

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.**



CIRCULAR NO.SU/ Sci./College/NEP-2020/104/2024

It is hereby inform to all concerned that, In continuation circular No.SU./Revised B.Sc./NEP/72/2024/25588-96 dated 29.04.2024, the revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technolgy, the Academic Council at its meeting held on 08 April 2024 has accepted **the following Revised B.Sc. Course Structure & Curriculum** as per direction by the State Government dated on 13 March 2024 under the Faculty of Science & Technology (as per National Education Policy – 2020) run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1	Physics	Ist and IInd semester
2	Instrumentation Practice	Ist and IInd semester
3	Electronics	Ist and IInd semester
4	Mathematics	Ist and IInd semester
5	Industrial Chemistry	Ist and IInd semester
6	Agrochemical Fertilizer	Ist and IInd semester
7	Horticulture	Ist and IInd semester
8	Biochemistry	Ist and IInd semester
9	Botany	Ist and IInd semester
10	Zoology	Ist and IInd semester
11	Biotechnology	Ist and IInd semester
12	bioinformatics	Ist and IInd semester
13	Microbiology	Ist and IInd semester
14	Dairy Science & TEchnology	Ist and IInd semester
15	Statistics	Ist and IInd semester
16	computer Science	Ist and IInd semester
17	Geology	Ist and IInd semester
18	Chemistry	Ist and IInd semester
19	Analytical Chemistry	Ist and IInd semester
20.	Polymer Chemistry	Ist and IInd semester
21.	Environmental Science	Ist and IInd semester
22.	Fishery Science	Ist and IInd semester

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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 Sambhajanagar
-431 004.
REF.NO. SU/SCI./2024/27128-35
Date:-27.05.2024.

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

Dr. Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar- 431001



B.Sc. Degree Programme

(Three Year / Four Years (Hons) / Four Years (Hons with Research))

Course Structure and Syllabus for B. Sc. First Year

(AS PER NEP-2020)

Subject (Major):

DAIRY SCIENCE & TECHNOLOGY

Effective from 2024-25

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century. At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

Introduction to Undergraduate Degree course in Dairy Science and Technology:

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.

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 prepares students for starting entrepreneurship in dairy processing and Dairy farming.

Courses of Study: Courses of the study indicate pursuance of study in a particular discipline. Every discipline shall offer four categories of courses of study, viz. Discipline Specific Core (DSC) courses, Discipline Specific Electives (DSEs), Skill Enhancement Courses (SECs) and Generic Electives (GEs). Besides these four courses, a student will select Ability Enhancement Courses (AECs) and Value-Added Courses (VACs) from the respective pool of courses offered by the University.

- a) **Discipline Specific Core (DSC):** Discipline Specific Core is a course of study, which should be pursued by a student as a mandatory requirement of his/ her programme of study. In Bachelor of Science (Hons.) Mathematics programme, DSCs are the core credit courses of Mathematics which will be appropriately graded and arranged across the semesters of study, being undertaken by the student, with multiple exit options as per NEP 2020.
- b) **Discipline Specific Elective (DSE):** The Discipline Specific Electives (DSEs) are a pool of credit courses of Mathematics from which a student will choose to study based on his/ her interest.
- c) **Generic Elective (GE):** Generic Electives is a pool of courses offered by various disciplines of study (excluding the GEs offered by the parent discipline) which is meant to provide multidisciplinary or interdisciplinary education to students.

In case a student opts for DSEs beyond his/ her discipline specific course(s) of study, such DSEs shall be treated as GEs for that student.

d) **Ability Enhancement course (AEC), Skill Enhancement Course (SEC) and Value Addition Course (VAC):** These three courses are a pool of courses offered by all the Departments in groups of odd and even semesters from which a student can choose.

- i. **AEC:** AEC courses are the courses based upon the content that leads to knowledge enhancement through various areas of study. They are based on Language and Literature, and Environmental Science which are mandatory for all disciplines.
- ii. **SEC:** SECs are skill-based courses in all disciplines and are aimed at providing hands-on training, competencies, proficiency and skills to students. SEC courses may be chosen from a pool of courses designed to provide skill-based instruction.
- iii. **VAC:** VACs are common pool of courses offered by different disciplines and aimed towards personality building, embedding ethical, cultural and constitutional values; promote critical thinking, Indian knowledge systems, scientific temperament, communication skills, creative writing, presentation skills, sports and physical education and team work which will help in all round development of students.

Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree) Programme with Multiple Entry and Exit Options

Subject (Major): Dairy Science and Technology

BSc First Year: 1st Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory (Dairy Science and Technology)	DSC-1	Market Milk Industry	2		2		2+2 = 4
	DSC-2	Lab Course-I Practical based on DSC-1		4		2	
Major (Core) M2 Mandatory	DSC-1	-----	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Major (Core) M3 Mandatory	DSC-1	-----	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	GE/OE-1	To be chosen from other faculty	2		2		2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	SEC-1	1) Dairy Chemist 2) Clean Milk Production	1		1		2
	SEC-2	1) Lab Course-Dairy Chemist 2) Lab Course-Clean Milk Production		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	IKS-1	Choose any one from pool of courses	2		2		
OJT/ FP/CEP/CC/RP	CC-1	Health and Wellness (Common for all the faculty)		4		2	2
			13	18	13	09	22

GE/OE-1 : **Goat Farming** (This course will be available for the students from other faculty)

BSc First Year: 2nd Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory (Dairy Science and Technology)	DSC-3	Dairy farm Management	2		2		2+2 = 4
	DSC-4	Lab Course -II Practical based on DSC-3		4		2	
Major (Core) M2 Mandatory	DSC-3		2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Major (Core) M3 Mandatory	DSC-3		2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Generic / Open Elective (GE/OE) (Choose any two from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	GE/OE-2	To be chosen from other faculty	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	VSC-1	1) Cattle Management 2) Adulteration Testing in Milk	1		1		2
	VSC-2	3) Lab Course- Cattle Management 1) Lab Course- Adulteration Testing in Milk		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	VEC-1	Constitution of India (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	CC-2	Yoga Education / Sports and Fitness (Common for all the faculty)		4		2	2
			13	18	13	09	22
Exit Option : Award of UG Certificate in 3 Majors with 44 credits and an additional 4 credits of core NSQF course / Internship OR continue with Major and Minor							

GE/OE-2 : **Poultry Farming** (This course will be available for the students from other faculty)

Students will have to choose any three subjects as a **Major 1, Major 2, Major 3**, from Basket 1 under the Faculty of Science and Technology.

Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year. Students will have to select / declare choice of one subject as a **major subject** in the beginning of second year **out of three major options M1, M2 and M3 (which were opted in the first year).**

Detailed Illustration of Courses included in 1st and 2nd semester:

- 1) **Major (Core)** subject are mandatory.

DSC-1 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-2 : This is a 2 credit practical course based on DSC-1

DSC-3 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-4 : This is a 2 credit practical course based on DSC-3

- 2) **Generic / Open Elective (GE/OE):** (Needs to be chosen (any two) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

GE/OE -1 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

GE/OE -2 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

- 3) **SEC (Skill Enhancement Courses) :** Choose any one from pool of courses. These courses needs to be designed to enhance the technical skills of the students in specific area.

SEC-1 : This is a 1 credit theory course to enhance the technical skills of the students in specific area.

SEC-2 : This is a 1 credit practical course based on SEC-1.

- 4) **VSC (Vocational Skill Courses) :** Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

VSC-1 : This is a 1 credit theory course based Hands on Training corresponding to Major (core) subject.

VSC-2 : This is a 1 credit practical course based on VSC-1

- 5) **AEC (Ability Enhancement courses):** The focus of these courses should be based on linguistic and communication skills.

AEC-1 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

AEC-2 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

- 6) **IKS (Indian Knowledge System)** : The courses related to traditional and ancient culture of India will be included in this section. The respective college will have to choose one of the courses from the pool of courses designed by the University.

IKS-1 : To be chosen from the pool of courses designed by the University

This is a 2 credit theory course based on Indian Knowledge System. It will be common for all the faculty

- 7) **VEC (Value Education Courses)**: The courses such as understanding India, Environmental Science / Education, Digital and Technological solutions etc will be part of Value Education Courses.

VEC-1 : Constitution of India

This is a 2 credit theory course based on value education. It will be common for all the faculty

- 8) **CC (Curricular Courses)**: The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Performing Arts.

CC-1 : Health and Wellness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-2 : Yoga education / Sports and Fitness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

General Guidelines for Course Selection

- 1) The Major subject is the discipline or course of main focus, bachelors degree shall be awarded in that discipline / subject.
- 2) Students will have to choose any three subjects as a Major 1, Major 2, Major 3, from **Basket 1** under the Faculty of Science and Technology (based on the available options in the respective college).
- 3) Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year.
- 4) In the beginning of second year, students will have to select / declare choice of **one major subject** and **one minor subject** from three major options **M1, M2 and M3(which were opted in the first year)**
- 5) Once the students finalize their **Major Subject** and **Minor Subject** in the beginning of the second year of the programme, they shall pursue their further education in that particular subject as their **Major and Minor** subjects. Therefore, from second year onwards curriculum of the Major and Minor subjects shall be different.
- 6) Students are required to select **Minor subject** from **other discipline of the same faculty**
- 7) Students are required to select **Generic /Open Elective** (vertical 3 in the credit framework) **compulsorily from the faculty different than that of their Major / Minor subjects.**
- 8) Vocational Skill Courses and Skill Enhancement Courses (VSC and SEC) shall be related to the Major subject
- 9) Curriculum of Ability Enhancement Courses (AEC), Value Education Courses (VEC), Indian Knowledge System (IKS), and Co-curricular Courses (CC) will be provided by the University separately.

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the Bachelor of Science Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge:** Graduates of the Bachelor of Science program will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.
2. **Interdisciplinary Proficiency:** Graduates will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem-solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.
3. **Critical Thinking and Analytical Skills:** Graduates will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.
4. **Leadership and Innovation:** Graduates will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.
5. **Global Citizenship and Cultural Sensitivity:** Graduates will possess a global perspective and cultural sensitivity, recognizing the inter connectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Bachelor of Science curriculum, reflecting our commitment to nurturing well-rounded graduates who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Programme Outcomes (POs) :

The National Education Policy (NEP) 2020 for India emphasizes several key aspects for Bachelor of Science (B.Sc.) programs, aiming to produce graduates who are not only well-versed in their respective disciplines but also equipped with skills necessary for holistic development and employability. While specific program outcomes may vary between institutions and disciplines within B.Sc. programs, here are some common outcomes aligned with NEP 2020:

- **PO1.The citizenship and society:** Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic, environmental and societal realities while encompassing relevant contemporary issues.
- **PO2.Environment and sustainability:** Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development.
- **PO3.Ethics:** Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.
- **PO4.Individual and team work:** Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.
- **PO5.Communication:** Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO6.Project management and finance:** Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.
- **PO7.Life-long learning:** Recognize the need for lifelong learning and have the ability to engage in independent and life-long learning in the broadest context of technological change.

These program outcomes align with the broader goals of NEP 2020 to transform higher education in India and prepare students for the challenges and opportunities of the 21st century. Board of Studies designing B.Sc. curricula are encouraged to incorporate these outcomes into their program objectives and learning outcomes.

Programme Specific Outcomes (PSOs):

On completion of the 03/ 04 years Degree in B.Sc. (Mathematics) **students will be able to:**

- **PSO 1.Disciplinary Knowledge:** Bachelor degree in Dairy Science & Technology is the culmination of in-depth knowledge of Dairy Technology, Animal Husbandry, Dairy Chemistry, Dairy Microbiology, Dairy Engineering, Food safety and Management and Entrepreneurship in dairying
- **PSO 2.Critical thinking and analytical reasoning:** The students undergoing this programme acquire ability of critical thinking and logical reasoning and capability of recognizing and distinguishing and various aspects of Dairy Industry problems.
- **PSO 3.Problem Solving:** The knowledge gained by the students through this programme develops an ability to analyse the problems of dairy industry, identify and define appropriate solutions. This programme enhances students holistic developments.
- **PSO 4. Research related skills:** The completing this programme develops the capability of inquiring about appropriate questions relating to the different areas of Dairy Science & technology. Ability to pursue advanced studies and research in Dairy Science & Technology
- **PSO 5.Information/digital Literacy:** The completion of this programme will enable the learner to use appropriate software's to solve system of dairy industry and farm management
- **PSO 6. Self-directed learning:** The students completing this programme will develop ability of working independently and to make an in-depth study of various notions of Dairy Science & Technology.

Semester – I

DSC-1

Market Milk Industry

Maximum Marks : 50

Total Credits : 02

Total Contact Hours : 30 Hrs

Learning Objectives:

1. To introduce students with the chronology of dairy development in India.
2. To understand the structure of milk and its constituents.
3. To understand basic microbiology of milk.

Course outcomes (Cos):

1. Identify the chronology of dairy development in India.
2. Describe the chemical constituents of milk.
3. Classify and understand the microorganisms found in milk.
4. Explain the legal standards for milk.

DSC-1 : Market Milk Industry		Total Hrs : 30
Total Credits : 02 Hrs	Total Contact Hours : 30 Maximum marks 50	
Unit I: Dairy development in India		10
<ol style="list-style-type: none">1. Military dairy farm2. NDRI3. Dairy co-operatives4. NDDB5. Operation flood programme		
Unit II: Dairy Chemistry		10
<ol style="list-style-type: none">1. Definition and composition of milk.2. Major and Minor constituents of milk.3. Factors affecting quality and quantity of milk.4. Physic-chemical properties of milk.5. Nutritive value of milk.6. Adulteration in milk7. Legal standards for liquid milks		
Unit –III Microbiology of milk (10)		10
<ol style="list-style-type: none">1. Definition and classification of microorganisms.2. Reproduction and growth of microorganisms.3. Common microorganisms found in milk.4. Desirable and undesirable fermentation of milk.5. Clean milk production, sources of contamination.6. Milk borne diseases.		

Books Recommended:

1. Outlines of Dairy Technology by Sukumar De.
2. Dairy Chemistry by M. M. Rai.
3. Dairy Microbiology by K. C. Mahanta.
4. Dairy Processing by Earl.
5. Dairy India Year book by P. R. Gupta.
6. Recent Trends in Dairy & Food Processing, Ed. A.S. Khojare, Paithani Prakashan, Aurangabad
7. Dairy Technology and Engineering by H.G.Kessler.
8. Dairy Plant Engineering and Management by Tuffel Ahmed.

Course Code: DSC- 2

Title of Course: Lab course based on DSC 1

Total Credits: 02

Total Contact Hrs: 60 Hrs

Maximum Marks : 50

Learning objectives:

- To provide skill of determination of quality of milk.
- To provide skill of determination of specific gravity, acidity, Fat, TS and SNF.
- To develop practical skills and techniques for identification of bacteria.
- To gain knowledge of various adulterants found in milk

Course Outcome (CO):

On successful completion of this course students will:

CO 1: Able to determine raw milk quality.

CO 2: Able to determine microbial quality of milk.

CO 3: Able to detect adulterants in milk

Course Code: DSC- 2

Title of Course: Lab course based on DSC 1

Total Credits: 02

Total Contact Hrs: 60 Hrs

Maximum Marks : 50

1. Platform tests for raw milk.
2. Determination of density and specific gravity of milk.
3. Determination of SNF/TS
4. Preparation of Gerber sulphuric acid
5. Determination of fat
6. Preparation of standard NAOH solution
7. Determination of acidity of milk.
8. Determination of milk ash
9. Determination of milk protein
10. Determination of milk lactose
11. Detection of adulterants in milk.
12. Study of microscope
13. Preparation of smear for simple staining
14. Staining of bacteria
15. Dairy plant visit

Books Recommended

1. Manuals in Dairy Technology, Chemistry and Microbiology, Dairy Science Institute Mumbai
2. Handbook of Food Analysis, Part XI, Dairy Products BIS, New Delhi
3. Outlines of Dairy Technology by Sukumar De.
4. Dairy Chemistry by M. M. Rai.
5. Dairy Microbiology by K. C. Mahanta.

SEC-1 : 1) Dairy Chemist

Total Credits : 01

Maximum Marks : 50

Total Contact Hours : 15 Hrs

Learning objectives:

1. To understand raw milk quality of milk.
2. To understand constituents of milk.
3. To understand the process of detection of milk adulterants

Course Outcomes (COs):

On successful completion of this course students will be:

CO 1: Able to determine raw milk quality.

CO 2: Able to describe the constituents of milk.

CO 3: Learn the techniques to detect various milk adulterants

Syllabus SEC-1 A : Dairy Chemist	Total Hrs : 15
Basics of Dairy Chemist	15
<ol style="list-style-type: none">1. Role of Dairy Chemist.2. Definition and composition of milk.3. Nutritive value of milk.4. Major & Minor constituents of milk.5. Physic-chemical properties of milk.6. Factors affecting quality and quantity of milk	

Books Recommended:

1. Manuals in Dairy Technology, Chemistry and Microbiology, Dairy Science Institute Mumbai
2. Handbook of Food Analysis, Part XI, Dairy Products BIS, New Delhi
3. Outlines of Dairy Technology by Sukumar De.
4. Dairy Chemistry by M. M. Rai.
5. Dairy Microbiology by K. C. Mahanta.

SEC- 1 : 2) Clean Milk Production

Total Credits : 01
Maximum Marks : 50

Total Contact Hours :15 Hrs

Learning objectives:

1. To understand concept of clean milk
2. To inculcate the skill of production of clean milk.
3. To specify the measure to produce clean milk

Course Outcomes (CO's):

On successful completion of this course students will be:

- CO 1: Gain knowledge about clean milk production.
CO 2: Understand the methods of clean milk production.
CO 3: Understand constraints in clean milk production..

Syllabus		Total Hrs : 15
SEC- 1B Clean Milk Production		
Total Credits : 01 Hrs Maximum Marks : 50	Total Contact Hours :15	
1. Concept of lean milk production 2. Clean milk and safe milk. 3. Methods of clean milk production. 4. Bacterial standard for raw milk. 5. Benefits of clean milk production. 6. Diseases transmitted to human through milk. 7. Factors affecting clean milk production.		

Books Recommended:

- 1) Textbook of Animal Husbandry by G.C.Banerjee
- 2) Livestock production and management by NSR Sastry and Thomas
- 3) Text book of livestock production and management by Verma D.N.
- 4) Codex (1997) General requirements (food hygiene) supplements vol 1B FAO/WHO
- 5) website: www.agrimoon.com

SEC-2: Lab Course – Based on 1) Dairy Chemist

Learning objectives:

1. To understand raw milk quality of milk.
2. To understand constituents of milk.
3. To understand the process of detection of milk adulterants

Learning Course Outcome (CO):

On successful completion of this course students will be:

CO 1:Able to determine raw milk quality.

CO 2:Able to describe the constituents of milk.

CO 3:Learn the techniques to detect various milk adulterants

SEC-2 : Lab Course – SEC-1A (Based on SEC1A) Dairy Chemist		Total Hrs : 30
Total Credits : 01	Total Contact Hours : 30 Hrs Maximum Marks : 50	
1. Platform tests for raw milk. 2. Determination of density and specific gravity of milk. 3. Determination of fat in milk 4. Determination of SNF in milk 5. Determination of TS/Moisture in milk 6. Determination of acidity of milk. 7. Detection of neutralizer in milk 9. Detection of Sugar in milk 10. Detection of salt in milk 11. Visit to dairy plant.		

Books Recommended:

1. Manuals in Dairy Technology, Chemistry and Microbiology, Dairy Science Institute Mumbai
2. Handbook of Food Analysis, Part XI, Dairy Products BIS, New Delhi
3. Outlines of Dairy Technology by Sukumar De.
4. Dairy Chemistry by M. M. Rai.
5. Dairy Microbiology by K. C. Mahanta.

SEC-2 : Lab Course – Based on 2) Clean milk production

Learning objectives:

- To understand concept of clean milk
- To inculcate the skill of production of clean milk.
- To specify the measure to produce clean milk

Course Outcome (CO):

On successful completion of this course students will be:

CO 1: Gain knowledge about clean milk production.

CO 2: Understand the methods of clean milk production.

CO 3: Understand constraints in clean milk production..

SEC-2 : Lab Course - SEC1B (Based on SEC1B) Clean milk production		Total Hrs : 30
Total Credits : 01	Total Contact Hours : 30 Hrs Maximum Marks : 50	
<ol style="list-style-type: none"> 1. Identify the sources of contamination of raw milk. 2. Identify cleanliness of milking equipment and utensils. 3. Identify health of the animals 4. Hygienic milker 5. Types of housings of animals 6. Methods of hand milking 7. Machine milking 8. Animal waste management practices 9. Study of milk storage equipments 10. Visit to dairy farm 		

Books Recommended:

- 2) Textbook of Animal Husbandry by G.C.Banerjee
- 2) Livestock production and management by NSR Sastry and Thomas
- 3) Text book of livestock production and management by Verma D.N.
- 4) Codex (1997) General requirements (food hygiene) supplements vol 1B FAO/WHO
- 5) website: www.agrimoon.com

This course will be available for the students from other faculty

GE/OE- 1

Goat Farming

Learning objectives:

1. To know the different breeds of goat.
2. To understand the general management practices in goatfarming.
3. To understand the different diseases in goat.

Course Outcomes (CO,s): On successful completion of this course students will be:

CO 1 : Understand characteristics of the different breeds in goat.

CO 2 : Apply the general management practices in goat.

CO 3 : Describe the diseases in goat.

GE/OE-1 : Goat Farming		Total Hrs : 30
Total Credits : 02	Total Contact Hours : 30 Hrs Maximum Marks : 50	
Unit I: Goat – Importance , rearing and housing		15
i) Importance of goat farming. ii) Systems of goat rearing. iii) Housing of goat		
Unit II : Care and Management of goat		15
i) General management practices of goat ii) Management of kids, pregnant does and lactating does. iii) Care and management of breeding buck		

Books Recommended:

- 1) Textbook of Animal Husbandry by G. C. Banerjee
- 2) Livestock production and management by NSR Sastry and Thomas
- 3) Text book of livestock production and management by Verma D.N.
- 4)Advances in Animal Husbandry, The I.C.A.R Publication.
- 5)Animal husbandry and Dairy science by Jagdish Prasad.

Semester – II

DSC-3 :
Dairy Farm Management

Learning Objectives:

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 management.

Learning outcomes (COs):

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.

Syllabus DSC-3 : Dairy Farm Management	Total Hrs : 30
Total Credits : 02 Total Contact Hours : 30 Hrs Maximum Marks :50	
Unit:I Management	10
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	10
i) Housing of cattle and buffalo ii) Calf management iii) Heifer management iv) Care and management of pregnant cow and buffalo & lactating cows and buffalo and breeding bulls of cow and buffalo.	
Unit: III Sheep and Goat management	10
i) Housing of sheep and goat ii) Feeding of sheep and goat iii) General management practices of sheep and goat. iv) Grading and marketing of wool.	

Books Recommended:

1. A Text book of animal husbandry by G. C. Banerjee.
2. A Text book of animal science by Dr. A.U. Bhikane and Dr. S. B. Kavitkar.
3. Advances in animal husbandry, The I.C.A.R Publication.

4. Animal husbandry and Dairy science by Jagdish Prasad.
5. Farm animal management and feeding practices in India by Thomas & Shashtri.
6. Dairy farm management by Dr. V. V. Niras and Dr. R. V. Kulkarni.
7. Text book of Animal health and hygiene by Dr. R. V. Kulkarni and Dr. V. V. Niras.

DSC-4 : Lab Course –II (Based on DSC-3)

Dairy Farm Management

Learning objectives:

- To provide skill of determination of quality of milk.
- To provide skill of determination of Specific Gravity, Acidity, Fat, TS and SNF.
- To develop practical skills and techniques for identification of bacteria..
- To gain knowledge of different breeds of cattle and buffaloes with their functional characteristics.

Course Outcome (COs):

On successful completion of this course students will:

CO 1: Able to determine raw milk quality.

CO 2: Able to determine microbial quality of milk.

CO 3: Understand the fundamental and experimental concept of Dairy Farm Management.

Syllabus

DSC-4 : Lab Course –II (Based on DSC-3)

Dairy Farm Management

Total Credits : 02

Total Contact Hours : 60 Hrs

Maximum Marks : 50

1. Morphology of cattle and buffalo.
2. Study of cattle breeds; milch, draught, dual and exotic breeds.
3. Study of buffalo breeds.
4. Determination of age of animals
5. Study of housing systems of cattle and buffaloes
6. Identification of healthy and sick animals
7. Recording pulse, temperature and respiration rate of farm animals
8. Preparation of antiseptic ointments
9. Casting of animals
- 10 Record keeping of animals
16. Dehorning of animals
17. Identification marks of animals
18. Visit to dairy farm

Books Recommended

1. A Text book of Animal Husbandry by G. C. Banerjee.
2. A Text book of Animal Science by Dr. A.U. Bhikane and Dr. S. B. Kawitkar.
3. Advances in animal husbandry, The I.C.A.R Publication.
4. Animal husbandry and Dairy science by Jagdish Prasad.
5. Farm animal management and feeding practices in India by Thomas & Shashtri.
6. Text book of Dairy farm management by Dr. V. V. Niras and Dr. R. V. Kulkarni.

VSC-1A: 1) Cattle Management

Learning objectives:

1. To provide information of. Breeding, Feeding and Management of cattle.
2. To inculcate the skill of cattle management.
3. To know scientific information of calf, heifer cow and bull management..

Course Outcomes (COs): On successful completion of this course students will be:

CO 1: Able to know more about housing systems for cattle.

CO 2: Understand the methods of dehorning and other practices.

CO 3: Learn more about different type of cattle breeds.

VSC-1A : Cattle Management		Total Hrs : 15
Total Credits : 01	Total Contact Hours : 15 Hrs Maximum Marks : 50	
1. Grooming , 2. drying off, 3. Castration. 4. Dehorning, 5. Identification marks, 6. Control of bad habits.		

Books Recommended:

1. Text book of animal husbandry by G. C. Banerjee.
2. A Text book of animal science by Dr. A.U. Bhikane and Dr. S. B.Kavitkar.
3. Advances in animal husbandry, The I.C.A.R Publication.
4. Animal husbandry and Dairy science by Jagdish Prasad.
5. Farm animal management and feeding practices in India by Thomas & Shashtri.
6. Text book of Dairy farm management by Dr. V. V. Niras and Dr. R. V. Kulkarni.

VSC-1 : 2) Adulteration Testing in Milk

Learning objectives:

1. To understand composition of milk.
2. To provide hands on training for detection of adulteration of milk.
3. To describe the role of regulatory bodies

Learning Course Outcome (CO):

On successful completion of this course student will be able to

CO 1: Detect adulteration of milk..

CO 2: Apply qualitative test for detection of adulteration of milk..

CO 3: Describe role of regulatory bodies

Syllabus		Total Hrs :
VSC-1B : Adulteration Testing in Milk		15
Total Credits : 01	Total Contact Hours : 15 Hrs Maximum Marks : 50	
Unit I : Adulteration		15
1. Adulteration: Introduction. 2. Role of FSSAI 3. Effect of adulteration of milk on human health. 4. Definition and types of adulteration in milk. 5. Common adulterants found in milk. 6. Qualitative test to detect adulterants in milk		

Books Recommended:

1. Manual in Dairy Chemistry, Dairy Science Institute, Aarey Milk Colony, Bombay
2. FSSAI, Manual of Methods of Analysis of Foods: Milk and Milk Products
3. FAO , Manuals of food quality control - 8. Food analysis: quality, adulteration and tests of identity. (Vol. 2). Food and Agriculture Organization.

VSC-2 : Lab Course - Based on 1) Cattle management

Learning objectives:

- To provide information of. Breeding, Feeding and Management of cattle.
- To inculcate the skill of cattle management.
- To know scientific information of calf, heifer cow and bull management..

Course Outcomes (COs): On successful completion of this course students will be:

CO 1: Able to know more about housing systems for cattle.

CO 2: Understand the methods of dehorning and other practices.

CO 3: Learn more about different type of cattle breeds.

Syllabus	
VSC-2 : Lab Course - Based on 1) Cattle management	
Total Credits : 01	Total Contact Hours : 30 Hrs
Maximum Marks : 50	
<ol style="list-style-type: none">1. Housing of cattle,2. Calf management,3. Heifer management4. Management of pregnant cow.5. Management of lactating cow,6. Management of breeding bull.7. Morphology of cattle8. Housing systems for cattle: Face to face and Tail to tail.9. Study of cattle breeds<ul style="list-style-type: none">• Gir• Deoni,• Red Kandhari,• Sahiwal• Tharparkar,• Amritmahal• Khillar	

Books Recommended:

1. Text book of Animal Husbandry by G. C. Banerjee.
2. A Text book of Animal Science by Dr. A.U. Bhikane and Dr. S. B.Kavitkar.
3. Advances in animal husbandry, The I.C.A.R Publication.
4. Animal husbandry and Dairy science by Jagdish Prasad.
5. Farm animal management and feeding practices in India by Thomas &Shashtri.
6. Text book of Dairy farm management by Dr. V. V. Niras and Dr. R. V. Kulkarni.

VSC-2 : Lab Course - Based on 2) Adulteration Testing in Milk

Learning objectives:

1. To understand composition of milk.
2. To provide hands on training for detection of adulteration of milk.
3. To understand the role of regulatory bodies

Learning Course Outcome (COs):

On successful completion of this course student will be able to

- **CO 1:** Detect adulteration of milk..
- **CO 2:** Apply qualitative test for detection of adulteration of milk..
- **CO 3:** Able to understand role of regulatory bodies

Syllabus

VSC-2 : Lab Course - Based on 2) Adulteration Testing in Milk

Total Credits : 01

Total Contact Hours : 30 Hrs

Maximum Marks : 50

1. Sampling of milk
2. Detection of added water in milk.
3. Detection of adulteration
4. Detection of Urea in milk
5. Detection of Sucrose in milk
6. Detection of Glucose in milk
7. Detection of Starch in milk
8. Detection of Hydrogen peroxide in milk
9. Detection of Neutralizer in milk
10. Visit to dairy plant

Books Recommended:

1. Manual in Dairy Chemistry, Dairy Science Institute, Aarey Milk Colony, Bombay
2. FSSAI, Manual of Methods of Analysis of Foods: Milk and Milk Products
3. FAO , Manuals of food quality control - 8. Food analysis: quality, adulteration and tests of identity. (Vol. 2). Food and Agriculture Organization.

This course will be available for the students from other faculty

GE/OE-2 : Poultry Farming

Learning objectives:

1. To provide knowledge of importance of poultry farming
2. To inculcate the skill of poultry farming
3. To understand the process of management of poultry farming

Course Outcome (CO's):

On successful completion of this course students will be:

CO 1: Gain knowledge about different types of poultry birds.

CO 2: Understand the methods of poultry management.

CO 3: Learn general poultry management practices.

GE/OE-2: Poultry Farming		Total Hrs : 30
Total Credits : 02	Total Contact Hours : 30 Hrs Maximum Marks : 50	
1. Terminologies used in poultry Industry 2. Zoological classification 3. Indian poultry industry: A brief review 4. Growing trends in poultry industry 5. Classification of fowls: American class, English class, Mediterranean class and Indian class		

Books Recommended:

- 1) Textbook of Animal Husbandry by G.C.Banerjee
- 2) Livestock production and management by NSR Sastry and Thomas
- 3) Text book of livestock production and management by Verma D.N.
- 4) website: www.nndb.coop
- 5) Animal husbandry and Dairy Science by Jagdish Prasad.

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