DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/B.Sc./CBC & GS/17/2024

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted the following Syllabi under the Faculty of Science & Technology as per Choice Based Credit Grading System** as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc. Chemistry (Optional)	Vth & VIth semester
2.	B.Sc. Analytical Chemistry (Optional)	Vth & VIth semester
3.	B.Sc. Polymer Chemistry (Optional)	Vth & VIth semester
4.	B.Sc.Biochemistry (Optional)	Vth & VIth semester
5.	B.Sc.Dairy Science & Technology (Optional)	Vth & VIth semester
6.	B.Sc.Microbiology (Optional)	Vth & VIth semester
7.	B.Sc. Botany (Optional)	Vth & VIth semester
8.	B.Sc. Computer Science (Optional)	Vth & VIth semester
9.	B.Sc. Computer Science (Degree)	Vth & VIth semester
10.	B.Sc.Information Technology (Optional)	Vth & VIth semester
11.	B.Sc.Information Technology (Degree)	Vth & VIth semester
12.	Bachelor of Computer Application (Optional)	Vth & VIth semester
13.	Bachelor of Computer Application (Degree)	Vth & VIth semester

This is effective from the Academic Year 2024-25 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajinagar.
-431 004.
REF.No.SU/2024/ 1786-94
Date:- 21.06.2024.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] **The Director, Board of Examinations & Evaluation,** Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBAJINAGAR.

Faculty of Science & Technology

B.Sc. Third Year Semester V & VI

(CBCS)

Course Structure and Curriculum

Subject: Dairy Science & Technology

Semester No.	Paper No.	Course Code	Title of Paper	Theory	Internal assessment	Total Marks	Min Marks
		B.Sc. First Year					
I	I	DST-111	Dairy Farm Management	(40)	10	(50)	20
	II	DST-112	Dairy Chemistry & Microbiology	(40)	10	(50)	20
	III	DST-121	Lab course I (based on DST-111 & DST-112)			(50)	20
			Total			150	60
II	IV	DST-211	Animal Nutrition & Feed Processing	(40)	10	(50)	20
	V	DST-212	Dairy Processing & Engineering	(40)	10	(50)	20
	VI	DST-221	Lab course II (based on DST-211 & DST-212)			50	20
			Total			150	60
		B.Sc. Second Year					
III	VII	DST-311	Animal Reproduction & Artificial Insemination	(40)	10	(50)	20
	VIII	DST-312	Traditional Indian Dairy Products	(40)	10	(50)	20
	IX	DST-321	Lab course 3 (based on DST-311)			50	20
	X	DST-322	Lab course 4 (based on DST-312)			50	20
	SEC	DST-313	SEC-1 Any one skill to be chosen out of two: SEC-1 (A) Artificial Insemination Technology SEC-2 (D) Paneer Technology	40	10	50	20
			Total			250	100
IV	XI	DST-411	Genetics and Animal Breeding	(40)	10	(50)	20
	XII	DST-412	Ice-cream and Fat rich dairy products	(40)	10	(50)	20
	XIII	DST-421	Lab course 5 (based on DST-411)			50	20
	XIV	DST-422	Lab course 6 (based on DST-412)			50	20
	SEC	DST-413	SEC-2 Any one skill to be chosen out of two: SEC-2 (C) Techniques of Animal Breeding SEC-2 (D) Ice Cream Technology	40	10	50	20
			Total			250	100
		B.Sc. Third Year					
V	XV	DST-511	Cheese and Fermented milk products	(40)	10	(50)	20
	XVI	DST-512	Dairy by-products and Packaging Technology	(40)	10	(50)	20
	XVII	DST-521	Lab course 7 (based on DST-511)			50	20
	XVIII	DST-522	Lab course 8 (based on DST-512)			50	20
	SEC	DST-513	SEC-3 Any one skill to be chosen out of two: SEC-3 (E) Fermented Dairy Products Technology	40	10	50	20

			Entrepreneurship in Dairying				
	XXXI	DST-621	Lab course I (based on DST-611)			**50**	**20**
	XXXII	DST-622	Lab course I (based on DST-612)			**50**	**20**
	SEC	DST-613	SEC-4 Any one skill to be chosen out of two: SEC-4 (G) Milk Powder Technology SEC-4 (H) Dairy Entreprenuership	**40**	**10**	**50**	**20**
			Total			**250**	**100**
Internal Assessment: Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student							

B.Sc. Third Year Semester V (CBCS)

Paper DST 511 Cheese and Fermented Milk Products

Total Credits : 02 **Total Periods : 45** **Marks: 50**

Learning objectives:

1. To understand the concept of cheese making.
2. To describe the process of cheese manufacture.
3. To understand different fermented milk products.

Learning outcomes:

1. Able to describe cheese making
2. Describe process of making cheese
3. Able to manufacture different fermented milk products

Unit I : Starter Culture **10**

1.Introduction to subject.

2.Study of starter culture: Definition, types, factors affecting quality of starter and starter defects.

Unit II : Cheese Making **15**

1.History, status, scope in dairy industry.

2.Classification and methods of manufacturing of variety of cheeses.

Cheddar Cheese, Gouda cheese, Mozzarella cheese,Pizza cheese, cottage cheese and processed cheese.

3.Defects in cheese, causes and prevention.

Unit III :Fermented Milk products I: **05**

Dahi, Chakka and Srikhand.

Unit IV :Fermented Milk products II: **10**

1.Yoghurt, Lassi and cultured Butter milk

2.Acidophilus milk, Kefir, Kumiss,Leben and Bulgarian milk.

Unit –V Tutorial Seminar and Assignment **05**

Lab Course Based on DST 511

1. Study of cheese making equipment.
2. Manufacturing of Cheese
3. Preparation of Dahi,
4. Preparation of Chakka
5. Preparation of Srikhand
6. Preparation of Lassi
7. Preparation of Acidophilus Milk

Books Recommended

1. Fundamentals of cheese science by P,F.Fox.,T.P.Guinne,T.M.Cogan and L.P.H. Mcsweeney
2. Microbiology and biochemistry of cheese and permitted milk irritate by B.A.Low
3. Chemistry and fermented milk foods by Frank Kosikowski
4. Outlines of Dairy Technology by S.K. De
5. Recent Trends in Dairy & Food Processing, Ed. A.S. Khojare, Paithani Prakashan, Aurangabad
6. Milk and dairy products technology by Edgar Spreer
7. Technology of Indian Milk Products by R.P.Aneja, B.N.Mathur, R.C.Chandan&A.K.Banergy
8. Dairy Microbiology by K.C.Mahanta
9. Dairy bacteriology by Hammer
10. Handbook of Dairy Processing by M/S Alfa Lavel

B.Sc. Third Tear Semester V (CBCS) Paper DST 512

Dairy By- products and Packaging Technology

Total Credits: 02 **Marks : 50** **Total Periods : 45**

Learning objectives:

1. To understand the types of dairy byproducts.
2. To learn about manufacture of different by products
3. To describe different of packaging material
4. To learn forms of packaging materials

Learning outcomes:

1. Able to understand the types of dairy byproducts
2. Able to manufacture of different by products
3. Able describe different of packaging material
4. Able to understand the forms of packaging materials

Unit I : **10**

-Status, scope and utilization of dairy by- products in India

-Whey processing, beverages of whey and dried milk

- Butter milk processing, condensed butter milk & dried butter milk

Unit II : **10**

- Casein : Industrial and food grade casein,uses

- Lactose: types , manufacturing methods, uses

Unit III: **10**

Importance of packaging, definition and functions of packaging.

Materials of packaging: paper and paper based products, glass, plates aluminum foils, timber plastic laminates.

Forms of packaging: Bottle, cartoon, pouch, sachet, can, box, tub, barrel, cup ...etc.

Packaging Techniques: Vacuum packaging, Modified atmosphere packaging, Aseptic packaging, edible packaging

Unit IV : **10**

Packaging machines: Tin can filling machine, Seaming machine, FFS machine

Coding and labeling of food packages,Disposal of waste package materials.

Unit –V Tutorial Seminar and Assignment **05**

Lab Course

1. Preparation of whey beverages.
2. Preparation of buttermilk
3. Preparation of casein.
4. Preparation of lactose.
5. Identification of different packaging material
6. Testing of plastic and laminates
7. Labeling of package

Books Recommended

1. Outlines of Dairy Technology by Sukumar De
2. Technology of Indian Milk products, Aneja RP, Mathur BN, Chandan RC & Banerjee AK, A Dairy India Publication
3. Dairy India Year book 2007
4. Utilization of byproducts from dairy industry by Sheetal Handu
5. Food Packaging, principles and practices by Gorden L. Robertson, Routledge

B.Sc. Third Tear Semester VI (CBCS)

Paper DST 611

Condensed and Dried Milks

Total Credits : 02 **Marks : 50** **Total Periods : 45**

Learning objectives:;

1. To understand concept of condensed milk.
2. To understand concept of dried milk.
3. To understand process of manufacturing of condensed milk.
4. To understand process of manufacturing of dried milk.

Learning outcomes:

1. Able to understand the concept of condensed milk
2. Understand concept of dried milk.
3. Able to manufacture condensed milk.
4. Able to manufacture dried milk.

Unit I : Condensed Milk **15**

1. History,status ,scope and types
2. Physico-chemical changes taking place during manufacturing of condensed milk.
3. Heat stability of milk and condensed milk.
4. Defects in condensed milk their causes and prevention.

Unit II :Dried Milk **15**

1. History and status of dried milk.
2. Type and composition of dried milks.
3. SMP and WMP Manufacturing.
4. Defects their causes and prevention.

Unit III: Study of infant food, malted food and dairy whitener **10**

1. Study of infant food,
2. Malted food
3. Dairy Whitener.

Unit –IV Tutorial Seminar and Assignment **05**

Lab Course

1. Study of vacuum pan.
2. Determination of heat stability of milk.
3. Manufacturing of condensed milk
4. Manufacturing of evaporated milk
5. Study of drum drying process
6. Study of spray drying process
7. Manufacturing of skim milk powder
8. Manufacturing of whole milk powder

Books Recommended:

1.Outlines of Dairy Technology by Sukumar De

2.Dairy Processing by Earl

3.Dairy India yearbook by P.R.Gupta

4.Recent trends I dairy technology and food processing by A.S.Khojare

B.Sc. Third Tear Semester VI (CBCS)

Paper DST 612

Quality Assurance and Entrepreneurship in Dairying

Total Credits : 02 Marks : 50 **Total Periods : 45**

Learning objectives:

1. To learn basic concepts of quality assurance
2. To learn the quality management systems
3. To learn basic concepts of dairy entrepreneurship
4. To learn the entrepreneurial qualities

Learning outcomes:

1. Understand the concepts of quality assurance
2. Describe the quality management systems
3. Understand the basic concepts of dairy entrepreneurship
4. Inculcate the entrepreneurial qualities

Unit I: Quality assurance **10**

1. Importance of quality assurance & food safety
2. Food acts laws and standards,
3. Food safety and hygiene
4. Cleaning and disinfection

Unit II: Food safety systems **10**

1. ISO:22000
2. HACCP
3. TQM
4. GMP

Unit III: Entrepreneurship Development **20**

1. Concept of entrepreneurship
2. Entrepreneurial and managerial characteristics
3. Milk procurement, Processing and manufacturing systems
4. Pricing and marketing of milk and milk products
5. Survey of milk production potential and marketing

Unit –V Tutorial Seminar and Assignment **05**

Lab Course

1. Identification of CCP in dairy plant
2. Preparation of samples and labeling for analysis
3. CIP of pasteurizer
4. Documentation and record keeping
5. The SWOT analysis for dairy entrepreneur
6. Preparation of small dairy project proposal
7. Preparation of questionnaire for market survey
8. Visit to dairy industry.

Books Recommended:

1. Dairy Processing and quality assurance by Dr. Saurav Singh
2. Dairy Technology : Dairy product and quality assurance by Shiashraya Singh
3. Entrepreneurship Development & Industrial Consultancy, A.K. Makwana & A.K. Chauhan, ICAR ecourse for Dairy & Food Technology
4. A handbook for dairy entrepreneurs by Pranav Kumar, Amardeep Singh and Devesh Thakur
5. EDI study material, EDI, BHAT, Ahmedabad, Website : http://www.ediindia.org

SKILL ENHANCEMENT COURSES

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice based credit system (CBCS) semester pattern

B.Sc. Third Year: Sem V

Dairy science and Technology

Skill Enhancement Course (SEC) DST-513, SEC-3 (E)

Fermented Dairy Products Technology

Total Credits: 02 **Total Periods: 45**

Marks: 50

Unit-1: Introduction

1) Starter culture

1) Desirable characteristics of starter culture

Unit 2: Fermented Milk products I:

1)Dahi,

2) Chakka

3)Srikhand.

Unit 3: Fermented Milk products II:

1) Yoghurt

2) Lassi

3) Cultured Butter milk

4) Acidophilus milk ,

5) Kefir,

6) Kumiss,

7) Leben

8) Bulgarian milk.

Practicals :

1) Manufacturing of Dahi,

2) Manufacturing of Chakka

3) Manufacturing of Srikhand

4) Manufacturing of Lassi

5) Manufacturing of Cultured Butter milk

6) Acidophilus milk

7) Visit to dairy industry

Dr Babasaheb Ambedkar Marathwada University, Aurangabad

Choice based credit system (CBCS) semester pattern

B.Sc.Third Year: Sem V

Dairy science and Technology

Skill Enhancement Course (SEC) DST-513, SEC-3 (F)

Dairy By products Technology

Credits: 02 **Total Periods: 45** **Marks: 50**

Unit-1: Introduction

1) Status of dairy by- products in India,

2) Scopeof dairy by- products in India

3) Utilization of dairy by- products in India

Unit-2: Properties of skim milk, whey and butter milk

1) Physico chemical characteristic of skim milk

2) Physico chemical characteristic of whey

3) Physico chemical characteristic of butter milk

Unit-3: Casein and Processing of Skim Milk, Whey and butter milk

1) Skim milk processing

2) Butter milk processing

4) Whey processing,

4) Casein: Industrial and food grade casein

Practicals:

1) Preparation of Skim milk
2) Preparation of whey
3) Preparation of butter milk
4) Preparation of acid casein
5) Preparation of food grade casein
6) Visit to dairy products manufacturing industry

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Dr Babasaheb Ambedkar Marathwada University, Aurangabad

Choice based credit system (CBCS) semester pattern

B.Sc.Third Year: Sem VI

Dairy science and Technology

Skill Enhancement Course (SEC) DST-613, SEC-4 (G)

Milk Powder Technology

Total Credits: 02 **Total Periods: 45**

Marks: 50

Unit-1: Introduction

1) Objects of production
2) Development in WMP and SMP technology
3) Definition and Indian standards
4) Composition
5) Food and nutritive value
6) Role of milk constituents

Unit 2: Methods of production

1) Drying milk by cold treatment : Process, Principle and Flow diagram
2) Drum drying/film/roller drying : Process, Principle and Flow diagram
3) Spray drying : Process, Principle and Flow diagram

Unit 3: SMP and WMP

1) Manufacturing of WMP and SMP by drum drying
2) Manufacturing of WMP and SMP by Spray drying
3) Instantization
4) Packaging

5) Storage

6) Yield

7) Defects in WMP and SMP

8) Uses

Practicals :

1) Preparation of WMP by drum drying process

2) Preparation of SMP by drum drying process

3) Preparation of WMP by spray drying process

4) Preparation of SMP by spray drying process

5) Packaging of WMP

6) Packaging of SMP

7) Visit to dairy industry /powder plant

Dr Babasaheb Ambedkar Marathwada University, Aurangabad

Choice based credit system (CBCS) semester pattern

B.Sc.Third Year: Sem VI

Dairy Science and Technology

Skill Enhancement Course (SEC) DST-613, SEC-4 (H)

Dairy Entrepreneurship

Total Credits: 02 **Total Periods: 45**

Marks: 50

Unit-1: Introduction

1) Need of entrepreneurship

2) Types of Dairy Entrepreneurships

2) Entrepreneurial skills

Unit 2: Dairy Processing

1) Starting with milk procurement and chilling
2) Processing of milk
3) Milk products manufacturing
4) Milk and milk products storage

Unit 3: Pricing and marketing

1) Importance of market survey

2) Pricing of milk and milk products

3) 3) Packaging and labeling of milk

4) Marketing of milk and milk products

Practicals :

6. The SWOT analysis for dairy entrepreneur
7. Analysis of entrepreneurial traits
8. Preparation of flow chart for milk collection center
9. Preparation of questionnaire for market survey
10. Preparation of small dairy project proposal
11. Cost and feasibility analysis of dairy proposal
12. Visit to dairy industry.

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