STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IVth Semester Diploma in Food Processing and Preservation (Effective from Session 2022-23 Batch)

THEORY

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION- SCHEME							
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks A	Class Test (CT) Marks B	End Semester Exam. (ESE) Marks C	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	Credits
1.	Bakery and Confectionary	2049401	03	03	10	20	70	100	28	40	03
2.	Technology of Meat, Poultry and Eggs	2049402	03	03	10	20	70	100	28	40	03
3.	Technology of dairy and sea food	2049403	03	03	10	20	70	100	28	40	03
4.	Bio molecules and nutrition	2049404	03	03	10	20	70	100	28	40	03
5.	Technical writing	2049405	03	03	10	20	70	100	28	40	03
	Total : -		**15**				**350**	**500**			**15**

PRACTICAL

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME					
			Periods per Week	Hours of Exam.	Practical		Total Marks (A+B)	Pass Marks in the Subject	Credits
					Internal (PA)	External (ESE)			
6.	Technology of dairy and sea food lab	2049406	04 50% physical 50% Virtual	03	15	35	50	20	02
7.	Technology of Meat, Poultry and Eggs. Lab	2049407	04 50% physical 50% Virtual	03	15	35	50	20	02
8.	Food Packaging Technology Practical	2049408	04 50% physical 50% Virtual	03	15	35	50	20	02
9.	Bakery and Confectionery Practical	2049409	02 50% physical 50% Virtual	03	15	35	50	20	01
Total: -				**14**			**200**		**07**

TERM WORK

Sr. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal (PA)	Marks of External (ESE)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
10.	Course under Moocs / Swayam / Others (T.W)	2049410	04	15	35	50	20	02
Total: -			**04**			**50**		**02**
Total Periods per week Each of duration One Hour			**33**	Total Marks = **750**				**24**

BAKERY AND CONFECTIONARY

SUBJECT CODE : 2049401	Theory			No. of period in one session:42			Credits
	No. of Periods per week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	10	
				C.T	:	20	

COURSE OBJECTIVES:

1. Understand the role of various food components in baking.
2. Acquire Knowledge of methods of baking and the interaction of the elements used for baking.
3. Acquire basic skills in baking and confectionery.

COURSE OUTCOMES :

After Completion of the Course, the Students will be able to:

1. To acquire Knowledge the processing methods used in baking and confectionery industries.
2. To understand the various types of food products made using baking technology.
3. To Gain basic idea about baking and confectionery manufacture and quality control.
4. To know the importance of each ingredient in the bakery and how it effects the overail product and its sensory and quality parameters.
5. To start a small scale bakery and confectionery unit.

Contents: Theory		Hrs	Marks
Unit 1	**Production of Sugar** Sugarcane, raw sugar, refined sugar, whit sugar, beetsugar, manufacture of sugar from sugar cane, refining of sugar.	[9]	
Unit 2	**Classification of Confectionery** Sugar boiled confection crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, soft candy, lollypop, cream, lozenges, gumdrops, honeycomb candy.	[9]	
Unit 3	**Principles of baking and Bread manufacturing** Major baking ingredients and their functions, role of baking ingredients in improving the quality of bread. Characteristics of good flour used for making bread, biscuits and cakes. Ingredients used for bread manufacture, methods of mixing the ingredients, dough developments methods. Straight dough, sponge dough, mauling, proofing, baking, packing, spoilage bread stating. Methods to reduce bread staling and spoilage.	[8]	
Unit 4	**Cake and Biscuit manufacturing** Processing of cakes and biscuits ingredients, development of batter, baking and packing, Spoilage in cakes and biscuits.	[6]	

Book Recommended :

1. **Zhou. W. Huly. H. (2014), "Bakery Products Science and Technology", 2nd Edition, Wiley Blackwell Publishers.**
2. **Pyter, E.J. and Gorton.L.A.(2009). "Baking Science & Technology" V of. 1 Fourth Edition. Sosland Publications.**
3. **Stanley P. Cauvain, Linds S. Young, (2008), "Baked Products: Science Technology and Practics" John Wiley & Sons Publishers.**

TECHNOLOGY OF MEAT, POULTRY AND EGGS

SUBJECT CODE: 2049402	Theory			No. of period in one session:42			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	10	
				C.T	:	20	

RATIONALE:

To understand the technology for handling, processing, preservation of meat, poultry and fish products.

COURSE OBJECTIVES:

1. To understand need and importance of live stock, egg and poultry industry
2. To study structure, composition and nutritional quality of animal products.
3. To study processing and preservation of animal foods.
4. To understand technology behind preparation of various animal food products

COURSE OUTCOMES :

After Completion of the Course, the Students will be able to:

1. Understand the quality standards of fats and fatty foods.
2. Calculate nutritive value of eggs.
3. Apply the process of handling, transportation, chilling, freezing of Fish.
4. Know factors affecting post-mortem changes in meal.

Contents: Theory		Hrs	Marks
Unit 1	**Meat Processing** Factors affecting post-mortem changes, properties and shelf-life of meat. Meat tenderization and Meat quality evaluation. Modern abattoirs, slaughter house and its features. Preservation of meat aging, pickling, smoking. Dried and Cured meat. Canned meat, Frozen meat, Cooked and Refrigerated meat, Sausages.	**[8]**	
Unit 2	**Fish Processing** Types of fish, composition, structure and spoilage factors of fish. Post-mortem changes in fish. Handling and transportation of fish. Bacteriology of fish, Chilling of fish, Freezing and Individual quick freezing. Canning and smoking operations, Salting and drying of fish, pickling. Radiation processing of fish and fish products. Seafood quality Assurance, Advances in fishery by products technology.	**[8]**	
Unit 3	**Egg Processing** Structure, composition, nutritive value, calculation of nutritive value and functional properties of eggs, Factor affecting egg quality and measures of egg quality. Preservation of egg by different methods. Egg powder processing.	**[10]**	
Unit 4	Importance of fats and oils in foods; Sources, composition and properties of fats and oils (plant and animal origin); Reversion and rancidity of fats and oils; Extraction of fats and oils – Rendering, pressing, solvent extraction, supercritical fluid extraction, enzyme-derived oil extraction.	**[8]**	
Unit 5	By-products of fat/oil processing industries – Oil seed protein isolates; Quality standards of fats and fatty foods; Antioxidants and its mechanism of application	**[8]**	

Book Recommended :

TECHNOLOGY OF DAIRY AND SEA FOODS

SUBJECT CODE: 2049403	Theory			No. of period in one session:42			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	10	
				C.T	:	20	

COURSE OBJECTIVES:

1. Understand the thermal and chemical properties of milk and milk products.
2. Acquire Knowledge of collection, Transportation, receiving, grading, weighing and cooling of milk.
3. Apply the process of sterilization and dehydration.
4. Use for controlling water activity of different milk products in relation to their chemical activity.
5. Know the process for storage technology of sea foods.

COURSE OUTCOMES :

After Completion of the Course, the Students will be able to:

1. Understand the thermal and chemical properties of milk and milk products.
2. Acquire Knowledge of collection, Transportation, receiving, grading, weighing and cooling of milk.
3. Apply the process of sterilization and dehydration.
4. Use for controlling water activity of different milk products in relation to their chemical activity.
5. Know the process for storage technology of sea foods.

Theory Contents		Hrs	Marks
Unit 1	Dairy development in India, engineering and thermal properties of milk and milk products; Chemical properties of milk and milk products	**[8]**	
Unit 2	Collection, Transportation, receiving, Grading, Weighing and cooling of Milk, Straining, Filtration, Clarification, Homogenization. Pasteurization of milk –holding method, HTST, uperization, vacreation.	**[8]**	
Unit 3	Sterilization- UHT; homogenization - concept, advantages and disadvantages, centrifugation and cream separation .	**[10]**	
Unit 4	Dehydration: advances in drying of milk and milk products; drum dryer and spary dryer- working principle	**[8]**	
Unit 5	Water activity; sorption behavior of foods, energy of binding water, control of water activity of different milk products in relation to their chemical; Sea foods- scope, processing and storage technologies involved	**[8]**	

Book Recommended :

BIO MOLECULES AND NUTRITION

SUBJECT CODE: 2049404	Theory			No. of period in one session:42			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	10	
				C.T	:	20	

RATIONALE:

Bio Molecules and Nutrition is a course that covers the areas of foods and nutrition from a scientific approach. Studies prepare students for many science, dietetics, food industry, and heath-related careers. Producing, processing, preparing, evaluating, and using food are all aspects of this field. They are interrelated and cross over into many branches of science.

COURSE OBJECTIVES:

1. To understand the characteristics and types of micro organism associated with food.
2. To apply beneficial effect of micro organism.
3. Apply the process of sterilization and dehydration.
4. To draw bacterial grown curve and microbial growth in food.
5. To Know the relevance of micro biology standards for food safety.

COURSE OUTCOMES :

After Completion of the Course, the Students will be able to:

1. To understand the characteristics and types of micro organism associated with food.
2. To apply beneficial effect of micro organism.
3. Apply the process of sterilization and dehydration.
4. To draw bacterial grown curve and microbial growth in food.
5. To Know the relevance of micro biology standards for food safety.

	Theory contents	Hrs.	Marks
Unit 1	**Introduction to Food Microbiology:** Introduction of microbiology and its relevance to everyday life, Inter-relationship of microbiology with other sciences. History and Development of Food Microbiology. **Definition and Scope of food microbiology**. General characteristics of bacteria, fungi, virus, protozoa and algae. Beneficial effect of micro organisms. Characteristics of Micro organisms in Food: Types of micro organisms associated with food, their morphology and structure. Significance of spores in food microbiology.	**[9]**	
Unit 2	**Cultivation of Micro-organisms:** Methods of isolation and cultivation, Serial dilution method, Pure culture technique. Enumeration of Micro organisms-qualitative and quantitative microbial growth in Food: Bacterial growth curve and microbial growth in food. Factors affecting the growth of micro organisms in food, effect of environmental factors in growth of micro organism - pH , water activity, oxygen availability, temperature and others.	**[12]**	

Unit 3	**Food Borne Diseases:** Microbial intoxication and infections: Sources of contamination of food, Types – food borne infections, food borne intoxications, symptoms and method of control. Toxins in foods. Common and Recent Examples of Food borne out breaks. Importance of sanitation and hygiene in relation with spreading of micro organisms. Relevance of micro biology standards for food safety. Rapid Methods of detection and recent advances.	**[12]**	
Unit 4	Microbial Food Spoilage: Sources of Micro organisms in foods. Some important food spoilage micro organisms. Spoilage of specific food groups-Milk and dairy products, Meat, poultry and sea foods, Cereal and cereal products, Fruits and vegetables and Canned products.	**[9]**	

Book Recommended :

1. Food Microbiology, 2nd Edition by Adams Janes.
2. Modern Micro biology, Janes.
3. Fundamental of Food M. Jay. Microbiology, Bibek Ray.

TECHNICAL WRITING

SUBJECTCODE: 2049405	Theory			No. of period in one session:42			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	10	
				C.T	:	20	

COURSE OBJECTIVES:

1. To acquire confidence to use written communication in the work and personal experience beyond college.
2. To acquaint with the concept of a writer-reader relationship and identify the need for active participation from both writer and reader.
3. To teach the skills needed for successfully Communication in a modern world through written materials.

COURSE OUTCOMES :

After Completion of the Course, the Students will be able to:

1. Understand and know how to follow the stages of the writing process and apply them to technical and workplace writing tasks.
2. Produce a set of document related to technology and writing in the workplace and improve their ability to write clearly and accurately.
3. Apply the basic components of definitions, descriptions, process explanations and other common forms in technical writing.
4. Communicate basic technical writing concepts and terms such as audience analysis, jargon, format visuals and presentation.
5. Interpret material on technology.
6. Use methods of research and documentation on topics in technology, including on-line research.

	Theory contents	Hrs.	Marks
Unit 1	i. Technical Writing Skills ii. Soft Skills iii. Content Writing iv. Paging	**[06]**	
Unit 2	Paragraph writing Writing Style Business Writing Report Writing	**[06]**	
Unit 3	Project Synopsis Writing Blog Writing	**[06]**	
Unit 4	SDLC (Software Development Life Cycle) ; Software Development Life Cycle. • How Software is developed, tested, maintained and retrieved . • How products are installed, configured, customized and deployed . • Relating software product features and business benefits. • Working with programmers and testers . • Understanding software requirement specifications . • Analyzing product architecture . • Web everywhere . • Documentation development life cycle. • Types of documents associated with software products. • Different types of software and what they do.	**[12]**	

Unit 5	**What is Technical Writing?** • Role of a Technical writer • Principles of Technical Writing, Documentation deliverables • Printed documentation and Online Help Systems • Working with images and illustrations	**[12]**	

TECHNOLOGY OF DAIRY AND SEA FOOD LAB

SUBJECT CODE: 2049406	Theory			No. of periods in one session: 56			Credits
	No. of periods per week			Full Marks	:	50	02
	L	T	P/S	Internal (PA)	:	15	
			04	External (ESE)	:	35	

COURSE OBJECTIVES :

1. To Monitor thermal treatments of milk.
2. To detect presence of pathogens and toxins in milk.
3. To perform antibiotic test, sanitation test on milk.

PRACTICAL OUTCOMES:

After Completion of the Course, the Students will be able to:

1. Monitor the thermal treatments of milk.
2. Detect the presence of pathogens and toxins in milk.
3. Perform Antibiotic Test, Decomposition Test, Histamine Test, Sanitation Test and PCD'S Test on milk.

CONTENTS: Practical		Hrs.	Marks
Experiment 1	**Monitor thermal treatments of milk**	**[08]**	
Experiment 2	**Detect the presence of pathogens and toxins in milk**	**[08]**	
Experiment 3	Antibiotic Testing	**[08]**	
Experiment 4	Decomposition Testing	**[08]**	
Experiment 5	Histamine Testing	**[08]**	
Experiment 6	Sanitation Testing	**[08]**	
Experiment 7	PCD's Testing	**[08]**	

Books Recommended: -

TECHNOLOGY OF MEAT, POULTRY, AND EGGS. LAB

SUBJECT CODE: 2049407	Theory			No. of periods in one session: 56			Credits
	No. of periods per week			Full Marks	:	50	02
	L	T	P/S	Internal (PA)	:	15	
			04	External (ESE)	:	35	

COURSE OBJECTIVES :

1. To estimate the total meat pigments.
2. To Prepare meat products.
3. To determine metmyoglobin content of meat.
4. To prepare fish protein concentrate.
5. To determine egg quality.

PRACTICAL OUTCOMES:

After Completion of the Course, the Students will be able to:

1. To estimate the total meat pigments.
2. To Prepare meat products.
3. To determine metmyoglobin content of meat.
4. To prepare fish protein concentrate.
5. To determine egg quality.

CONTENTS: Practical		Hrs.	Marks
Experiment 1	**Estimation of Total meat pigments.**	**[8]**	
Experiment 2	**Determination of metmyogobin content of meat.**	**[8]**	
Experiment 3	Preparation of meat products	**[8]**	
Experiment 4	Determination of meat PH	**[8]**	
Experiment 5	Composition and structure of Egg.	**[8]**	
Experiment 6	Determination of egg quality by Hang Unit.	**[8]**	
Experiment 7	Preparation of fish protein Concentrate (FPC)	**[8]**	

Books Recommended: -

FOOD PROCESSING TECHNOLOGY PRACTICAL

SUBJECT CODE: 2049408	Theory			No. of periods in one session:			Credits
	No. of periods per week			Full Marks	:	50	02
	L	T	P/S	Internal (PA)	:	15	
			04	External (ESE)	:	35	

COURSE OBJECTIVES :

1. To Prepare orange squash, mange, jam, guava jam tomato ketchuls.
2. To acquaint with apparatus, Instruments used.
3. To setup the experimental tools on work table.

PRACTICAL OUTCOMES:

After Completion of the Course, the Students will be able to:

1. To prepare orange squash, mange, jam, guava jam tomato ketchuls.
2. To acquaint with apparatus, Instruments used.
3. To setup the experimental tools on work table.

CONTENTS: Practical		Hrs.	Marks
Unit 1	**BURSTING STRENGTH TEST (BST)** Bursting strength is the measure of the force required to puncture through a corrugated board. Rather than applying force at the edge	**[08]**	
Unit 2	PUNCTURE RESISTANCE TEST The puncture resistance test aims to simulate such collisions by evaluating the energy required to create a hole in the packaging material.	**[08]**	
Unit 3	CLIMATE CONDITIONING FOR DIFFERENT ENVIRONMENTS During a climate conditioning test, the packaging material is placed and kept within a specified climatic atmosphere chamber for a length of time	**[08]**	
Unit 4	VIBRATION TEST TO SIMULATE TRANSIT VEHICLE VIBRATIONS Including the interior packing and closure, in terms of its strength and the protection it provides the products within: Standard, Required equipment and Suitable packaging materials.	**[08]**	
Unit 5	COMPRESSION TEST FOR PACKAGING compression test can be used to measure the ability of a container to resist external compressive loads applied to it.	**[08]**	
Unit 6	SHOCK TEST FOR PACKAGING Free-fall drop testing like the carton drop test is easy to perform and can reveal issues in packaging materials, methods or assortment through a series of drops.	**[08]**	
Unit 7	REDUCED PRESSURE TEST FOR RIGID CONTAINERS A climate conditioning test, a leak test simulates elevated air pressures using a calibrated vacuum chamber.	**[08]**	

Books Recommended: -

1) Preparation of orange squash.
2) Preparation of Mango Jam.
3) Preparation of Guava Jam.
4) Preparation of Tomato Ketchup.
5) Preparation of ICE Cream.
6) Preparation of Sponge Cake.

BAKERY AND CONFECTIONERY PRACTICAL

SUBJECT CODE: 2049409	Theory			No. of periods in one session: 28			Credits
	No. of periods per week			Full Marks	:	50	01
	L	T	P/S	Internal (PA)	:	15	
			02	External (ESE)	:	35	

RATIONALE:

To help the students to understand about the nutrients in different foods

COURSE OBJECTIVES :

1. To Study different baking processes.
2. To acquire knowledge of changes in food products.
3. To determine, gluten.

PRACTICAL OUTCOMES:

After Completion of the Course, the Students will be able to:

1. To Study different baking processes.
2. To acquire knowledge of changes in food products.
3. To determine, gluten.

CONTENTS: Practical		Hrs.	Marks
Experiment 1	Introduction to Bakery and confectionery Equipments.	**[04]**	
Experiment 2	Preparation of Barfi.	**[04]**	
Experiment 3	Preparation of Biscuit.	**[04]**	
Experiment 4	Preparation of Chocolate.	**[04]**	
Experiment 5	Preparation of Boiled Candy.	**[04]**	
Experiment 6	Preparation of Chikki.	**[04]**	
Experiment 7	Preparation of Gluten content.	**[04]**	

LIST OF EQUIPMENTS

1. Weighing Machine
2. Gasstove
3. Cooking vessels
4. Grinder
5. Mixer Grinder
6. Fridge
7. Serving vessels
8. Sealing Machine

COURSE UNDER MOOCS / SWAYAM / OTHERS (TW)

SUBJECT CODE (2049410)	Term Work			No. of periods in one session: 56			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal (PA)	:	15	
	-	-	04	External(ESE)	:	35	

COURSE OBJECTIVES :

ABOUT SWAYAM:

This is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time. All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to any learner.

More than 1,000 specially chosen faculty and teachers from across the country have participated in preparing these courses.

The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and

(4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state of the art pedagogy / technology.

In order to ensure that best quality content is produced and delivered, nine National Coordinators have been appointed. They are:

AICTE (All India Council for Technical Education) for self-paced and international courses NPTEL (National Programme on Technology Enhanced Learning) for Engineering

UGC (University Grants Commission) for non-technical post-graduation education CEC (Consortium for Educational Communication) for under-graduate education NCERT (National Council of Educational Research and Training) for school education NIOS (National Institute of Open Schooling) for school education

IGNOU (Indira Gandhi National Open University) for out-of-school students IIMB (Indian Institute of Management, Bangalore) for management studies

NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme

Courses delivered through SWAYAM are available free of cost to the learners, however learners wanting a SWAYAM certificate should register for the final proctored exams that come at a fee and attend in- person at designated centres on specified dates. Eligibility for the certificate will be announced on the course page and learners will get certificates only if this criterion is matched. Universities/colleges approving credit transfer for these courses can use the marks/certificate obtained in these courses for the same.

Below is a list of all SWAYAM courses categorized by subject. **Student can register to portal and complete the course.**

Humanities, Business, Programming, Mathematics, Social Sciences, Data Science,

Education &Teaching, Computer Science, Health & Medicine, Personal Development, Science, Engineering, Art& Design.