Course Title	Food Microbiology - I				
Type of Course	**Major**				
Semester	2				
Academic Level	100				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To know the important genera of microorganisms associated with food and their characteristics.	U	F	▪ Quiz / Assignment/Discussion / Seminar ▪ Midterm Exam ▪ Final Exam
CO2	Apply the knowledge in the laboratory techniques to detect, quantify, and identify microorganisms in foods	Ap	C	
CO3	To gain knowledge on various methods of cultivation and identification of food microbes.	Ap	M	
CO4	Develop basic laboratory skills for the isolation, identification, and quantification of microorganisms in food samples	E	P	
CO5	Establish a comprehensive understanding about the concept of growth of microbes in food	U	C	
CO6	To Understand the knowledge on history of microbiology	U	P	
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hr
I	**Introduction to Microbiology**		**10**
	1	History and Development of Microbiology- Germ theory of disease, Koch's postulates	2
	2	Theory of spontaneous generation and biogenesis	1
	3	Microscopy – History, Parts of microscope, properties	2
	4	Types of microscopes - Light microscope (Bright field, Dark field)	2
	5	Fluorescence and Electron microscope	3
II	**Characteristics of Microorganisms in Food**		**12**
	6.	**Bacteria** -size, shape and arrangement	1
	7.	Bacteria -Structure, Morphology	2
	8.	Bacteria - Reproduction -Binary fission, Transformation, Transduction and conjugation,	2
III	9.	Fungi -Morphology, Classification, Reproduction –Sexual and Asexual.	2
	10.	Yeast -Structure, Morphology, Reproduction –Sexual and Asexual	1
	11.	Virus-Classification, Composition, Morphology	2
	12.	Replication of virus-lysogenic &lytic cycle	1
	13	Algae: Types	1
IV	**Cultivation of Micro-organisms**		**12**
	14.	Methods of isolation and cultivation, Serial dilution method.	2
	15.	Pure culture technique- streak plate, pour plate, spread plate	2
	16	Enumeration of Microorganisms qualitative and Quantitative	3
	17.	Cultural Media – classification, Selective, Differential, Enrichment Media	3
	18	Staining techniques – simple, differential staining	2
	Microbial Growth in Food		**11**
	19	Factors affecting the growth of microorganisms in food (intrinsic, extrinsic)	3
	20	Nutritional requirement of microorganisms.	3
	21	Bacterial growth curve and	3
	22	Microbial growth in food.	2
V	**Practical**		**30**
	Introduction to equipment's and glassware used in		6
	Microbiology Sterilization techniques: Dry heat and moist heat		6
	Staining reagents and procedures		4
	Staining techniques – simple staining, gram staining, negative staining.		10
	Fungal staining		4

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	1	1	-	1	1	1	-	1	2	1	1	1
CO 2	2	2	3	2	2	2	1	1	-	2	2	2
CO 3	-	1	-	2	-	-	1	1	1	1	-	1
CO 4	2	1	1	-	1	1	-	1	2	1	2	1
CO 5	-	2	2	1	1	-	2	2	1	1	-	2
CO 6	1	1	-	1	1	1	1	-	1	1	1	1

Correlation Levels:s

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5		✓	✓	✓
CO 6			✓	✓

Course Title	FOOD AND HEALTH				
Type of Course	**MDC**				
Semester	2				
Academic Level	100				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category #	Evaluation Tools used
CO1	Understand the components of food and their significance.	U	C	▪ Quiz / Assignment/ Discussion / Seminar ▪ Midterm Exam ▪ Final Exam
CO2	Evaluate the impact of diet on health, considering both macro and micronutrients.	E	C	
CO3	Recognise different types of food adulteration,Food allergens , food poison and understand detection methods.	Ap	P	
CO4	Grasp the concepts of sustainable food practices and their environmental impact	U	F	
CO5	Stay updated on the latest research in nutritional science and Apply knowledge gained to make informed dietary choices.	Ap	M	

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs
I	**Health and Nutrition**		**9**

	1	Definition of physical health, mental health, social health and spiritual health-	**2**
	2	Determinants of health	**1**
	3	Definition of terms: Nutrition, under Nutrition and Malnutrition	**1**
	4	Health & Nutritional status – adequate, optimum & good nutrition.	**2**
	5	Food Groups, Food Pyramid	**2**
	6	Balanced diet and BMI	**1**
II	**Food Concepts**		**8**
	7	Functional Foods, Prebiotics, Probiotics, Nutraceuticals.	2
	8	Organic Foods, GM Foods and their Advantages and Disadvantages	3
	9	Fortified Food	1
	10	Heritage Foods	1
	11	Nutrigenetics and Nutrigenomics	1
III	**Food Allergy and Food Poisoning.**		**8**
	12	Food allergy , symptoms and Common food allergens.	2
	13	Anti nutritional factors in foods:	2
	14	Food poisoning: food infection and intoxication : Sources, symptoms, preventive measures	4
IV	**Lifestyle and Food Related Diseases.**		**11**
	15	Obesity, diabetics, Hypertension, CVD and Constipation - Causes, symptoms and prevention	5
	16	HFSS foods and its impact on health	2
	17	Types of diets :Low-carbohydrate diet and low-fat diet, Mediterranean diet, DASH diet	2
	18	Diet therapy	1

	19	Physical Activity and Health- Importance of exercise for overall well-being.	1
V	**Open Ended Module:**		**9**
		Healthy food for wealthy nation	

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	1	-	1	1	1	1	-	1	1	2	1	1
CO 2	2	3	2	2	2	2	3	2	2	-	2	2
CO 3	1	-	2	-	-	1	-	2	-	1	-	-
CO 4	1	-	1	1	2	1	1	-	1	2	1	1
CO 5	2	3	2	2	-	2	2	1	1	2	1	1

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5	✓	✓		✓
CO 6			✓	✓