

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU./B.Sc.CBC & GS/11/2022

It is hereby inform to all concerned that, on the recommendation of Faculty of Science & Technology Meeting dated 24.08.2022, **the Academic Council at its meeting held on 29 August 2022 has accepted the following Syllabi of B.Sc. Degree under the Choice Based Credit & Grading System along with Rules and Regulation** as appended herewith:-

1.	B.Sc.Computer Science (Optional)	Ist and IInd semester
2.	B.Sc.Computer Application (Optional)	Ist and IInd semester
3.	B.Sc.Computer Application (Degree)	Ist and IInd semester
4.	B.Sc.Computer Science (Degree)	Ist and IInd semester
5.	B.Sc.Horticulture (Optional)	Ist to VIth semester
6.	B.Sc.Botany (Optional)	Ist to VIth semester
7.	B.Sc. Agrochemical & fertilizer (Optional)	Ist to VIth semester
8.	B.Sc.Home Science (Optional)	Ist and IInd semester
9.	B.Sc.Automobile Technology (Degree)	Ist and IInd semester
10.	B.Sc.Workshop Technology (Degree)	Ist and IInd semester
11.	B.Sc.Refrigeration and Air Conditioning (Degree)	Ist and IInd semester
12.	B.Sc.Environmental Science (Optional)	Ist and IInd semester
13.	B.Sc.Biotechnology (Degree)	Ist and IInd semester
14.	B.Sc.Biotechnology (Optional)	Ist and IInd semester
15.	B.Sc.Dairy Sci.& Tech (Optional)	Ist and IInd semester
16.	B.Sc.Zoology (Optional)	Ist to VIth semester
17.	B.Sc.Polymer Chemistry (Optional)	Ist and IInd semester
18.	B.Sc.Fisheries Science (Optional)	Ist and IInd semester
19.	B.Sc.Instrumentation Practice (Optional)	Ist semester
20.	B.Sc.Biochemistry (Optional)	Ist and IInd semester
21.	B.Sc.Non Conventional & Conventional Energy (Degree)	Ist and IInd semester

This is effective from the Academic Year 2022-23 and onwards.

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

University Campus,
Aurangabad-431 004.
Ref.No. SU/B.Sc./2022/ 8428-35
Date:-29.08.2022.

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[Signature]
**Deputy Registrar,
Academic Section**

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Copy forwarded with compliments to :-

- 1] **The Principal, concerned affiliated College,**
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 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,
- 2] The Section Officer, [B.Sc. Unit] Examination Branch,
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The In-charge, [E-Suvidha Kendra],
Rajarshi Shahu Maharaj Examination Branch,
- 6] The Public Relation Officer,
- 7] The Record Keeper,

**Dr. Babasaheb Ambedkar Marathwada University
Aurangabad – 431 517 (MS) India**



Undergraduate Bachelor Degree Program in Science

(B. Sc. First Year)

Semester- I and II

Dairy Science and Technology

(Optional Subject)

Course Structure and Curriculum

(Outcome based Curriculum)

Choice Based Credit System

(Effective from Academic Year 2022-23)


19/08/22
Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

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1. Preamble

Dairy Science and Technology plays an important role in India's agriculture based economy. The rapid expansion of dairy industry in India has created huge demand of skilled professionals in this field. Student pursuing the course in the field of dairy science and technology have a lot of scope and career opportunities in the field of industry and research equally.

Introduction: India has the world's highest dairy herd with over 300 million bovines, producing over 187 million tonnes of milk. India is first among all countries in both in production and consumption of milk. Keeping this view in the world of globalization the education in the sector of dairy science and technology is playing a significant role in creation of employment for youth in various ways and will also provide skilled human resources for the development of nation. The barriers among the academic fields seem to have dissolved. However, the disparities in the field of curriculum aspect, evaluation and mobility exist. With the changing scenario at local and

global level, the syllabus restructuring should keep pace with developments in the education sector. Choice Based Credit System (CBCS) is being adopted and implemented to address the issues related to traditional system and it also aims to maintain the best of earlier curriculum. The student is at the centre of CBCS. The present curriculum focuses on students' needs, skill development, interdisciplinary approach to learning and enhancing employability. Dairy Science and Technology curricula are offered at two levels viz. undergraduate and postgraduate. The undergraduate curricula are prepared to impart basic knowledge of the respective subject from all possible angles. In addition, students of dairy science and technology can find jobs in both public and private sectors such as Dairy plant, Ice cream manufacturing plants, Cheese making factory, dairy farms...etc. Syllabus also prepare students for starting entrepreneurship in dairy processing and Dairy farming.

Objectives to be achieved:

- To enrich students' knowledge and train them in the field of dairy science and technology
- To introduce the concepts of application and research in breeding, feeding and management
- To inculcate sense of scientific responsibilities and social and environment awareness
- To help students for entrepreneurship in dairying.

Course Structure:

- For First year: Student has to select 4 different subjects among the subjects offered by the College /Institute.
- For Second year: Student has to select 3 different subjects among 4 subjects chosen in first year.
- For Third year: Student has to select only 1 subject among the 3 subjects opted in second year
- CGPA will be calculated based on core 132 credits only
- Each theory credit is equivalent to 15 clock hours of teaching (12hrs classroom+3hrs of tutorials-active learning method) and each practical credit is equivalent to 30 clock hours of teaching in a semester.
- For the purpose of computation of workload, the following mechanism may be adopted as per UGC guidelines: i) 1 Credit = 1 Theory period of one-hour duration per week ii) 1 Credit = 1 Tutorial period of one-hour duration per week iii) 1 Credit = 1 Practical period of two-hour duration per week
- Each theory Lecture time for FY, SY, TY is of 1 hour = 50 min
- Each practical session time for FY is of 3 hour 15 min = 195 min

- Each practical session time for SY & TY is of 4 hour 20 min = 260 min

Program Educational Objectives (PEOS), Program Outcomes (POS) & Program Specific Outcomes B.Sc. (Dairy Science & Technology)

Vision

- To become centre of excellence for Teaching, Research and Extension in Dairy Science & Technology

Mission

- To deliver hands on knowledge & skills in dairy science and technology
- To create employability in students
- To impart entrepreneurial skills in dairy science and technology

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: To impart fundamental knowledge of the subject

PEO 2: To emphasize on hands on training

PEO 3: To develop entrepreneurship skills

PEO 4: To apply the subject knowledge in real field

PROGRAM OUTCOMES (POS)

PO 1: Understanding fundamentals concepts of Dairy Science & Technology

PO 2: Inculcation of hands on skills

PO 3: Enhancement of entrepreneurial skills

PO 4: Enlightening modern and novel approach in dairying

PROGRAM SPECIFIC OUTCOMES (PSOS)

PSO 1: Apply the fundamental knowledge in Dairy Science & Technology

PSO 2: Able to develop hands on skills in Dairy Science & Technology

PSO 3: Able to apply the basic knowledge of chemistry, microbiology, technology and engineering to Dairying

PSO 4: Harness the opportunities to participate in dairy start-ups

Eligibility for Admission:

First Year B.Sc.: a. Higher Secondary School Certificate (10+2) or its equivalent Examination with English and Biology; and two of the science subjects such as Physics, Chemistry, Mathematics, Geography, Geology, etc.

OR

b. Three Years Diploma in Pharmacy Course of Board of Technical Education conducted by Government of Maharashtra or its equivalent.

OR

c. Higher Secondary School Certificate (10+2) Examination with English and vocational subject of + 2 level (MCVC) –Agricultural / Paramedical group

Admissions will be given as per the selection procedure / policies adopted by the respective college keeping in accordance with conditions laid down by the University.

Duration: The duration of course will be six semesters (three years).

Medium of Instruction: Medium of instruction will be in English.

Attendance:

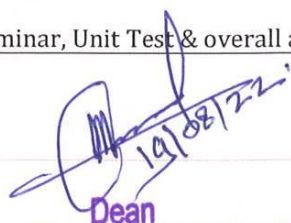
1 A student attending at least 75% of the total number of classes* held shall be allowed to appear at the concerned Semester Examinations subject to fulfilment of other conditions laid down in the regulations.

2. A student attending less than 60% of the total number of classes* held shall not be allowed to appear at the concerned Semester Examinations and he /she has to pursue admission to the same Semester in the very next year for attending the classes and appearing at the said Semester Examination.

*Such attendance will be calculated from the date of commencement of classes or the date of admission, whichever is later.

Choice Based Credit System Curriculum For Dairy Science and 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
			Total			200	80
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
			Total			200	80
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
			Total			200	80
VI	XIX	DST-611	Condensed and Dried Milks	(40)	10	(50)	20
	XX	DST-612	Quality Assurance and Entrepreneurship in Dairying	(40)	10	(50)	20
	XXXI	DST-621	Lab course I (based on DST-611)			50	20
	XXXII	DST-622	Lab course I (based on DST-612)			50	20
			Total			200	80
Internal Assessment:							
Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student							


 19/08/22
 Dean

Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada
 University, Aurangabad

Course structure of B.Sc. I
(Dairy Science & Technology optional subject)
(Choice Based Credit System)

Semester I (Core Courses and Skill Enhancement Courses)				
Course	Course Title	Teaching time/week	Marks	Credits
DST-111	Dairy Farm Management	2 hours	50(40+10)	2
DST-112	Dairy Chemistry & Microbiology	2hours	50(40+10)	2
DST-121	Lab course I (based on DST-111 & DST-112)	3 hours	50	1.5

Total credits for Semester I : 6 (Theory : 4 ; Laboratory : 2)

Semester II (Core Courses and Skill Enhancement courses)				
DST-211	Animal Nutrition & Feed Processing	2 hours	50 (40+10)	2
DST-212	Dairy Processing & Engineering	2 hours	50 (40+10)	2
DST-221	Lab course-2 (based on DST-211 & DST-212)	3 hours	50	1.5

Total credits for Semester II: 6 (Theory: 4 ; Laboratory : 2)

B.Sc. First Year Semester – I
Paper -DST-111. Dairy Farm Management

Total Credits : 02

Marks : 50

Total Periods : 45

Learning Objectives of the course:

1. To introduce students with role of livestock in national economy.
2. To understand the general management practices in dairy farming.
3. To enable students to understand the cattle & buffalo , sheep & goat and poultry management.
4. To introduce diseases and health care practices of domestic animals.

Learning outcomes of the course :

1. Describe the role of livestock in national economy.
2. Apply the general management practices in dairy farming.
3. Describe the cattle and buffalo management practices.
4. Describe the sheep and goat management practices.
5. Apply the management practices in poultry.
6. Describe the diseases and health care practices of domestic animals.

Unit:I management

(07)

- i) Role of livestock in national economy
- ii) **Management** ; definition, principles, tools and function of management.
- iii) **General management practices in dairy farming** ; Grooming, drying-off, castration, dehorning, identification marks, control of bad habits, removing extra teats etc.

Unit: II Cattle and Buffalo management (08)

- i) Housing of cattle and buffaloes
- ii) Calf management
- iii) Heifer management
- iv) Care and management of pregnant & lactating cows and buffaloes, cross breed cows and breeding bulls.

Unit: III sheep and goat management

(07)

1. Housing of sheep and goat.
2. General management practices of sheep and goat.

Unit:IV Poultry management

(08)

1. Housing of poultry.
2. General management practices poultry.

Unit : V Animal health and diseases.

(10)

1. Classification of diseases.
2. Study of major diseases; FMD, RP, BQ, H.S, and Anthrax.
3. Brucellosis, Babesiosis, Theileriosis.
4. Pneumonia, calf score, diarrhoea.
5. Ranikhet, coccidiosis, fowl pox, Gumboro, Parasites of poultry.
6. First aid measures.
7. Disposal of carcasses.

Unit : VI Tutorials, Seminars and Assignments

(05)

B.Sc. First Year (CBCS)
Paper –DST-112-Dairy Chemistry & Microbiology

Total Credits : 02

Marks : 50

Total Periods : 45

Learning Objectives of the course:

1. To introduce students with the chronology of dairy development in India.
2. To understand the structure of milk and its chemical constituents.
3. To understand various desirable and undesirable micro-organisms found in milk.

Learning outcomes of the course :

1. Identify the chronology of dairy development in India.
2. Describe the chemical constituents of milk.
3. Classify the desirable and undesirable micro-organisms found in milk.
4. Explain the legal standards for milk.

Unit- I: Dairy development in India

(08)

1. Military dairy farm
2. NDRI
3. Dairy co-operatives
4. NDDB
5. Operation flood programme

Unit II: Dairy Chemistry

(15)

1. Synthesis of milk constituents.
2. Definition and composition of milk.
3. Major & Minor constituents of milk.
4. Factors affecting quality and quantity of milk.
5. Physic-chemical properties of milk.
6. Nutritive value of milk.

Unit -III Microbiology of milk (10)

1. Definition and classification of micro organisms.
2. Reproduction and growth of micro organisms.
3. Common micro organisms found in milk.
4. Fermentation of milk – desirable and undesirable.
5. Clean milk production, sources of contamination.
6. Milk borne diseases.

Unit IV – Legal standards for milk

(07)

1. Legal standards- FSSAI, PFA, BIS, IDF.
2. Adulteration of milk.

Unit V –Tutorials, Seminars and Assignments

(05)

**B.Sc. First Year
Dairy Science & Technology
Lab Course 1 DST -121**

Marks : 50

Credits : 1.5

1. Morphology of cattle and buffalo.
2. Study of cattle breeds ; milch, draught, dual, exotic and cross breeds.
3. Study of buffalo breeds.
4. Study of goat breeds.
5. Study of sheep breeds.
6. Study of poultry breeds.
7. Determination of age of animal.
8. Identification of healthy and sick animal.
9. Recording temperature, pulse and respiration rate of farm animal.
10. Preparation of antiseptic ointments and astringents.
11. Preparation of vaccination schedule.
12. Platform tests for raw milk.
13. Determination of density and specific gravity of milk.
14. Determination of fats/SNF/TS.
15. Determination of acidity of milk.
16. Staining of bacteria.
17. Detection of adulterants in milk.

B.Sc. First Year Semester – II

Paper -DST-211. Animal Nutrition & Feed Processing

Total Credits : 02

Marks : 50

Total Periods : 45

Learning Objectives of the course:

1. To introduce students with different feedstuffs used in animal nutrition.
2. To understand the role of different nutrients in animal nutrition.
3. To understand conservation of green fodder as silage and hay.
4. To understand Agro industrial by products and unconventional feeds used in animal nutrition
5. To study methods of preparation of concentrate mixture, mineral mixture. Calf starter and milk replacer.

Learning outcomes of the course :

1. Describe the different feedstuffs used in animal nutrition.
2. Describe the role of different nutrients in farm animal feeding.
3. Describe conservation of green fodder as silage and hay.
4. Explain agro industrial by products and unconventional feeds used in animal nutrition.
5. Classify the different concentrate feeds

Unit- I : Animal Nutrition

(06)

1. Terminologies used in animal nutrition.
2. Importance of nutrients.
3. Classification of feeds and fodders.
4. Digestive system of ruminants.
5. Study of rumen microbiology.

Unit II : Nutrients for animal growth

(20)

1. **Water:** sources, requirements, water losses and function of water in animal body.
2. **Carbohydrates** : Defination, classification, importance and digestion and metabolism in ruminants.
3. **Proteins** : Defination, classification, importance and digestion in ruminants.
4. **Lipids** : Defination, classification, importance and digestion in ruminants.
5. **Minerals** : Defination, types and importance in animal nutrition.
6. **Vitamins** : Defination, classification and importance in animal nutrition.
7. Probiotics, antibiotics, hormones and other growth stimulating substances.

Unit - III : Roughages and concentrates

(08)

1. Nutritional characteristics of roughages and concentrates.
2. Conservation of green fodders as silage and hay.
3. Processing of inferior quality roughages.
4. Nutritional characteristics of agro industrial byproduct and unconventional feeds.
5. Urea molasses mineral blocks.
6. Energy value of feed stuffs.

Unit IV : Feeding standards for farm animals

(06)

1. Ration : Defination, types and characteristics of balanced ration.
2. Compounded feeds, concentrate mixture and mineral mixture.
3. Calf starter and milk replacer.

UnitV : Tutorials, Seminars and Assignments

(05)

B.Sc. First Year

Paper -DST-212. Dairy Processing & Engineering

Total Credits : 02

Marks : 50

Total Periods : 45

Learning Objectives of the course :

1. To understand dairy processing operations.
2. To introduce special milks available in the market.
3. To enable to identify equipments and utilities used in dairy plant.

Learning outcomes of the course :

1. Describe the dairy processing operations.
2. Identify the special milks.
3. Describe the equipments used in dairy plant.
4. Explain the utilities requirement in dairy plant.

Unit- I : Dairy Processing

(20)

1. Milk collection, transportation, grading, weighing and cooling of milk.
2. Filtration and clarification of milk
3. Separator and cream separation.
4. Standardization.
5. Pasteurization : history, formulation standards, types, FDV, Regeneration efficiency.
6. Homogenization : single & double stage homogenization, theory of homogenization, homogenizer valve, homogenization efficiency.
7. Sterilization : Bottle, UHT, aseptic packaging.

Unit -II : Special milks

(05)

1. Flavored milks.
2. Toned & double toned milk.
3. Recombined & reconstituted milk.
4. Imitation milks

Unit -III : Dairy Engineering

(15)

1. Cleaning & Sanitation : cleaning agents, CIP & COP.
2. Working & maintenance of can washer and crate washer.
3. Sanitary milk pumps & fittings, types of pumps.
4. Boiler : properties of steam, steam generation and types of boilers.
5. Refrigeration : vapor compression refrigeration cycle, common refrigerants, properties of good refrigerants.
6. Dairy plant layout: selection of site, layout of liquid and composite milk plant.

Unit -IV : Tutorials, Seminars and Assignments

(05)

**B.Sc. First Year
Dairy Science & Technology**

Lab Course 2 DST-221

Marks : 50

Credits : 1.5

1. Study of digestive system of ruminants.
2. Determination of moisture/ Dry matter.
3. Determination of Ash.
4. Determination of Crude fiber/ Crude protein/Ether extract.
5. Computation of ration for milch animals.
6. Processing of feeds and fodders.
7. Preparation of Concentrate mixture/Mineral mixture.
8. Preparation of Calf starter/Milk replacer.
9. Preparation of Silage/Hay.
10. Collection of samples of feeds and fodders.
11. Study of Cream Separator.
12. Study of Pasteurizer.
13. Study of Homogenizer.
14. Study of Sterilizer.
15. Preparation of Flavored milks.
16. Visit to Dairy farm/ Dairy plant.