MGM UNIVERSITY, AURANGABAD

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) progrmme

FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2021-22

M.Sc. Food Technology

SEMESTER-I

CURRICULUM

Course code	Course Title	Type	Teaching Scheme			Evaluation Scheme						Minimum Passing						Credit
						Internal			External		Total	Internal			External		Total	
(Mandatory)			L	T	P	CA	MSE	TW	ESE	PR		CA	MSE	TW	ESE	PR		
MFT-111	Food Chemistry and Nutrition	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-112	Food Preservation Technology	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-113	Food Engineering	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-114	Food Packaging Technology	Theory	4			20	20		60		100	-	-	-	24	-	40	4
FTL-115	Crop production Concepts & Practices (Practical)	Practical			4			40		60	100	-	-	16		24	40	2
FTL-116	Product Innovation - Lab (Practical)	Practical			2			20		30	50	-	-	8		12	20	1
FTL-117	Mini Project	Practical			4			40		60	100	-	-	16		24	40	2
FTL-118	Seminar	Practical			1			20		30	50	-	-	8		12	20	1
FTL-119	Open Elective Course	Practical			1			20		30	50	-	-	8		12	20	1
	Total		**16**		**12**	**80**	**80**	**140**	**240**	**210**	**750**	**0**	**0**	**56**	**96**	**84**	**300**	**23**

L- Lecture, T-Tutorial, P-Practical, CA- Continuous Assessment, MSE- Mid Semester Examination, ESE- End Semester Examination, PR-Practical, TW-TermW

FOOD CHEMISTRY & NUTRITION

University:MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
CourseUnitCode: MFT-111
Course Unit Title: Food Chemistry & Nutrition
Credits allocated: 4+0 (4 Theory+0 Practical)
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech. & Processing Master's of Science, Year1/Semester1

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME :

Upon successful completion, students will have the knowledge and skills to:
A thorough explaining of the -The subject imparts basic knowledge of Food chemistry & Nutrition process. This information will make the student competent in Food chemistry &nutrition process

OBJECTIVE:

- To acquaint with properties and role of various constituents in foods, interaction and changes during processing.
- To acquaint with importance of various foods and nutrients in human nutrition.

DETAILED SYLLABUS

THEORY

UNIT-I Water

Definition and importance; major food constituents and their physico-chemical properties; role of water in food.

UNIT-II Carbohydrates Proteins and Lipids

Carbohydrates, proteins and lipids: classification, physical, chemical, nutritional, and functional properties and their structural correlations; auto-oxidation of lipids and rancidity

UNIT-III Minor constituents in food

Properties of minerals, vitamins, pigments, anti-oxidants, flavour components, allergens, toxins and anti-nutritional factors in foods; Interaction of constituents in food systems; Changes during storage and processing; Browning reactions in foods.

UNIT-IV Food groups and their typical composition

Food groups and their typical composition; essential nutrients- sources, functions, deficiency diseases; requirements and recommended dietary allowances; digestion, absorption, transport and metabolism o f nutrients in human system; protein quality evaluation.

UNIT- V Enzymes

Enzyme: Classification, Nomenclature, application of enzyme in food industry.

Suggested Reading/Reference Books/Text Books :

1. Bamji MS, Rao NA & ReddyV.2003.Textbook of Human Nutrition. Oxford & IBH.
2. Belitz HD.1999.FoodChemistry.SpringerVerlag.
3. De Man JM.1976.Principles of FoodChemistry.AVI.
4. FennemaOR.1996.FoodChemistry.MarcelDekker.
5. MeyerLH.1987.FoodChemistry.CBS.
6. SwaminathanM.1974.EssentialsofFoodsandNutrition.Vol.II.Ganesh&Co.

Assessment Method

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100

Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4. Marks-15
- 5 MCQs Marks - 5

II. Home Assignment Conduction:

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD PRESERVATION TECHNOLOGY

University:MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
CourseUnitCode: MFT-112
Course Unit Title: Food Preservation Technology
Credits allocated: 4+0 (4 Theory+0 Practical)
Level of Study: PG
Mode of delivery planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech & Processing – Masters of Science, Year 1st / Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the -historical developments, principles & Scope of food processing; Use and application of enzymes and microorganisms in processing and preservation of foods

OBJECTIVE

To acquaint with principles of different techniques used in processing and preservation of foods.

DETAILED SYLLABUS

THEORY

UNII-I Food Processing and Preservation

Scope of food processing; historical developments; principles of food processing and preservation.

UNIT- II Preservation of Food by Heat

Processing and preservation by heat – blanching, pasteurization, sterilization and UHT processing,

canning, extrusion cooking, dielectric heating, microwave heating, baking, roasting and frying, etc

UNIT- III Preservation by low-temperature

Introduction to processing and preservation by low-temperature- refrigeration, freezing, CA, MA, and dehydro-freezing.

UNIT – IV Processing and preservation by drying

Introduction to Processing and preservation by drying, concentration and evaporation-types of dryers and their suitabilityfor different food products; ultra- filtration, reverse osmosis.

UNIT – V Processing and preservation by non-thermal methods

Introduction to Processing and preservation by non-thermal methods, irradiation, high pressure, pulsed electric field, hurdle technology.

Suggested Reading/Reference Books/Text Books

1. Arsdel WB, Copley MJ & Morgan AI. 1973. Food Dehydration. 2 nd Ed. Vols. I, II. AVI Publ.
2. Desrosier NW & James N.1977. Technology of Food Preservation. 4 th Ed. AVI. Publ.
3. Fellows PJ. 2005. Food Processing Technology: Principle and Practice. 2 nd Ed. CRC.
4. Jelen P. 1985. Introduction to Food Processing. Prentice Hall.
5. Potter NN & Hotchkiss 1997. Food Science. 5 th Ed. CBS.
6. Potty VH & Mulky MJ. 1993. Food Processing. Oxford & IBH.
7. Ramaswamy H & Marcotte M. 2006. Food Processing: Principles and applications. Taylor & Francis.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Internal Assessment (Marks conduction): 40

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4. Marks- 15
- 5 MCQs Marks - 5

III. Home Assignment Conduction:

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD ENGINEERING

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: MFT-113 **Course Unit Title:** Food Engineering

Credits allocated: 4+0 (4 Theory+0 Practical) **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year 1 /Semester1

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME :

Upon successful completion, students will have the knowledge and skills to: The main purpose of the subject is to understand basic principle of Food Engineering and its Processes. Introduction to food engineering & processes, Kinetics of biological reactions, Method for thermal process evaluation, Food chilling and freezing, Process Heat Transfer

OBJECTIVE :

To acquaint with basic principle of Food Engineering and its Processes, with importance of various foods process and their evaluation

DETAILED SYLLABUS

THEORY

UNIT – I Introduction to food engineering & processes

Introduction to food engineering & processes: principles of thermodynamics and heat transfer applied tofood engineering; fundamentals of heat and analogy to mass transfer in food processing.

UNIT- II Method for thermal process evaluation

Method for thermal process evaluation - Commercial sterility, pasteurization and sterilization methods based on slowest heating region,heat exchangers; general introduction to aseptic canning process, hydrostatic sterilizer and aseptic packaging practices and design problems.

UNIT – III Food chilling and freezing

Food chilling and freezing – Pre-cooling and cold storage; CA and MA; Properties of frozen foods; freezing point depression; general introduction to enthalpy change during freezing; Plank's equation for predicting rates of product freezing; Cryogenic freezing and IQF; design of food freezing equipment suchas air blast freezers, plate freezers and immersion freezers.

UNIT-IV Heat Transfer

Process Heat Transfer - Modes of heat transfer and overall heat transfer; thermal properties of foods such as specific heat and thermal conductivity; Fourier's law, steady state and unsteady state conduction; heatexchange equipment; energy balances; rate of heat transfer;

UNIT-V Mass Transfer

Introduction about mass transfer, important process in mass transfer, application of mass transfer in food industry.

Suggested Reading/ Reference Books/ Text Books :

1. Brennan JG, Butter JR, Corell ND & Lilly AVE. 1990. Food Engineering Operations. Elsevier.
2. Charm SE, McCabe WL, Smith JC & Harriott P.1993. Unit Operations of Chemical Engineering.McGraw Hills.
3. Earle RL. 1985. Unit Operations in Food Processing. Pergamon Press.
4. Fellows P. 1988. Food Processing Technology. VCH Ellis Horwood.
5. Heldman DR & Singh RP.1995. Food Process Engineering. AVI Publ.
6. McCabe WL & and Smith JC. 1971. Fundamental of Food Engineering. AVI Publ.
7. Sahay KM & Singh KK. 1994. Unit Operation of Agricultural Processing.Vikas Publ. House.
8. Singh RP & Heldman DR. 1993. Introduction to Food Engineering. Academic Press.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

III. Home Assignment Conduction:

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD PACKAGING TECHNOLOGY

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-114
Course Unit Title: Food Packaging Technology
Credits allocated: 4+0 (4 Theory+0 Practical)
Level of Study: PG
Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME

Upon successful completion, students will have the knowledge and skills to: Active and intelligent packaging, Non-migratory bioactive polymers (NMBP) in food packaging, Time-temperature indicators, Packaging-flavor interactions Course designed to impart advanced knowledge and skills required to learn various aspects of food packaging technology at food industries

OBJECTIVE

To provide knowledge about selected trends and development in food packaging technologies and materials aiming at assuring the safety and quality of foodstuffs in order to design an optimized package which satisfies all legislative, marketing and functional requirements sufficiently, and fulfils environmental, cost and consumer demands as well as possible.

DETAILED SYLLABUS

THEORY

UNIT I Introduction of food Packaging and Type

Active and intelligent packaging, Active packaging techniques, Intelligent packaging techniques, Current use of novel packaging techniques, Oxygen, ethylene and other scavengers, Oxygen

scavenging technology, Ethylene scavenging technology, Carbon dioxide and other scavengers, Antimicrobial foodpackaging: Constructing an antimicrobial packaging system, Factors affecting the effectiveness of antimicrobial packaging.

UNIT II Non-migratory bioactive polymers

Non-migratory bioactive polymers (NMBP) in food packaging, Advantages of NMBP, limitations, inherently bioactive synthetic polymers: types and applications, Polymers with immobilized bioactive compounds.

UNIT III Important Parameter in food packaging

Time-temperature indicators (TTIs), Defining and classifying TTIs, Requirements for TTIs, The development of TTIs, Current TTI systems, Maximizing the effectiveness of TTIs, Using TTIs to monitorshelf-life during distribution, Using TTIs to optimize distribution and stock rotation.

UNIT IV Innovative Packaging

Packaging-flavour interactions, Factors affecting flavour absorption, role of the food matrix, role of differing packaging materials, Case study: packaging and lipid oxidation, Modeling flavour absorption, Packaging– flavour interactions and active packaging, Novel MAP applications for fresh-prepared produce, Novel MAP gases, Testing novel MAP applications, Applying high O 2 MAP.

UNIT V Materials and Application of food packaging

Modern packaging systems: Green plastics for food packaging, The problem of plastic packaging waste, The range of biopolymers, Developing novel biodegradable materials, Legislative issues, Current applications, Integrating intelligent packaging , role of packaging in the supply chain, Creating integrated packaging, storage and distribution: alarm systems and TTIs, Traceability: radio frequency identification, Recycling packaging materials: The recyclability of packaging plastics, Improving the recyclability of plastics packaging, Testing the safety and quality of recycled material, Using recycledplastics in packaging.

Suggested Reading/ Reference Books/ Text Books

1. Ahvenainen R. 2001. Novel Food Packaging Techniques. CRC.
2. Crosby NT. 1981. Food Packaging Materials. App. Sci. Publ.
3. Mahadeviah M & Gowramma RV. 1996. Food Packaging Materials. Tata McGraw Hill.

4. Painy FA. 1992. A Handbook of Food Packaging. Blackie.
5. Palling SJ. 1980. Developments in Food Packaging. App. Sci. Publ.
6. Rooney ML. 1988. Active Food Packaging. Chapman & Hall.
7. Sacharow S & Griffin RC.1980. Principles of Food Packaging. AVI Publ.
8. Stanley S & Roger CG. 1998. Food Packaging. AVI Publ.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

CROP PRODUCTION CONCEPTS & PRACTICES

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-115
Course Unit Title: Crop production Concepts & Practices
Credits allocated: 0+2
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Learning outcome: Upon successful completion students will have the knowledge and skills in Importance of Nutrition and role of food chemistry, different techniques in food preservation, fundamentals of food engineering and food packaging technology

Objectives: To get acquaint with Crop production concepts, importance of nutrition, preservation techniques and role and different types of food packaging and application and advantages of engineering instruments and equipments.

PRACTICALS:

1. Study of crop production concepts and practices.
2. Nutritive value of different food groups
3. Identification and classification of different food groups
4. Proximate analysis of foods
5. Study and calculation of BMR
6. Study, calculation and role of BMI
7. Study of Nutritional labeling and importance of labeling
8. Study of different food preservation techniques

9. Study of preservation of food using high concentration of sugar (Jam/Jellies)
10. Study of preservation of food by creating anaerobic environment (Pickle)
11. Preservation of food by using salt
12. Study of different types of drying techniques and their principal used in food preservation
13. Preservation of foods by using chemicals
14. Dehydration of fruits
15. Dehydration of vegetables
16. Study of centrifugal separation (cream separation from milk)
17. Study of Reynold's number apparatus to predict the type of flow
18. Study of different types of valves
19. Study of different tools and fittings
20. Measurement of thickness of paper and paper board
21. To measure the absorption capacity of paper
22. Study of different types of packaging
23. Study and importance of vacuum packaging
24. Study of edible food packaging
25. Determination of static and dynamic tensile strength of paper

Practical Assessment for 100 marks

Components(TW)	Record Book	Table Viva	Attendance	Total Marks
Internal Marks	10	10	20	40
External Assessment: Semester End Practical				60
Total Marks				100

- **Record book -**In ongoing academic semester the role of Record Book is to develop their writing skills & they have the data of practicals in it.

- **Table Viva-** Table Viva is important to build student confidence. How much students are clearer about their practical Knowledge

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below. (Equal weightage of percentage to marks is given)

Sr. No	Percentage of attendance	Marks
1.	70	14
2.	80	16
3.	90	18
4.	100	20

Internal Practical Exam: In ongoing academic semester the Internal Practical Exam are conducted to check their practical skills and techniques Usually in laboratory. They will be better placed to perform well in a practical exam if they can report their methodology and observations accurately.

PRODUCT INNOVATION -I LAB

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-116
Course Unit Title: Product Innovation -I Lab
Credits allocated: 0+1
Level of Study: PG
Mode of delivery planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester I
Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Study of heat transfer analysis by conduction
2. Determination of thermal conductivity of solid food products
3. Study of centrifugal separation (cream separation from milk
4. Study of Reynolds number apparatus to predict the type of flow
5. Measurement of thickness of paper and paper board
6. Study of food packaging
7. Study and Importance of vacuum packaging
8. Study of edible food packaging
9. Study of freeze drying process
10. Formulation of protein energy rich product
11. Preparation of law calorie food product
12. Fortification of iron in daily used products
13. Development of infant or weaning food
14. Development of geriatric food
15. Preparation of new product development for athletes
16. Preparation of low glycemic index.
17. Preparation of speciality food based on convenience food

18. Formulation of Beverage based food product
19. Preparation of food items using food preservation Techniques
20. Demonstration of various machinery use in food processing industry operation.

Practical Assessment for 50 marks

Components(TW)	Record Book	Table Viva	Attendance	Total Marks
Internal Marks	5	5	10	20
External Assessment: Semester End Practical				30
Total Marks				50

- **Record book -**In ongoing academic semester the role of Record Book is to develop their writing skills & they have the data of practicals in it.

- **Table Viva**- Table Viva is important to build student confidence. How much students are clearer about their practical Knowledge

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below. (Equal weightage of percentage to marks is given)

Sr. No	Percentage of attendance	Marks
1.	70	7
2.	80	8
3.	90	9
4.	100	10

- **Internal Practical Exam**: In ongoing academic semester the Internal Practical Exam are conducted to check their practical skills and techniques Usually in laboratory. They will be

better placed to perform well in a practical exam if they can report their methodology and observations accurately.

MINI PROJECT

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-117 **Course Unit Title:** Mini Project

Credits allocated: 0+2 **Level of Study: PG**

Mode of delivery planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester : Food Tech. & Processing-Master's of Science,Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.

2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

PROCEDURE

Sr. No	Activities	Responsibilities
1	PG students are decide on thire team members for their semester project with their proposed project domain and title	Project head, PG students
2	Director shall allocate the project guide based on their area of expertise (ot more than 3 batches to a guide)	Director
3	Ensuring that students have regular discussion meetings with their project guides.	Project guide Project head
4	Synopsis preparation and submission	Project head
5	Verification of student project log book	Project guide Project head

6	Approval of PPT : Abstract,existing, proposed system. 30% of proposed work. 80% of proposed work. 100% of proposed work.	Project guide
7	Preparation and submission of progress report during project	Students Project head
8	Preparaing list for Redo students (insufficient content, plagiarism, poor presentation, genuiene absentees.	Project head
9	Submission of hard copy of project report	Project head
10	Evaluation of project report	External examiner
11	Organizing final project viva-voce	Project heads
12	Ensuring that if a candidate fails to submit the project report on or before the specified deadline , he/she is deemed to have failed in the project work and shall re – enroll for the same	Project head Project guide Director

Project Assessment (100 Marks)

Idea of Project	**Understanding of Subject**	**Literature survey**	**Attendance**	**Total Marks**
10	10	10	10	40
External Assessment				60
Total Marks				100

Ideas of project

Defining projects ideas is crucial for setting realistic expectations and laying out a clear vision for a project life cycle. Project-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

- **Attendance:**

  In ongoing semester attendance are important for students. They are expected to do their project in the semester that is timetabled. The criteria of attendance are given below.

Sr.No.	Percentage of attendance	Marks
1.	70	7
2.	80	8
3.	90	9
4.	100	10

Project External Assessment (Marks distribution):60

External Assessment: Semester End Project Examination						
Components	Project Report	PowerPoint Presentation	Viva Voce	Innovativeness	Individual Contribution	Total
	10	10	10	20	10	60
Total marks						100

SEMINAR

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-118
Course Unit Title: Seminar
Credits allocated: 0+1
Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 1 hrs / weekly

Recommended Year /Semester: Food Tech & Processing – Masters of Science, Year 1st / Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Outcomes:

1.The purpose of a seminar is to create an experience of working together.

2.One of the main objectives of conducting seminars is to avoid a passive experience everyone should

have a way to contribute and communicate and also stage daring Improves.

DETAILED SYLLABUS

1) The allotted faculty will notify about seminar conduction to the students of respective class.
2) The seminar topics will be listed by the students initially based on their topic of interest.
3) The seminar topics will be discussed with the faculty for finalizing the topic.
4) The finalized seminar topics will be displayed on the notice board with Director's approval.
5) The students will prepare the seminar topics; PPT and word file in allotted hours.
6) The final seminar presentation will be done by the students according t the exam date scheduled by the University,
7) Evaluation of the final seminar presentation and the word file will be done by the external examiner allotted by the University.

SEMINAR ASSESMENT (Marks distribution): 50

Seminar Topic	Understanding of Subject	Presentation	Attendance	Total Marks
05	05	05	05	20
External Assessment:				30
Total Marks				50

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below. (Equal weightage of percentage to marks is given)

Sr. No	Percentage of attendance	Marks
1.	70	2
2.	80	3
3.	90	4
4.	100	5

OPEN ELECTIVE COURSE

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-119 **Course Unit Title:** Open Elective Course

Credits allocated: 0+1 **Level of Study: PG**

Mode of delivery planned learning activities and teaching method: Lecture 1 hrs / weekly

Recommended Year /Semester: Food Tech & Processing – Masters of Science, Year 1st / Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

SOP for Open elective Courses

- It is mandatory for undergraduate & post graduate students to undertake open elective courses for concern credits before the completion of the degree.
- Students have the option of choosing any open Elective courses under the category of mandatory elective courses.
- A student is not eligible for more than one open Elective course under the category of mandatory courses.
- For UG and PG programs the Open Electives are offered within the regular class hours.
- These courses generally earn concern credits consisting of 8 weeks-12 weeks during the completion of semester.
- Students can view the complete details of the courses offered Elective courses in their course layout.
- Till a student finishes OEC under the mandatory course category, he/she is eligible to apply for other open elective courses.
- Evaluation pattern is the discretion of the faculty concerned for UG & PG courses will be with only end semester examinations

- Examinations are conducted by the departments concerned and the results are indicated only in Grades in the marks card.
- Minimum pass percentage is 40% for courses under the mandatory category. Grades are awarded only if the student passes.
- These courses are conducted after or before the regular class hours and the courses offered are different in Odd and Even semesters.
- Students are advised to finalize their choice of programs in consultation with their OEC coordinator.
- Minimum prescribed attendance for these courses is 85%. **Medical and co-curricular claim will be considered only if the student put in 75% physical attendance or the classes.**
- Attendance claim shall be submitted to OEC coordinator within 07 days after availing the leave.
- Students who fail to secure the minimum pass marks or required minimum attendance or who discontinue in between the course are required to register afresh. Re-registration is permitted only in the subsequent semester which may be for the same course or any other courses from the choices available during the particular semester.
- He / She submit course syllabus weekly report on the basis of that OEC co-ordinator conduct their continuous assessment.
- A student is not eligible to graduate without completing OEC mandatory course.
- OEC offered bydepartmentslike Performing Arts, Industrial Automation, Industry 4.0, Vastushashra, Sketching, Hotel Management, Film Making, Python programming, Theatre and Music etc.
- Each course admits only 40 students on a first-come-first-served basis. Courses which do not get minimum required applications may not be conducted.
- The course platform for registration are SWAYAM NPTEL, Agmooc and Coursera.

The Department/Centre/Office of the activity/event concerned will set the relevant parameters to measure the content of each given criterion depending on the need and application of the particular activity/event and will assess the performance of every student objectively.

Assessment of OEC (1 Credit: 50Marks)

Internal Evaluation

Internal Assessment	10Marks
Weekly Report Submission	10Marks

- Student should register and submit joining certificate/ registered authentic document to OEC coordinator.
- Students should submit weekly report on the basis of course.
- OEC coordinator will conduct their continuous assessment for all activities during semester.

External Evaluation

Certificate Submission	30Marks

Note: If the student unable to submit the OEC Certificate, for them there will be conduction of department (internal) examination, on the basis of open elective course syllabus submitted / selected by students.

MGM UNIVERSITY, AURANGABAD

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) progrmme

FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2021-22

M.Sc. Food Technology

SEMESTER-II

CURRICULUM

Detail Course Layout with course content

Course cod	Course Title	Type	Teaching Schem			Evaluation Scheme						Minimum Passing						Credit
						Internal			External		Total	Internal			External		Total	
(Mandatory)			L	T	P	CA	MSE	TW	ESE	PR		CA	MSE	TW	ESE	PR		
MFT-121	Beverages Technology	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-122	Technology of cereal,legume and oil seed	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-123	Food Microbiology & Toxicology	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-124	Food Quality System and Food Analysis	Theory	4			20	20		60		100	-	-	-	24	-	40	3
FTL-125	Food science Lab	Practical			6			40		60	100	-	-	16		24	40	3
FTL-126	Processing Lab	Practical			2			20		30	50	-	-	8		12	20	1
FTL-127	Mini Project	Practical			4			40		60	100	-	-	16		24	40	2
FTL-128	Seminar	Practical			1			20		30	50	-	-	8		12	20	1
FTL-129	Open Elective Course	Practical			1			20		30	50	-	-	8		12	20	1
	Total		16		14	80	80	140	240	210	750	0	0	56	96	84	300	23

L- Lecture, T-Tutorial, P-Practical, CA- Continuous Assessment, MSE- Mid Semester Examination, ESE- End Semester Examination, PR-Practical, TW-TermWork

BEVERAGES TECHNOLOGY

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: MFT-121 **Course Unit Title:** Beverages Technology

Credits allocated: 4+04 (Theory+0 Practical) **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: This subject is designed to impart basic knowledge on the area of beverages technologies. Types of beverages, Specialty beverages, Alcoholic beverages.

OBJECTIVE:

To provide a technical view of beverages and a full discussion of manufacturing processes in the context of technology and its related chemistry as well as a more fundamental appraisal of the underlying science.

DETAILED SYLLABUS

THEORY

Unit-I Beverages and types of beverages

Introduction to Beverages, Importance of beverages and status of beverage industry, Classification of beverages, Processing of beverages. FSSAI specifications for beverages. Type of beverages: fruit juices, fermented and non-fermented beverages, synthetic beverages, carbonated and non-carbonated beverages. Low-calorie and dry beverages. Isotonic and sports beverage.

Unit-II Processing of beverages

Different process: Juice extraction, clarification, preservation, packaging, concentration and drying.

Various beverages from fruit juices, their preparation and preservation: Fruit juice, RTS, Squash, Nectar, cordial, crush, syrup, fruit juice concentrate, fruit juice powder

Unit-III Classification of beverages

Non carbonated and carbonated synthetic beverages: Ingredients, source of carbon dioxide, chemical and physical properties of carbon dioxide, carbonating process, packaging of carbonating beverages. Specialty beverages based on tea, coffee, cocoa, spices, nuts, dairy and imitation dairy-based beverages.

Unit -IV Alcoholic beverages

Alcoholic Beverages: Non-Distilled Beverages: Beer and Wine Distilled Beverages: Vodka, Rum, Gin, Whisky, Toddy, Brandy, the role of yeast in beer and other alcoholic beverages.

Unit-V Water for beverages

Water for beverages: Types of water required for beverages, treatment of water. Additives for beverages: Natural and synthetic sweeteners and colours, acids, emulsifiers, preservatives, flavours and flavour enhancers.

Suggested Reading/ Reference Books/ Text Books:

1. HardwickWA.1995.HandbookofBrewing.MarcelDekker.
2. HuiYH.etal2004.HandbookofFoodandBeverageFermentationTechnology.MarcelDekker.
3. PriestFG&StewartGG.2006.HandbookofBrewing.2ndEd.CRC.
4. RichardPVine.1981.CommercialWineMaking-ProcessingandControls.AVIPubl.
5. VarnamAH&SutherlandJP.1994.Beverages:Technology,
6. Chemistry and Microbiology. Chapman & Hall.
7. WoodroofJG&PhillipsGF.1974.Beverages:CarbonatedandNonCarbonated.AVIPubl.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

TECHNOLOGY OF CEREAL, LEGUME AND OIL SEED

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-122
Course Unit Title: Technology of cereal ,legume and oil seed
Credits allocated: 4+0 (4 Theory+0 Practical)
Level of Study: PG
Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the -General introduction and production and utilization trends, Wheat, Rice, Corn, Legumes and Oil Seeds.

OBJECTIVE: To acquaint with production and consumption trends, structure, composition, quality evaluation, and processing technologies for product development and value addition of various cereals, pulses and oil seeds.

DETAILED SYLLABUS

THEORY

UNIT -I Introduction to cereal, pulses and oil seeds

General introduction and production and utilization trends; Structure and composition of common cereals, pulses and oilseeds.

UNIT -II Wheat: Types and physicochemical characteristics

Wheat: Types and physicochemical characteristics; wheat milling - products and byproducts; factors affecting quality parameters; physical, chemical and rheological tests on wheat flour; additives used in bakery products; flour improvers and bleaching agents; manufacture of bakery

products, pasta productsand various processed cereal-based foods; manufacture of whole wheat atta, blended flour and fortified flour.

UNIT -III Rice: Classification, physicochemical characteristics

Rice: Classification, physicochemical characteristics; cooking quality; rice milling technology; by-products of rice milling and their utilization; Parboiling of rice- technology and effect on quality characteristics; aging of rice - quality changes; processed products based on rice.

UNIT -IV Corn: Types and nutritive value

Corn: Types and nutritive value; dry and wet milling, manufacture of value-added products; processingof barley, oats, sorghum and millets.

UNIT -V Legumes and oilseeds: composition, processing and storage

Legumes and oilseeds: composition, anti-nutritional factors, processing and storage; processing for production of edible oil, meal, flour, protein concentrates and isolates; extrusion cooking technology; snack foods; development of low cost protein foods.

Suggested Reading/ Reference Books/ Text Books

1. Chakrabarty MM. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy DAV & Dobraszczyk BJ. 2001. Cereal and Cereal Products. Aspen.
3. Hamilton RJ & Bhati A. 1980. Fats and Oils - Chemistry and Technology.App. Sci. Publ.
4. Hoseney RS. 1994. Principles of Cereal Science and Technology. 2 nd Ed.AACC.
5. Kay DE. 1979. Food Legumes. Tropical Products Institute.
6. Kent NL. 1983. Technology of Cereals. 4 th Ed. Pergamon Press.
7. Kulp K & Ponte GJ.2000. Handbook of Cereal Science and Technology.2 nd Ed.Marcel Dekker.
8. Lorenz KL.1991. Handbook of Cereal Science and Technology. Marcel Dekker.
9. Marshall WE & Wadsworth JI. 1994. Rice Science and Technology. Marcel Dekker.
10. Mathews RH. 1989. Legumes Chemistry, Technology and Human Nutrition. Marcel Dekker.
11. Matz SA. 1969. Cereal Science. AVI Publ.
12. Paquot C. 1979. Standard Methods of Analysis of Oils, Fats and Derivatives. Pergamon Press.
13. Pomeranz Y. 1987. Modern Cereal Science & Technology. VCH Publ.

14. Salunkhe DK.1992. World Oilseeds: Chemistry, Technology and Utilization. VNR.
15. Swern D. 1964. Bailey's Industrial Oil and Fat Products. InterSci. Publ.
16. Watson SA & Ramstad PE.1987. Corn; Chemistry and Technology.AACC.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester Home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD MICROBIOLOGY & TOXICOLOGY

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-123
Course Unit Title: Food Microbiology & Toxicology
Credits allocated: 4+0 (4 Theory+0 Practical)
Level of Study: PG
Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the -Growth and survival of microorganisms in foods, Biochemical changes caused by microorganisms, Food hygiene and sanitation, Food Fermentations. This subject is designed to impart a fundamental knowledge on the principles and food microbiology techniques.

OBJECTIVES:

To acquaint with different groups of micro-organisms associated with food, their activities, destruction and detection in food.

DETAILED SYLLABUS

THEORY

UNIT-I Growth and survival of microorganisms in foods

Growth and survival of microorganisms in foods; spoilage organisms of milk, fruits, vegetables, grains and oil seeds, meat and poultry; Physical and chemical methods to control microorganisms.

UNIT-II Microbial spoilage of foods Factors affecting kinds

Microbial spoilage of foods Factors affecting kinds, numbers, growth and survival of microorganisms in foods, Intrinsic factors; pH, water activity, nutrients etc and Extrinsic factors:

Relative humidity, temperature and gaseous atmosphere.

UNIT-III Role of microorganisms in food

Role of micro organisms in food : all factors affecting growth and destruction of microbes-aerobes and anaerobes, psychrophiles, psychrotrophs, mesophiles, thermoduric, thermophiles, halophiles, osmophiles and sporeformers.

UNIT-IV Definition scope and general principles of food toxicology

Definition scope and general principles of food toxicology; food contamination (physical, chemical and microbial) classification of food toxicants; factors affecting toxicity of compounds.

UNIT-V Toxicants and allergens in foods derived from plants, animals

Toxicants and allergens in foods derived from plants, animals; Microbial toxins; Food Poisoning; Food borne infections and disease; Derived Food toxicants- Processing & Packaging.

Suggested Reading/ Reference Books/ Text Books

1. Abdulla, M., Vohora, S.Band Athar, M. 1995. Trace and toxic elements in nutrition and health. Jamia Hamdard New Delhiand WileyEastern Ltd.
2. JohnN.Hathcock.1989.NutritionalToxicology.AcademicPress,Inc.Vol.III.
3. Klara Miller. 1987. Toxicological Aspects of Food. Elsevier Applied PublishersLTD.
4. MichaelJ.PelczarJR,E.C.S.Chan,NoelR.Krieg.2021.Microbiology.KindleEdition.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	

	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD QUALITY SYSTEM AND FOOD ANALYSIS

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-124
Course Unit Title: Food Quality System and Food Analysis
Credits allocated: 3+0
Level of Study: PG
Mode of delivery, planned learning activities and teaching method: Lecture 4hrs weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science,Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: Concept of quality, quality management, Quality assurance, Concept of quality, Concepts of quality management, Quality assurance and Management.

OBJECTIVES

To acquaint with food quality parameters and control systems, food standards, regulations, specifications.

DETAILED SYLLABUS

THEORY

UNIT-I Food quality and its role in food industry

Food quality and its role in food industry; need of quality control, factors affecting quality control, Quality attributes: physical, chemical, nutritional, microbial, and sensory; their measurement and evaluation, dominant and hidden attributes Color, Viscosity, Consistency, Sizeand shape, Texture, Taste. Defectin the food.

UNIT-II Concepts of quality management

Concepts of quality management: Objectives, importance and functions of quality control; Quality management systems in India; Sampling procedures and plans

UNIT-III Food Safety and Standards Act

Food Safety and Standards Act,2006. International food standards, Total Quality Management; GMP, GAP; Sanitary and hygienic practices; HACCP; Indian & International quality systems and standards like ISO and Food Codex; Applications in different food industries; Food adulteration and food safety.

UNIT-IV Sampling techniques

Sampling techniques; Wateractivity, its measurements and significance in food quality; Calibration and standardization of different instruments.

UNIT-V Different analytical techniques used in food analysis

Different analytical techniques used in food analysis. Different separation technique used for food. Microscopic techniques in food analysis.

Suggested Reading/ Reference Books/ Text Books :

1. AmerineMA,PangbornRM&RosslosEB.1965.PrinciplesofSensoryEvaluationofFood.AcademicPress.
2. EarlyR.1995.GuidetoQualityManagementSystemsforFoodIndustries.BlackieAcademic.
3. FuriaTE.1980.RegulatorystatusofDirectFoodAdditives.CRCPress.
4. JellinekG.1985.SensoryEvaluationofFood-TheoryandPractice.EllisHorwoood.

Assessment Method:

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

FOOD SCIENCE LAB

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-125
Course Unit Title: Food science Lab
Credits allocated: 0+3
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science,Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Physical-tests on wheat and rice; Physicochemical and rheological properties.
2. Determination of gluten content in wheat flour.
3. Conditioning of wheat; Milling of wheat and rice by laboratory mill.
4. Parboiling of rice.
5. Quality tests of rice.
6. Amylose content determination in rice.
7. Malting of barley,puffing and popping of grains.
8. Experimental parboiling and assessment of degree of polishing.
9. Preparation of protein concentrates and isolates and their evaluation for protein content and solubility.
10. Extraction of oil using expeller and solvent extraction methods.
11. Testing and evaluation of quality attributes of raw and processed foods.
12. Detection and estimation of foodadditives and adulterants.
13. Quality assurance procedure, GMP, GAP documentation.
14. Preparation of quality policy & documentation.
15. Application of HACCP to products.
16. Preparation of HACCP chart.

17. Preparation of documentation & records.
18. Visit to Units with ISO systems.
19. Visit to Units with HACCP certification.
20. Visit to Units implementing GMP, GAP.

Practical Assessment for 100 marks

Components(TW)	Record Book	Table Viva	Attendance	Total Marks
Internal Marks	10	10	20	40
External Assessment: Semester End Practical				60
Total Marks				100

- **Record book -**In ongoing academic semester the role of Record Book is to develop their writing skills & they have the data of practicals in it.

- **Table Viva-** Table Viva is important to build student confidence. How much students are clearer about their practical Knowledge

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	70	14
2.	80	16
3.	90	18
4.	100	20

- **Internal Practical Exam**: In ongoing academic semester the Internal Practical Exam are conducted to check their practical skills and techniques Usually in laboratory. They will be better placed to perform well in a practical exam if they can report their methodology and observations accurately.

PROCESSING LAB

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-126 **Course Unit Title:** Processing Lab

Credits allocated: 0+1 **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science,Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Chemical and microbiological analysis of raw water quality.
2. Preparation of regional fruit juices.
3. Preparation of whey-based beverages.
4. preparation of iced and flavoured tea beverage.
5. Preparation of carbonated and non- carbonated soft drinks.
6. Preparation of wine and beer.
7. Preparation of soy milk.
8. fruitmilkshakes, herbal beverages.
9. visit to relevant processing units.
10. Microscopic examination of bacteria, and yeast and molds.
11. Standard plate count; Yeast and mould count, Spore count.
12. Detection and enumeration of pathogenic and indicator organisms in food.
13. MPN of coli forms.
14. Enumeration of physiological groups- psychrophile, thermodurics, osmophiles and halophiles.
15. Evaluation of microbiological quality of commonly consumed street foods

Practical Assessment for 50 marks

Components(TW)	Record Book	Table Viva	Attendance	Total Marks
Internal Marks	5	5	10	20
External Assessment: Semester End Practical				30
Total Marks				50

- **Record book -**In ongoing academic semester the role of Record Book is to develop their writing skills & they have the data of practicals in it.

- **Table Viva**- Table Viva is important to build student confidence. How much students are clearer about their practical Knowledge

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	70	7
2.	80	8
3.	90	9
4.	100	10

- **Internal Practical Exam**: In ongoing academic semester the Internal Practical Exam are conducted to check their practical skills and techniques Usually in laboratory. They will be better placed to perform well in a practical exam if they can report their methodology and observations accurately.

MINI PROJECT

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-127
Course Unit Title: Mini Project
Credits allocated: 0+2
Level of Study: PG
Mode of delivery, planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science,Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.

2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

PROCEDURE

Sr. No	Activities	Responsibilities
1	PG students are decide on thire team members for their semester project with their proposed project domain and title	Project head, PG students
2	Director shall allocate the project guide based on their area of expertise (ot more than 3 batches to a guide)	Director
3	Ensuring that students have regular discussion meetings with their project guides.	Project guide Project head
4	Synopsis preparation and submission	Project head
5	Verification of student project log book	Project guide Project head

6	Approval of PPT : Abstract,existing, proposed system. 30% of proposed work. 80% of proposed work. 100% of proposed work.	Project guide
7	Preparation and submission of progress report during project	Students Project head
8	Preparaing list for Redo students (insufficient content, plagiarism, poor presentation, genuiene absentees.	Project head
9	Submission of hard copy of project report	Project head
10	Evaluation of project report	External examiner
11	Organizing final project viva-voce	Project heads
12	Ensuring that if a candidate fails to submit the project report on or before the specified deadline , he/she is deemed to have failed in the project work and shall re – enroll for the same	Project head Project guide Director

Project Assessment (100 Marks)

Idea of Project	**Understanding of Subject**	**Literature survey**	**Attendance**	**Total Marks**
10	10	10	10	40
External Assessment				60
Total Marks				100

Ideas of project

Defining projects ideas is crucial for setting realistic expectations and laying out a clear vision for a project life cycle. Project-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

- **Attendance:**

  In ongoing semester attendance are important for students. They are expected to do their project in the semester that is timetabled. The criteria of attendance are given below.

Sr.No.	Percentage of attendance	Marks
1.	70	7
2.	80	8
3.	90	9
4.	100	10

Project External Assessment (Marks distribution):60

External Assessment: Semester End Project Examination						
Components	Project Report	PowerPoint Presentation	Viva Voce	Innovativeness	Individual Contribution	Total
	10	10	10	20	10	60
Total marks						100

SEMINAR

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-128 **Course Unit Title:** Seminar

Credits allocated: 0+1 **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Practical 1 hrs / weekly

Recommended Year /Semester: Food Tech.& Processing– Master's Of Science,Year I / Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Outcomes:

1. The purpose of a seminar is to create an experience of working together.

2. One of the main objectives of conducting seminars is to avoid a passive experience everyone should have a way to contribute and communicate and also stage daring Improves.

DETAILED SYLLABUS

1. The allotted faculty will notify about seminar conduction to the students of respective class.
2. The seminar topics will be listed by the students initially based on their topic of interest.
3. The seminar topics will be discussed with the faculty for finalizing the topic.
4. The finalized seminar topics will be displayed on the notice board with Director's approval.
5. The students will prepare the seminar topics; PPT and word file in allotted hours.
6. The final seminar presentation will be done by the students according t the exam date scheduled by the University,
7. Evaluation of the final seminar presentation and the word file will be done by the external examiner allotted by the University.

SEMINAR ASSESMENT (Marks distribution): 50

Seminar Topic	Understanding of Subject	Presentation	Attendance	Total Marks
05	05	05	05	20
External Assessment:				30
Total Marks				50

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below. (Equal weightage of percentage to marks is given)

Sr. No	Percentage of attendance	Marks
5.	70	2
6.	80	3
7.	90	4
8.	100	5

OPEN ELECTIVE COURSE

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-129 **Course Unit Title:** Open Elective Course

Credits allocated: 0+1 **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Lecture 1 hrs / weekly

Recommended Year /Semester : Food Tech & Processing- Master's Of Science , Year I / Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

DETAILED SYLLABUS

SOP for Open elective Courses

- It is mandatory for undergraduate & post graduate students to undertake open elective courses for concern credits before the completion of the degree.
- Students have the option of choosing any open Elective courses under the category of mandatory elective courses.
- A student is not eligible for more than one open Elective course under the category of mandatory courses.
- For UG and PG programs the Open Electives are offered within the regular class hours.
- These courses generally earn concern credits consisting of 8 weeks-12 weeks during the completion of semester.
- Students can view the complete details of the courses offered Elective courses in their course layout.
- Till a student finishes OEC under the mandatory course category, he/she is eligible to apply for other open elective courses.

- Evaluation pattern is the discretion of the faculty concerned for UG & PG courses will be with only end semester examinations
- Examinations are conducted by the departments concerned and the results are indicated only in Grades in the marks card.
- Minimum pass percentage is 40% for courses under the mandatory category. Grades are awarded only if the student passes.
- These courses are conducted after or before the regular class hours and the courses offered are different in Odd and Even semesters.
- Students are advised to finalize their choice of programs in consultation with their OEC coordinator.
- Minimum prescribed attendance for these courses is 85%. **Medical and co-curricular claim will be considered only if the student put in 75% physical attendance or the classes.**
- Attendance claim shall be submitted to OEC coordinator within 07 days after availing the leave.
- Students who fail to secure the minimum pass marks or required minimum attendance or who discontinue in between the course are required to register afresh. Re-registration is permitted only in the subsequent semester which may be for the same course or any other courses from the choices available during the particular semester.
- He / She submit course syllabus weekly report on the basis of that OEC co-ordinator conduct their continuous assessment.
- A student is not eligible to graduate without completing OEC mandatory course.
- OEC offered bydepartmentslike Performing Arts, Industrial Automation, Industry 4.0, Vastushashra, Sketching, Hotel Management, Film Making, Python programming, Theatre and Music etc.
- Each course admits only 40 students on a first-come-first-served basis. Courses which do not get minimum required applications may not be conducted.
- The course platform for registration are SWAYAM NPTEL, Agmooc and Coursera.

The Department/Centre/Office of the activity/event concerned will set the relevant parameters to measure the content of each given criterion depending on the need and application of the particular activity/event and will assess the performance of every student objectively.

Assessment of OEC (1 Credit: 50Marks)

Internal Evaluation

Internal Assessment	10Marks
Weekly Report Submission	10Marks

- Student should register and submit joining certificate/ registered authentic document to OEC coordinator.
- Students should submit weekly report on the basis of course.
- OEC coordinator will conduct their continuous assessment for all activities during semester.

External Evaluation

Certificate Submission	30Marks

Note: If the student unable to submit the OEC Certificate, for them there will be conduction of department (internal) examination, on the basis of open elective course syllabus submitted / selected by students.

MGM UNIVERSITY, AURANGABAD

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) progrmme

FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2021-22

M.Sc. Food Technology

SEMESTER-III

CURRICULUM

Detail Course Layout with course content

Course code*	Course Title	Type	Teaching Scheme			Evaluation Scheme						Minimum Passing						Credit
						Internal			External		Total	Internal			External		Total	
(Mandatory)			L	T	P	CA	MSE	TW	ESE	PR		CA	MSE	TW	ESE	PR		
MFT-231	Technology of milk and milk products	Theory	4			20	20		60		100	-	-	-	24	-	40	4
MFT-232	Bakery and Confectionery Technology	Theory	4			20	20		60		100	-	-	-	24	-	40	4
FTL-233	Bakery Technology Lab	Practical			8			40		60	100	-	-	16		24	40	4
FTL-234	Major Project	Practical			8			80		120	200	-	-	32		48	80	4
FTL-235	Seminar	Practical			2			40		60	100	-	-	16		24	40	2
FTL-236	Blended Course	Practical			2			40		60	100	-	-	16		24	40	2
	Total		8		20	40	40	200	120	300	700	0	0	80	48	120	280	20

L- Lecture, T-Tutorial, P-Practical, CA- Continuous Assessment, MSE- Mid Semester Examination, ESE- End Semester Examination, PR-Practical, TW-TermWork

TECHNOLOGY OF MILK AND MILK PRODUCTS

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-231
Course Unit Title: Technology of milk ar milk products
Credits allocated: 4+0
Level of Study: PG

Mode of delivery planned learning activities and teaching method: Lecture 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing Masters of Science,Year I/III Semester
Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form.

Candidate should pass in Under Graduate Life Sciences.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the - techniques and technologies of testing and processing of milk into various products and by products-Condensed milk, Cream, Ice cream, Cheese, Indigenous milk products etc.

OBJECTIVE

To acquaint with techniques and technologies of testing and processing of milk into various products and by products.

DETAILED SYLLABUS

THEORY

UNIT I - Milk and Composition of milk of various species.

Present status of milk & milk products in India and Abroad; market milk-Composition of milk of various species, quality evaluation and testing of milk, procurement, transportation and processing of market milk, cleaning & sanitization of dairy equipments. Special milks such as flavoured, sterilized, recombined & reconstituted toned & double toned.

UNIT II - Condensed Milk and Dried Milk

Introduction to Condensed milk- Definition, methods of manufacture, evaluation of condensed & evaporated milk; dried milk- Definition, methods of manufacture of skim & whole milk powder, instantiation, physiochemical properties, evaluation, defects in dried milk powder.

UNIT III - Cream and butter

Introduction to Cream- Definition, classification, composition, cream separation, sampling, neutralization, sterilization, pasteurization & cooling of cream, evaluation, defects in cream; Butter- Definition, composition, classification, methods of manufacture, theories of churning, evaluation, defects in butter.

UNIT IV - Ice cream – Composition and standards

Ice cream- Definition, composition and standards, nutritive value, classification, methods of manufacture, evaluation, defects in ice cream and technology aspects of softy manufacture.

UNIT V - Cheese -Composition and classification

Introduction to Cheese: Definition, composition, classification, methods of manufacture, cheddar, Gouda, cottage and processed cheese, evaluation, defects in cheese.

UNIT VI - Indigenous milk products - Present status and method

Introduction to Indigenous milk products - Present status, method of manufacture of yoghurt, dahi, khoa, burfi, kalakand, gulabjamun, rosogolla, srikhand, chhana, paneer, ghee, lassi etc; probiotic milk products.

Suggested readings/ Reference books/ Text books

1. Aneja RP, Mathur BN, Chandan RC & Banerjee AK. 2002. Technology of Indian Milk Products. Dairy India Publ.
2. De S.1980. Outlines of Dairy Technology. Oxford Univ. Press.
3. Henderson JL. 1971. Fluid Milk Industry. AVI Publ.
4. Rathore NS et al. 2008. Fundamentals of Dairy Technology,Theory& Practices. Himanshu Publ
5. Spreer E. 1993. Milk and Dairy Products. Marcel Dekker.
6. Walstra P. 1999. Dairy Technology. Marcel Dekker.
7. Walstra P. (Ed.). 2006. Dairy Science and Technology. 2 nd Ed.

8. Taylor & Francis. Web BH, Johnson AH &Lford JA. 1987. Fundamental of Dairy Chemistry. 3 rd Ed. AVI Publ.

Assessment Method

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

BAKERY AND CONFECTIONERY TECHNOLOGY

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFT-232
Course Unit Title: Bakery and Confectioner Technology
Credits allocated: 4+0 (Theory+0 Practical)
Level of Study: PG

Mode of delivery planned learning activities and teaching method: Lecture 4hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year II / Semester III

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form.

Candidate should pass in Under Graduate Life Sciences.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to:
A thorough explaining of the -Bakery and confectionary industry, Technology for the manufacture of bakery products, Quality characteristics of confectionery ingredients.

OBJECTIVE:

To impart basic and applied technology of baking and confectionary and acquaint with the manufacturing technology of bakery and confectionary,

products.

DETAILED SYLLABUS

THEORY

UNIT I - Bakery and confectionary industry

Introduction to Bakery and confectionary industry; raw materials and quality parameters; dough development; methods of dough mixing; dough chemistry; rheological testing of dough-Farinograph, Mixograph, Extensograph, Amylograph / Rapid Visco Analyzer, Falling number, Hosney's dough stickiness tester and interpretation of the data.

UNIT II - Technology for the manufacture of bakery products

Introduction to 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 product; quality consideration and parameters; Staling and losses in baking; machineries used in bakery industry.

UNIT III - Quality characteristics of confectionery ingredients

Introduction to Quality characteristics of confectionery ingredients; technology for manufacture of flour, fruit, milk, sugar, chocolate, and special confectionary products; colour, flavour and texture of confectionary; standards and regulations; machineries used in confectionery industry.

SUGGESTED READINGS/ REFERENCE BOOKS/ TEXT BOOKS

1. Dubey SC. 2002. Basic Baking. The Society of Indian Bakers, New Delhi.
2. Francis FJ. 2000. Wiley Encyclopedia of Food Science & Technology. John Wiley & Sons.
3. Manley D. 2000. Technology of Biscuits, Crackers & Cookies. 2 nd Ed. CRC Press.
4. Pyler EJ. Bakery Science & Technology. 3 rd Ed. Vols. I, II. Sosland Publ.
5. Qarooni J. 1996. Flat Bread Technology. Chapman & Hall.

Assessment Method

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

<table>
<tr><td colspan="5">Theory Assessment (Marks distribution): 100</td></tr>
<tr><td rowspan="2">Internal Assessment</td><td rowspan="2">MSE (Unit test)</td><td colspan="2">CA</td><td rowspan="2">Total Marks</td></tr>
<tr><td>Attendance record</td><td>Home Assignment</td></tr>
<tr><td></td><td>20</td><td>10</td><td>10</td><td>40</td></tr>
<tr><td colspan="4">External Assessment: Semester End Theory Examination</td><td>60</td></tr>
</table>

Total Marks	100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

BAKERY TECHNOLOGY LAB

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-233 **Course Unit Title:** Bakery Technology Lab

Credits allocated: 0+4 (4 Theory+0 Practical) **Level of Study: PG**

Mode of delivery planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester III

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1.Study of milk testing methods

2.Determination of fat content of milk

3.Determination of solid not fat content in milk

4.Adulteration test for milk and milk products.

5.Study of pasteurization of milk

6.Standardization of milk

7.Preparation Of ghee

8.Preparation of curd/Yogurt

9.Preparation of Chakka

10.Prearation of Shrikhand

11.Preparation of channa

12.Preparation of Channa based sweet (Rasgulla)

13.Preparation of ice cream

14.Preparation of khoa

15.Preparation of khoa based products

16.Preparation of candy bar

17.Study of coagulation milk

18.Prepartion of Coagulated milk product(Paneer)

19.study of specifc gravity of milk

20. determination of gluten content of wheat flour

21. determination of dough rising capacity.

22. Quality evaluation of biscuits,

23. Preparation of bread.

24. Study and production of invert sugar.

25. Preparation of toffee.

26. Preparation of caramel.

27. Study of fondant and fudge.

28. Preparation of pizza base.

29.Preparation of cheese.

30. Preparation of milk peda.

31. Preparation of doughnuts.

32. Preparation of biscuits.

Practical Assessment for 100 marks

Components(TW)	Record Book	Table Viva	Attendance	Total Marks
Internal Marks	10	10	20	40
External Assessment: Semester End Practical				60
Total Marks				100

- **Record book -**In ongoing academic semester the role of Record Book is to develop their writing skills & they have the data of practicals in it.

- **Table Viva**- Table Viva is important to build student confidence. How much students are clearer about their practical Knowledge

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	70	14
2.	80	16
3.	90	18
4.	100	20

- **Internal Practical Exam**: In ongoing academic semester the Internal Practical Exam are conducted to check their practical skills and techniques Usually in laboratory. They will be better placed to perform well in a practical exam if they can report their methodology and observations accurately.

MAJOR PROJECT

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-234
Course Unit Title: Major Project
Credits allocated: 0+4
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 6 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science,Year1/SemesterIII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.

2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

DETAILED SYLLABUS

Major Project External Assessment (Marks distribution):200

Idea of Project	**Understanding of Subject**	**Literature survey**	**Attendance**	**Total Marks**
20	20	20	20	80
External Assessment				120
Total Marks				200

Ideas of project:

Defining projects ideas is crucial for setting realistic expectations and laying out a clear vision for a project life cycle. Project-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey:

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

- **Attendance:**

In ongoing semester attendance are important for students. They are expected to do their project in the semester that is timetabled. The criteria of attendance are given below.

Sr.No.	Percentage of attendance	Marks
1.	70	14
2.	80	16
3.	90	18
4.	100	20

Project External Assessment (Marks distribution):120

External Assessment: Semester End Project Examination						
Components	Project Report	PowerPoint Presentation	Viva Voce	Innovativeness	Individual Contribution	Total
	20	20	20	40	20	120
Total marks						200

SEMINAR

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-235 **Course Unit Title:** Seminar

Credits allocated: 0+2 **Level of Study: PG**

Mode of delivery planned learning activities and teaching method: Practical 1 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester III

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Outcomes:

1. The purpose of a seminar is to create an experience of working together.

2. One of the main objectives of conducting seminars is to avoid a passive experience everyone should have a way to contribute and communicate and also stage daring Improves.

DETAILED SYLLABUS

1) The allotted faculty will notify about seminar conduction to the students of respective class.
2) The seminar topics will be listed by the students initially based on their topic of interest.
3) The seminar topics will be discussed with the faculty for finalizing the topic.
4) The finalized seminar topics will be displayed on the notice board with Director's approval.
5) The students will prepare the seminar topics; PPT and word file in allotted hours.
6) The final seminar presentation will be done by the students according t the exam date scheduled by the University,
7) Evaluation of the final seminar presentation and the word file will be done by the external examiner allotted by the University.

SEMINAR ASSESMENT (Marks distribution): 100

Seminar Topic	Understanding of Subject	Presentation	Attendance	Total Marks
10	10	10	10	40
External Assessment:				60
Total Marks				100

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below. (Equal weightage of percentage to marks is given)

Sr. No	Percentage of attendance	Marks
9.	70	7
10.	80	8
11.	90	9
12.	100	10

BLENDED COURSE

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-236
Course Unit Title: Blended Course
Credits allocated: 0+2
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 1 hrs / weekly

Recommended Year /Semester: Food Tech.& Processing– Master's Of Science,Year I / Semester III

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

DETAILED SYLLABUS

SOP for Blended Courses

- It is mandatory for post graduate students to undertake blended courses for concern credits before the completion of the degree.
- Students have the option of choosing any blended courses under the category of mandatory elective courses.
- Students are advised to finalize their choice of programs in consultation with their Blended course coordinator.
- The course facilitator/mentor will conduct the whole course in consultation with Blended course coordinator.
- For PG programs the blended are offered within the regular class hours.
- These courses generally earn concern credits consisting of 1 Credit- 4 week 2 Credit-8 weeks 3-4 Credit -12 weeks during the completion of semester.
- Students can view the complete details of the courses offered blended courses in their course layout.

- Evaluation pattern is the discretion of the faculty concerned for PG courses will be with only end semester examinations
- Examinations are conducted by the departments concerned and the results are indicated only in Grades in the marks card.
- Minimum pass percentage is 40% for courses under the mandatory category. Grades are awarded only if the student passes.
- These courses are conducted after or before the regular class hours and the courses offered are different in Odd and Even semesters.
- Minimum prescribed attendance for these courses is 85%. Medical and co-curricular claim will be considered only if the student put in 75% physical attendance or the classes.
- Attendance claim shall be submitted to blended course coordinator within 07 days after availing the leave.
- Students who fail to secure the minimum pass marks or required minimum attendance or who discontinue in between the course are required to register afresh. Re-registration is permitted only in the subsequent semester which may be for the same course or any other courses from the choices available during the particular semester.
- He / She submit course syllabus weekly report on the basis of that blended course co-ordinator conduct their continuous assessment.
- A student is not eligible to graduate without completing OEC mandatory course.
- The course platform for registration are SWAYAM NPTEL, Agmooc and Coursera.

The Department/Centre/Office of the activity/event concerned will set the relevant parameters to measure the content of each given criterion depending on the need and application of the particular activity/event and will assess the performance of every student objectively.

Assessment Method for blended course :

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100			
Internal	MSE	CA	Total Marks

Assessment	(Unit test)	Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	70	7

2.	80	8
3.	90	9
4.	100	10

MGM UNIVERSITY, AURANGABAD

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) progrmme

FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2021-22

M.Sc. Food Technology

SEMESTER-IV

CURRICULUM

Detail Course Layout with course content

Course code*	Course Title	Type	Teaching Scheme			Evaluation Scheme						Minimum Passing						Credit
						Internal			External		Total	Internal			External		Total	
(Mandatory)			L	T	P	CA	MSE	TW	ESE	PR		CA	MSE	TW	ESE	PR		
MFT-241	Ethics/ Biosafety/ IPR	Theory	4			20	20		60		100	-	-	-	24	-	40	4
FTL-242	Big Idea	Pracitcal			20			80		120	200	-	-	32		48	80	10
FTL-243	Blended Course	Pracitcal			2			40		60	100	-	-	16		24	40	2
	Total		**4**		**22**	**20**	**20**	**120**	**60**	**180**	**400**	**0**	**0**	**48**	**24**	**72**	**160**	**16**

L- Lecture, T-Tutorial, P-Practical, CA- Continuous Assessment, MSE- Mid Semester Examination, ESE- End Semester Examination, PR-Practical, TW-TermWork

ETHICS/ BIOSAFETY/ IPR

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: MFT-241 **Course Unit Title:** Ethics/ Biosafety/ IPR

Credits allocated: 4+0 **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Lecture 4 hrs weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester IV

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

Candidate should pass in Under Graduate Life Sciences.

Outcomes: On completion of the course, students are able to understand

Explain the introduction, guidelines patent rights and systems

1. Biosafety: Introduction – biosafety issues in biotechnology - historical background.

2. Biosafety Guidelines

3. Intellectual Property Rights: Introduction to IPR, Types of IP

4. Patents And Patent Laws: Objectives of the patent system

Objective: To discuss about various aspects of biosafety regulations, IPR and bioethic concerns arising from the commercialization of biotech products.

DETAILED SYLLABUS

THEORY

UNIT- I Biosafety

Introduction – biosafety issues in biotechnology - historical background. Biological Safety Cabinets, Primary Containment for Biohazards. Biosafety Levels - Levels of Specific Microorganisms, Infectious Agents and Infected Animals.

UNIT- II Biosafety Guidelines

Guidelines and regulations (National and International including Cartegana Protocol) – operation of biosafety guidelines and regulations of Government of India; Definition of GMOs & LMOs. Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture. Environmental release of =GMOs - Risk - Analysis, Assessment, management and communication.

UNIT- III Intellectual Property Rights:

Introduction to IPR, Types of IP - Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge and Geographical Indications. Importance of IPR – patentable and non patentables, patenting life, legal protection of Biotechnological inventions. Agreements and Treaties - History of GATT & TRIPS Agreement; Madrid Agreement; Hague Agreement; WIPO Treaties; Budapest Treaty; PCT; Indian Patent Act 1970 & recent amendments. IPR and WTO regime - Consumer protection and plant genetic resources.

UNIT- IV Patents And Patent Laws:

Objectives of the patent system - Basic, principles and general requirements of patent law. Biotechnological inventions and patent law - Legal development - Patentable subjects and protection in Biotechnology. Patent Filing Procedures - National & PCT filing procedure, Time frame and cost, Status of the patent applications, Precautions while patenting, disclosure/ nondisclosure, financial assistance for patenting, introduction to existing schemes. Patent licensing and agreement. Patent infringement - meaning, scope, litigation, case studies.

UNIT- V Bioethics:

Introduction to ethics and bioethics, framework for ethical decision making. Ethical, legal and socioeconomic aspects of gene therapy, germ line, somatic, embryonic and adult stem cell research. Ethical implications of GM crops, GMO’s, human genome project, human cloning, designer babies, biopiracy and biowarfare. Eugenics and its possible approaches. Animal right activities -Blue cross in India- society for prevention of cruelty against animals. Ethical limits of Animal use. Green peace - Human Rights and Responsibilities.

SUGGESTED READING/ REFERENCE BOOKS/ TEXT BOOKS :

1. Beier F.K, Crespi R.S and Straus T. Biotechnology and Patent protection, Oxford and IBH Publishing Co. New Delhi.

2. Jeffrey M. Gimble, Academia to Biotechnology, Elsevier Academic Press.

3. Rajmohan Joshi (Ed.). 2006. Biosafety and Bioethics. Isha Books, Delhi.

4. Sasson A, Biotechnologies and Development, UNESCO Publications.

5. Senthil Kumar Sadasivam and Mohammed Jaabir M. S. (2008). IPR, Biosafety and Biotechnology Management, Jasen Publications, India.

6. Singh BD. 2007. Biotechnology: Expanding Horizon. Kalyani.

7. http://patentoffice.nic.in,

8. www.wipo.org

9. www.dbtindia.nic.in

10. www.dbtbiosafety.nic.in

Assessment Method

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

<table>
<tr><td colspan="5">Theory Assessment (Marks distribution): 100</td></tr>
<tr><td rowspan="2">Internal Assessment</td><td rowspan="2">MSE (Unit test)</td><td colspan="2">CA</td><td rowspan="2">Total Marks</td></tr>
<tr><td>Attendance record</td><td>Home Assignment</td></tr>
<tr><td></td><td>20</td><td>10</td><td>10</td><td>40</td></tr>
<tr><td colspan="4">External Assessment: Semester End Theory Examination</td><td>60</td></tr>
<tr><td colspan="4">Total Marks</td><td>100</td></tr>
</table>

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	75-80	7-8
2.	80-90	8-9
3.	90-100	9-10

BIG IDEA

University: MGM University, Aurangabad
Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.
Degree: M.Sc. Food Technology(PG)
Course Unit Code: FTL-242
Course Unit Title: Big Idea
Credits allocated: 0+10
Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 6 hrs weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science, Year1/Semester IV

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

Candidate should pass in Under Graduate Life Sciences.

Objective: To elaborate the procedure for Guiding Student projects

Responsibility:
Director

Project Head

All the Project Guide.

All Semester PG Students

DETAILED SYLLABUS

Sr. no	Activities	Responsibility
1	UG students are to decide on their team members for their semester project with their proposed project domain and title.	B.Sc./ B.Tech./ M.S
2	Director shall allocate the Project Guide based on their area of expertise (not more than 3 batches to a Guide)	Director
3	Ensuring	
4	Verification of Student project log book.	Project Head and Project Guide.
5	Approval of PPT: Abstract, Existing, Proposed system. 30% of proposed work.80% of proposed work. 100% of proposed work.	Project Guide
6	Preparation and submission of progress report during project	Students, Project Head.
7	Preparing list for Redo students (Insufficient content, Plagiarism, poor presentation Genuine Absentees)	Project Heads
8	Submission of hard copy of Project report	Project Head
9	Ensuring that If a candidate fails to submit the project report on or before the specified deadline ,he/she is deemed to have failed in the Project Work and shall re-enroll for the same in a subsequent semester.	Project Head, Project Guide, Director

Project Assessment (200 Marks)

Idea of Project	Understanding of Subject	Literature survey	Attendance	Total Marks
20	20	20	20	80
External Assessment				120
Total Marks				200

Ideas of project:

Defining projects ideas is crucial for setting realistic expectations and laying out a clear vision for a project life cycle. Project-based learning not only provides opportunities for students to collaborate or drive their own learning, but it also teaches them skills such as problem solving, and helps to develop additional skills integral to their future, such as critical thinking and time management.

Literature survey:

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic.

- **Attendance:**

In ongoing semester attendance are important for students. They are expected to do their project in the semester that is timetabled. The criteria of attendance are given below.

Sr.No.	Percentage of attendance	Marks
1.	70	14
2.	80	16

3.	90	18
4.	100	20

Project External Assessment (Marks distribution):120

External Assessment: Semester End Project Examination						
Components	Project Report	PowerPoint Presentation	Viva Voce	Innovativeness	Individual Contribution	Total
	20	20	20	40	20	120
Total marks						200

BLENDED COURSE

University: MGM University, Aurangabad **Faculty:** Basic & Applied Science

Institute: Institute of Biosciences and Tech. **Degree: M.Sc.** Food Technology(PG)

Course Unit Code: FTL-243 **Course Unit Title:** Blended Course

Credits allocated: 0+2 **Level of Study: PG**

Mode of delivery, planned learning activities and teaching method: Practical 1 hrs / weekly

Recommended Year /Semester: Food Tech.& Processing– Master's Of Science,Year I / Semester IV

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

DETAILED SYLLABUS

SOP for Blended Courses

- It is mandatory for post graduate students to undertake blended courses for concern credits before the completion of the degree.
- Students have the option of choosing any blended courses under the category of mandatory elective courses.
- Students are advised to finalize their choice of programs in consultation with their Blended course coordinator.
- The course facilitator/mentor will conduct the whole course in consultation with Blended course coordinator.
- For PG programs the blended are offered within the regular class hours.
- These courses generally earn concern credits consisting of 1 Credit- 4 week 2 Credit-8 weeks 3-4 Credit -12 weeks during the completion of semester.
- Students can view the complete details of the courses offered blended courses in their course layout.

- Evaluation pattern is the discretion of the faculty concerned for PG courses will be with only end semester examinations
- Examinations are conducted by the departments concerned and the results are indicated only in Grades in the marks card.
- Minimum pass percentage is 40% for courses under the mandatory category. Grades are awarded only if the student passes.
- These courses are conducted after or before the regular class hours and the courses offered are different in Odd and Even semesters.
- Minimum prescribed attendance for these courses is 85%. Medical and co-curricular claim will be considered only if the student put in 75% physical attendance or the classes.
- Attendance claim shall be submitted to blended course coordinator within 07 days after availing the leave.
- Students who fail to secure the minimum pass marks or required minimum attendance or who discontinue in between the course are required to register afresh. Re-registration is permitted only in the subsequent semester which may be for the same course or any other courses from the choices available during the particular semester.
- He / She submit course syllabus weekly report on the basis of that blended course co-ordinator conduct their continuous assessment.
- A student is not eligible to graduate without completing OEC mandatory course.
- The course platform for registration are SWAYAM NPTEL, Agmooc and Coursera.

The Department/Centre/Office of the activity/event concerned will set the relevant parameters to measure the content of each given criterion depending on the need and application of the particular activity/event and will assess the performance of every student objectively.

Assessment Method

Course Evaluation /Weightage: The relative weightage to the various examinations conducted, Unit test, Quiz, Home Assignment, Seminar and record maintained during a semester shall be as under both for Bachelors degree programmers.

Theory Assessment (Marks distribution): 100				
Internal Assessment	MSE (Unit test)	CA		Total Marks
		Attendance record	Home Assignment	
	20	10	10	40
External Assessment: Semester End Theory Examination				60
Total Marks				100

Internal Assessment (Marks conduction): 40

I. Unit Test Conduction:

In ongoing academic semester unit test are conducted to analyze students whether they are gaining theoretical knowledge, and also to keep them engaged in concerned subject continuously so as to better understand the subject develop interest in it.

No. of unit test	Total Marks
1	20

- Short Notes (any 3) out of 4 Marks-15
- 5 MCQs Marks-5

II. Home Assignment Conduction:

In ongoing academic semester home assignment are conducted to develop further in subject, more interest in subject and also to improve students writing skills necessary for scientific communication.

No. of Home Assignment	Total Marks
2	10

- **Attendance –** In ongoing semester attendance are important for students. They are expected to attend all sessions in the semester that are timetabled (practical, lectures, seminars). The criteria of attendance are given below.

Sr. No	Percentage of attendance	Marks
1.	70	7
2.	80	8
3.	90	9
4.	100	10