Meat Conversion – storage and preservation and processing of meat-product development _Meat food products –Beef-Mutton – pork, canning of meat	
III	**Poultry and Egg:** Egg and poultry Industry – Poultry structure, processing, composition, functional properties and nutritive value – grading, storage and preservation of eggs products – chicken – Duck. Measure of quality of eggs, poultry meat products.	
IV	**Fish and Sea foods:** Fish and Sea food products – structure, types, composition, post harvest changes, storage, selection and cooking, spoilage of fish processing of sea food processing plant operations, fish byproducts, preservation of fish and sea foods.	

REFERENCES

1. Ahmed P.E. "sea food safety" "National Academic Press-Washington, DC, 1991.
2. Aitkeer, A "Fish handling and processing 3rd, 1990 – Aberdeen Ministry of Agriculture. Edinburgh, 1990.
3. Bechtles, P.J, "Muscle as Food"- Academic press, Orlando, FL.,1986.
4. Beity D.C. and Hashsen R.G, "Animal products in human nutrition" academic press New York.1982.
5. Hall G.M, "Fish processing Technology, blackie, New York,1992.
6. Food Science – B.Srilakshmi, New Age International (P) Limited, Delhi

COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Understand about current scenario of meat and poultry industry in India	K2
	CO2	Develop the skills involved in Meat poultry and Sea food	K3
	CO3	Understand the various scientific changes that occurs after meat and poultry slaughtering	K2
	CO4	Improve the byproduct utilization of meat, poultry and fish processing industry along with the restructured meat products.	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	3	2	3	3	1	1	2	3	2
CO2	2	2	2	2	3	1	1	2	3	1
CO3	2	2	2	3	2	1	2	2	1	2
CO4	3	2	2	3	2	1	2	3	2	2
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT301P:** DAIRY TECHNOLOGY (PRACTICAL)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	**CONTENT**	**NO. OF HOURS**
	1. Analysis of raw milk, Market milk and other milk products 2. Product development with milk –Fermented milk products, lassi, butter milk 3. Preparation of low fat, high protein dairy products 4. Preparation of soya milk, tofu 5. Preparation of coconut milk 6. Preparation of ground nut milk 7. Preparation of Panir 8. Preparation of cheese 9. Preparation of ice cream 10. Preparation of khoa 11. Preparation of flavored milk 12. Visit to Dairy, Milk Products, and Ice cream Industries etc.	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Can analyze the raw milk and market milk (K5)	K5
	CO2	Student can prepare dairy based and non dairy based milk biproducts (K5).	K5
	CO3	Students can n visit the dairy industries to near and interpret previous practical and theoretical knowledge	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	2	3	1	3	2	2	2
CO2	1	2	3	3	2	1	3	2	3	2
CO3	2	3	2	3	3	2	2	2	3	2

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT302P:** BAKERY AND CONFECTIONARY TECHNOLOGY (PRACTICALS)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
	1. Study of different equipments used in bakery and confectionary 2. Estimation of gluten 3. Preparation of bread by strait dough method 4. Baking varieties of cakes, cookies, biscuit, Pizza and doughnuts 5. Preparation of yeast dough products 6. Preparation of soda cracker 7. Preparation of cake and cake decoration, cookies 8. Preparation of confectionaries candy, hard boiled candy, cotton candy 9. Preparation of chocolate, chewing gums, bubble gums 10. Visit to bakery and confectionary units/industries	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Student will be able to know the handling, operation of different types of bakery and confectionary equipment(	K6
	CO2	Develop the different types of doughs	K3
	CO3	Can visit the different bakery and confectionary industries to near and interpret previous practical and theoretical knowledge	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	3	2	1	1	2	2	2
CO2	2	3	2	2	2	1	1	2	2	1
CO3	3	3	3	1	2	1	2	2	3	2
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT303P:** CEREAL GRAINS, LEGUMES, OIL SEED TECHNOLOGY (PRACTICALS)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	**CONTENT**	**NO. OF HOURS**
	1. Market survey on Cereals, Legumes, Oilseed grains and their products 2. Soaking, Germination and Malting 3. Fermentation processing in Cereals and Pulses 4. Flour milling, Popping and Flaking 5. Processing of soy based products 6. Preparation and Evaluation of Ready to eat breakfast foods using millets 7. Visit to Dhal milling, Flour milling, Millet industries etc.	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Student will conduct the different markets and collecting the samples for laboratory analysis (K4)	K4
	CO2	Student can understand the flour milling, popping technologies	K2
	CO3	visit the different dhal mills, flour mills, millet mills to know the milling techniques near and interpret previous practical and theoretical knowledge	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	3	3	6	1	3	2	2	3
CO2	3	1	3	2	3	1	3	2	1	3
CO3	3	1	2	2	3	1	3	3	2	3

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	III
COURSE CODE & TITLE	**20RMSCFT304P:** MEAT, POULTRY AND SEA FOOD TECHNOLOGY (PRACTICALS)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	**CONTENT**	**NO. OF HOURS**
	1. Inspection and grading of eggs-study of shelf life 2. Inspection and grading of meat and poultry – study of shelf life 3. Inspection and grading of sea foods-study of shelf life 4. Development of meat, poultry and sea food products 5. Value addition to byproducts of eggs, meat and sea foods 6. Visit to livestock food industries and shrimp/fish/ Sea food processing units and poultry farms etc.	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Student will able to understand the grading of meat animals, poultry birds and their shelf lives.	K2
	CO2	visit the different meat slaughtering houses toknow the milling slaughtering techniques near and interpret previous practical and theoretical knowledge	K5

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	3	3	2	3
CO2	2	2	2	3	2	1	3	1	3	3
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT401: FOOD PRODUCT DEVELOPMENT AND MARKETING**		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with techniques of Product Development and International Trade for the food sector. 2. To equip students with knowledge of intellectual property rights (IPR), related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge-based economy.		

UNIT	CONTENT	NO. OF HOURS
I	**Innovations in product Development**: Introduction to the Product development and formulation - Need, Classification, General, characteristics of New food product-Classification of Food products. Factors affecting; food product development - Corporate factors - Market place factors, technological pressures – Governmental issues and legislations.	
II	**Food Product Development Process:** Phases of new product development - Idea generation, Screening, Product concept, Product Profile, Product engineering, Product launch, Pre and post launch evaluation – case studies.	
III	**Standard and Specialized Nutrition Products:** Product development with reference to nutritional and health needs- Health foods, Sports drinks, Infant foods, Baby foods, Geriatric foods, Value added foods, Functional foods, Neutraceuticals, prebiotics and probiotics, Herbal foods, Convenience foods.	
IV	**Product Commercialization and Marketing:** Test Marketing; evaluating results and analyzing, Entrepreneurship: Plant location, investment, financing the project, Ethics in food product development, Intellectual property/Patents. Business Proposal and Cost Analysis for MSME.	

<table>
<tr><td>REFERENCES</td><td colspan="3">

1. Fuller, G.W.(1994) New Food Product Development: From Concept to Market place CRC Press, New York.
2. Man, C.M.D. and Jomes A.A.(1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London.
3. Shapton, D.A. and Shapton, N.F. (1991) Principles and Practices for the Safe Processing of Foods, Butterworth Heinemann Ltd, Oxford.
4. Graf, E. and Saguy, I.S. 91991), Food Product Development: From Concept to the Market Place, Van Nostrand Reinhold New York.
5. Oickle, J.G. (1990) New Product Development and Value Added. Food Development Division Agriculture, Canada.
6. Proc. Food Processors Institute: A key to Sharpening your Competitive Edge. Food Processors Institute, Washington, DC.
7. Mike Stringer and Colin Dennis, "Chilled foods A comprehensive guide" 2ndedition. Wood head publishing limited, Cambridge, England,2000.
8. Andrew J. Taylor, "Food Flavor Technology", Sheffield Academic Press, 2002.
9. Debashri Ray "Nutritional Challenge and Total Quality Management" 1stedition; Sarupand Sons, New Delhi, 2002.
10. Rita Singh "Food Biotechnology" Volume 1, 1st edition, Global Vision publishing house, Delhi, 2004.
11. Rita Singh "Food Biotechnology" volume 2, 1st edition, Global vision publishing house,Delhi

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<tr><td>COURSE OUTCOME</td><td colspan="2">On the successful completion of course students will be able to</td><td>Knowledge</td></tr>
<tr><td></td><td>CO1</td><td>Will able to understand the product development and international trade for the food sector</td><td>K2</td></tr>
<tr><td></td><td>CO2</td><td>Will gain the ability to understand and the intellectual property rights and their value in</td><td>K2</td></tr>
<tr><td></td><td>CO3</td><td>Can develop the nutritional and healthy needs</td><td>K6</td></tr>
<tr><td></td><td>CO4</td><td>Economy Student can evaluate the results and analyzing the entrepreneurship, plant location, investment financing</td><td>K5</td></tr>
<tr><td>COs – POs MAPPING</td><td colspan="3">
<table>
<tr><th>CO/PO</th><th>PO1</th><th>PO2</th><th>PO3</th><th>PO4</th><th>PO5</th><th>PO6</th><th>PO7</th><th>PSO1</th><th>PSO2</th><th>PSO3</th></tr>
<tr><td>CO1</td><td>3</td><td>3</td><td>2</td><td>3</td><td>2</td><td>2</td><td>3</td><td>2</td><td>2</td><td>3</td></tr>
<tr><td>CO2</td><td>2</td><td>1</td><td>1</td><td>3</td><td>3</td><td>1</td><td>3</td><td>2</td><td>2</td><td>3</td></tr>
<tr><td>CO3</td><td>2</td><td>1</td><td>3</td><td>3</td><td>3</td><td>1</td><td>1</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>CO4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>3</td><td>3</td><td>3</td><td>2</td><td>3</td><td>3</td></tr>
<tr><td colspan="11">Low:1, Medium:2, High:3</td></tr>
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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT402:** FOOD SAFETY STANDARDS AND QUALITY CONTROL		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	To familiarize the students with industrial standards concerning safe food production and the existent national and international systems that ensure food quality		

UNIT	CONTENT	NO. OF HOURS
I	**Food Quality, Assessment and Evaluation**: Definition and Physico Chemical attributes; Sensory evaluation – optimal conditions – Selection of taste panel – Sensory test designs- Difference and Preference tests. Objective methods of evaluation. Chemical methods of evaluation. Microbial methods of evaluation	
II	**Food Constituents and Safety:** Food Additives – Definitions, Need, Safety; Undesirable constituents-Naturally occurring contaminants. Heavy metals, pesticide residues, products of microbial growth – Health hazards. Desirable constituents-chelating agents, acids, bases, buffer systems and salts, stabilizers, thickeners, poly hydro calcinols, anti-caking, firming, clarifying and bleaching agents; antioxidants, non-nutritional sweeteners, antimicrobial agents, antioxidants, emulsifiers, shortenings, humectants.	
III	**Food Standards and Food Laws:** FSSAI - Current rules and regulations- Definitions of standards of identity and quality- Food licensing and registration system- International food safety measures. Food laws and standard, PFA, AGMARK. Sampling and specification of raw materials and finished products. Concept of Codex Almentarious/USFDA/ISO 9000series. Rules and regulations for waste disposals. HACCP	
IV	**Food Contaminants and Adulteration:** Contaminants in milk and milk products; fruit and vegetable products; meat, poultry, eggs and fish; fats and oils; spices and condiments; Water and Beverages; Food grains and flours; sugars. Adulteration of foods.	

REFERENCES

1. S.N. Mahindru ,"Food Safety–Concept and Reality" , APH Publishing Corporation, 5 Ansari Road, Darya ganj, Newdelhi-2004
2. Rajesh Mehta and J.George–"Food Safety Regulation concerns and Trade –The developing country perspective ,Mac millanIndia Ltd ,2005.
3. VanishaNambiar, A Text book on "Food Contamination and Safety" ANMOL Publications Pvt.Ltd. New Delhi-2004.
4. Amerine, M.A., Pangborrn RM, and Roessler BB," Principles of Sensory evaluation of foods", Academic press New York,1965.
5. The prevention of food adulteration Act, 1954 and Prevention of food adulteration Rules, 1955. (1998). Federation of Indian Industry, NewDelhi.
6. Swaminathan.M., "Food Science and Eperimentalfoods" (1979) Ganesh and Company – Chennai.
7. Development in Milling and baking Technology (1991) Association of food scientists and Technologists, Mysore.
8. The prevention of food Adulteration Act 1954 (1997) Eastern Book Company, Lucknow.
9. Dr. Ramesh V. Bhat and R. NageswarRao (1992) "Food Safety in Public catering". NIN, ICMR, Hyderabad.
10. Blank.F.C., "Hand book of food and nutrition" (1999). AGRO Botanical Publishers,India.
11. Norman N. Potter, Joseph H. Hotchkiss (1996) "Food Science" 5th Edition. CBS Publishers and Distributors, NewDelhi.
12. Ramesh V. Bhat and B.S. NarasingaRao, "National Strategy for food quality control"(1985), National Institute of Nutrition, ICMR,Hyderabad.
13. Perpinstrum- Anderson, "World food trends and future food security"(1994) Food Policy Report, The International Food Policy Research Institute, Washington,D.C.,

COURSE OUTCOME

On the successful completion of course students will be able to		Knowledge
CO1	Interpret the basic concept of food safety	K6
CO2	Demonstrate the food safety regulations in India.	K5
CO3	Illustrate the various food additives and adulterants.	K2
CO4	Analysis of manifestation of food toxic effects.	K4

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	2	1	2	2	1
CO2	3	1	2	3	2	1	3	2	2	3
CO3	3	3	2	3	2	1	3	3	2	3
CO4	3	3	2	3	1	2	3	2	3	2

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT403:** RESEARCH METHODOLOGY, BIOSTATISTICS AND BIOINFORMATICS		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the principles and methods of scientificresearch 2. To familiarize students with statistical methods for data analysis 3. To develop scientific writing skills and learning bioinformaticstools in students		

UNIT	CONTENT	NO. OF HOURS
I	**Research Methodology:** Importance and definition of research. Meaning, aim and objective of research. Significance of research, Types of research, Research Problem - Selection. Formulation of Hypothesis. Sampling- Types of sampling design.	
II	**Data Collection, Measurement and Scaling Techniques:** Data Collection - Collection of primary data through different methods (Questionnaire, Observation, Interview, Case Study, Sociometry, Anthropometry, Projective tests and other methods) Collection of secondary data. Measurement scales. Research Design – Translational Research Design. Research Proposal. Thesis / Report Writing	
III	**Biostatistics:** Data –Data types, collection of data, classification and tabulation. Measures of central tendencies–Mean, median and mode. Measures of variation-Range, quartile deviation, mean deviation and standard deviation. Coefficient of variation; Correlation and linear regression. Small sample tests – t, F and chi square tests. ANOVA – one way and two way classifications. SPSS 16.0.	
IV	**Bioinformatics:** Introduction – Origin of bioinformatics Genome projects - General introduction to genome projects (rice genome project). Biological database - Introduction of database (DB), need, organization, search of DB. An over view of biological databases - NCBI, EMBL, DDBJ, SWISS-PROT, PDB, and KEGG. Sequence analysis - concepts of sequence analysis and their importance. BLAST – blastn, blastp, blastx, tblastx, output analysis matrix BLOSSUM, PAM, e-value. Proteomics - Introduction, principle, technique, 2-D database. Gel analysis software, post gel analysis, MALDI-TOF. Significance and applications of proteomics in modern biology. Concept of Big Data Analytics – Its application in market survey related to food industry	

REFERENCES

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2. Research Methodology, Methods and Techniques – C.R. kothari Wiley Eastern Limited – New Delhi
3. Research Methods and Measurements in Behavioural and Social Sciences – G. L. Bhatnagar- Agri.Cole. Publishing Academy. New Delhi.
4. Statistical Methods. S.P. Gupta
5. Fundamentals of Mathematical Statistics. S.C Gupta &Kapoor
6. Statistical Methods in Biological and Health Science. J. S. Milton & J.O.Tsokan.
7. Principles of Genome Analysis: A Guide to Mapping and Sequencing DNA from Different Organisms. Primrose SB. 2nd Ed. 1998.Blackwell Science: Oxford. ISBN 0- 632-04983-9.
8. Genome Mapping: A Practical Approach. Dear P (Editor). 1st Ed.2000. Oxford University Press: Oxford, NewYork.
9. Developing Bioinformatics Skills. Alfonso Valencia and Blaschke. L (2005)Oreille's Publication.
10. Bioinformatics Sequence, Structure and Databanks ed. By Des Higgins Willie Taylor. (2006).
11. Statistics Made Simple- Do It Yourself on PC. 2001 By K.V.S. Sarma, PrinticeHall.
12. Introduction to Bioinformatics, 2001 by T.A. Attwood and D.J. Parrysmith. Pearson Education AsiaPubl.
13. Principles of Biostatistics.2000, MarelloPagno. Published by Duxbury,USA.

COURSE OUTCOME

On the successful completion of course students will be able to		Knowledge
CO1	Understand the Principles of Scientific Research and different steps involved in doing researc	K2
CO2	Know how to design research and frame up different steps in design.	K6
CO3	Appraise the application of sampling through statistics.	K3
CO4	Build up the method for data collection and analyse the data.	K4

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	2	3	3	1	1	2	2	1
CO2	1	1	2	3	3	2	1	3	2	1
CO3	2	1	1	3	3	1	1	2	2	1
CO4	2	1	1	3	3	1	1	2	2	1

Low:1, Medium:2, High:3

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT404:** FOOD PACKAGING		
NUMBER OF CREDITS	4	**HOURS/WEEK**	4
COURSE OBJECTIVES	1. To acquaint students with the principles, methods, and materialsused for safe packaging of foods 2. To familiarize students with packing of different food productionand storage		

UNIT	CONTENT	NO. OF HOURS
I	Introduction to food packaging in India, need of packaging, Package requirements, package functions, Hazards acting on package during transportation & Storage, labeling laws.	
II	Package Materials: classification packages, paper as package material its manufacture, types, advantages corrugated and paper board boxes etc. Glass as package material, Manufacture, Advantages, disadvantages. Metal as package material manufacture, Advantages, disadvantages, Aluminum as package material,. Its advantages and disadvantages. Plastic as package material classification of polymers, properties of each plastics, uses of each plastics, chemistry of each plastic such as polyethylene, polypropylene, polystyrene, polycarbonate, PVC, PVDC, Cellulose acetate, Nylon etc.	
III	Lamination Coating and Aseptic packaging Lamination, need of lamination, types, properties, advantages & disadvantages of each type Coating on paper & films, types of coatings. Need of coating, methods of coatings. Aseptic packaging-Need, Advantages, process, system of aseptic packaging and materials used in aseptic packaging. Machineries used in Packing foods.	
IV	Packaging of Specific Foods Packaging of specific foods with its properties, Like bread, Biscuits, Coffee, Milk powder, egg powder, carbonated beverages. Snack foods, R.T.S. beverages.	

REFERENCES

1. Handbook of Package Engineering Joseph F. Hanlon
2. Fundamentals of Packaging F.A. Paine
3. Food Packaging Sacharow and Griffin
4. Principles of Food Packaging R. Heiss
5. Flexible Packaging of Foods A.L. Brody
6. Food Packaging and Preservation M. Mathouthi

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COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Discuss the various food packaging processes	K2
	CO2	Analyze the recent advancement in food packaging	K4
	CO3	Student will able to get experience on testing food packaging material to assure quality of foods	K3
	CO4	Understand different types of food packaging materials	K2

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	3	3	1	2	2	3	1
CO2	3	1	2	2	2	1	1	3	2	1
CO3	2	2	3	3	2	1	1	3	1	2
CO4	2	2	2	3	3	2	1	2	3	1
Low:1, Medium:2, High:3										

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VIKRAMA SIMHAPURI UNIVERSITY::NELLORE
DEPARTMENT OF FOOD TECHNOLOGY

Syllabus for M.Sc. Food Technology (2 Year Course) for V.S. University Constituent College(s) and Affiliated Colleges under the jurisdiction of Vikrama Simhapuri University, Nellore with effect from the Academic Year 2020 – 21

PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT401P:** FOOD PRODUCT DEVELOPMENT, MARKETING & FOOD SAFETYSTANDARDS AND QUALITY CONTROL (PRACTICAL)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
Food Product Development	1. Market Survey, Consumer survey to identify new products in terms of Line Extension 2. Repositioning Existing Products 3. New form/Reformulation 4. New packaging of existing products 5. Innovative products Creative Products 6. Identification of product for development Concept 7. Market research concerned product development 8. Development and Screening the products, developing criteria for screening scaling up 9. Designing score card for sensory evaluation 10. Test Marketing 11. Development of a new Food Product, evaluation – Research Project. 12. Business Proposal writing and Cost Analysis for MSME.	
Food Safety and Quality Control	1. Survey of different foods in market 2. Cereals and pulses – label information, adulterants 3. General tests for the presence of common adulterants in all food products 4. Coffee and tea ,spices , Honey –Adulterants 5. Milk and milk products - Adulterants 6. Determination of different preservatives 7. Determination of different colors 8. Document preparation for the approval of FSSAI 9. Visit to food industries like coffee, tea, honey and other industries and research Institutes etc.	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Students will know how to Present seminars	K1
	CO2 Student will able to understand the database analysis	K4

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	2	2	3	1	0	1	1	2
CO2	1	1	3	3	3	1	0	1	2	2
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT402P:** RESEARCH METHODOLOGY, BIOSTATISTICS, BIOINFORMATICSAND FOOD PACKAGING TECHNOLOGY (PRACTICAL)		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	-		

UNIT	CONTENT	NO. OF HOURS
Research methodology, Biostatistics and Bioinformatics	1. Seminar presentations, submission of research proposal 2. Interactive sessions with supervisors 3. Familiarization with windows, UNIX, Internet 4. Data base searching 5. Use of tools at NCBI, EMBL and SWISSPORT 6. BLAST analysis and FASTA analysis 7. Pairwise and Multiple sequence alignment 8. Finding composition of sequence, open reading frames 9. Secondary structure prediction of protein sequence 10. Phylogenetic tree construction 11. Design of PCR primer 12. Chi square test, t- test, F-test 13. ANOVA : one way and two way 14. Industrial Visit: Visit to research labs/ institutions related to food and biotechnology	
Food Packaging Technology	1. Classification of various packages bared on material and rigidity 2. Measurement of thickness of paper, paper boards 3. Measurement of water absorption of paper, paper boards 4. Measurement of puncture resistance of paper and paperboard 5. Measurement Tear resistance of papers 6. Determination of WVTR of films 7. Identification of plastic films 8. Determination of gas transmission rate of package films 9. Determination of coating on package materials 10. Prepackaging practices followed for packing fruits and vegetables 11. Industrial Visit: Visit to different industries for observation of packing of food items 12. Seminar presentations, submission of research proposal 13. Interactive sessions with supervisors 14. Familiarization with windows, UNIX, Internet 15. Data base searching 16. Use of tools at NCBI, EMBL and SWISSPORT 17. BLAST analysis and FASTA analysis	

	18. Pairwise and Multiple sequence alignment 19. Finding composition of sequence, open reading frames 20. Secondary structure prediction of protein sequence 21. Phylogenetic tree construction 22. Design of PCR primer 23. Chi square test, t- test, F-test 24. ANOVA : one way and two way 25. Industrial Visit: Visit to research labs/ institutions related to food and biotechnology	

REFERENCES	-		
COURSE OUTCOME	**On the successful completion of course students will be able to**		**Knowledge**
	CO1	Students will get an idea about research design and research proposal along with basic application oriented concepts in biostatistics and bioinformatics	K6
	CO2	PG Students will be able to understand qualitative and quantitative measures of different packaging materials, techniques and their applications in modern food packaging and preservation system.	K2

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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CO2	2	1	2	1	3	1	2	3	1	2
Low:1, Medium:2, High:3										

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PROGRAMME	M.Sc. Food Technology	**SEMESTER**	IV
COURSE CODE & TITLE	**20RMSCFT403P:** PROJECT CUM IMPALAT TRAINING		
NUMBER OF CREDITS	2	**HOURS/WEEK**	2
COURSE OBJECTIVES	1. To enable students explore, independently, topics of research importance related to the food industry and to empower students to design a research study based on the principles of scientific research. 2. To provide students exposure to industrial set-up		

UNIT	CONTENT	NO. OF HOURS
Project Work	A research project will be allotted to each student after the III semester (or after II Semester in the Summer Vacation period). They will be required to complete the data collection, analysis and writing of the dissertation so as to submit it at the end of IV Semester before practical examinations and to present it at seminar in the department in the internal assessment. Implant Training: Hands-on working experience in the industry/ Internship Report To enable students observe, work flow and processes in food industries and associated enterprises	

REFERENCES	-	
COURSE OUTCOME	**On the successful completion of course students will be able to**	**Knowledge**
	CO1 Able to plan and execute experiments or undertake literature surveysindependently	K6
	CO2 Develop the skills to design experiments for solving problems in foodresearch	K6

COs – POs MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	3	2	0	3	1	1	3
CO2	1	3	3	3	3	0	2	1	2	3
Low:1, Medium:2, High:3										

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