॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

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एनईपी–२०२० सुधारित श्रेयांक आराखडयानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी प्रथम वर्षाचे अभ्यासक्रम शैक्षणिक वर्ष २०२६–२७ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २२ एप्रिल २०२६ रोजी संपन्न झालेल्या मा.विद्यापरिषद बैठकीतील विषय क्र.०४/६४–२०२६ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण–२०२० सुधारित श्रेयांक आराखडयानुसार पदवी प्रथम वर्षाचे अभ्यासक्रम शैक्षणिक वर्ष २०२६–२७ पासून लागू करण्यास मा.विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी.एस्सी. प्रथम वर्षाचे खालील विषयाचे अभ्यासक्रम शैक्षणिक वर्ष २०२६–२७ पासून लागू करण्यात येत आहे.

01	B.Sc. I Year Botany	06	B.Sc. I Year Geology
02	B.Sc. I Year Chemistry	07	B.Sc. I Year Enviornment & Earth Science
03	B.Sc. I Year Mathematics	08	B.Sc. I Year Statistics
04	B.Sc. I Year Zoology	09	B.Sc. I Year Dairy Science
05	B.Sc. I Year Microbiology	10	B.Sc. I Year Agrochemical & Fertilizers

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/परिपत्रक/पदवी/बीएस्सी/२०२६–२७/ 66
दिनांक : २२.०६.२०२६

सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :–
१) मा. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. प्र.कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ
३) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा,प्रस्तुत विद्यापीठ.
४) मा. संचालक, परिक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
५) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळविण्यात येते की, परिपत्रक अभ्यासक्रम संकेतस्थळावर प्रसिध्द करण्यात यावेत.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

UNDER GRADUATE PROGRAMME OF

SCIENCE & TECHNOLOGY

B.Sc. First Year

DAIRY SCIENCE

(For Affiliated Colleges)

Effective from the Academic year 2024 – 2025

(As per NEP-2020)

Framed by

BOARD OF STUDIES IN DAIRY SCIENCE

S.R.T.M. University, Nanded - 431 606

From the Desk of the Dean, Faculty of Science and Technology

Swami Ramanand Teerth Marathwada University, Nanded, enduring to its vision statement "***Enlightened Student: A Source of Immense Power***", is trying hard consistently to enrich the quality of science education in its jurisdiction by implementing several quality initiatives. Revision and updating curriculum to meet the standard of the courses at national and international level, implementing innovative methods of teaching-learning, improvisation in the examination and evaluation processes are some of the important measures that enabled the University to achieve ***the 3Es, the equity, the efficiency*** and ***the excellence*** in higher education of this region. To overcome the difficulty of comparing the performances of the graduating students and also to provide mobility to them to join other institutions the University has adopted the cumulative grade point average (CGPA) system in the year 2014-2015. Further, following the suggestions by the UGC and looking at the better employability, entrepreneurship possibilities and to enhance the latent skills of the stakeholders the University has adopted the Choice Based Credit System (CBCS) in the year 2018-2019 at graduate and post-graduate level. This provided flexibility to the students to choose courses of their own interests. To encourage the students to opt the world-class courses offered on the online platforms like, NPTEL, SWAYM, and other MOOCS platforms the University has implemented the credit transfer policy approved by its Academic Council and also has made a provision of reimbursing registration fees of the successful students completing such courses.

SRTM University has been producing a good number of high calibre graduates; however, it is necessary to ensure that our aspiring students are able to pursue the right education. Like the engineering students, the youngsters pursuing science education need to be equipped and trained as per the requirements of the R&D institutes and industries. This would become possible only when the students undergo studies with an updated and evolving curriculum to match global scenario.

Higher education is a dynamic process and in the present era the stakeholders need to be educated and trained in view of the self-employment and self-sustaining skills like start-ups. Revision of the curriculum alone is not the measure for bringing reforms in the higher education, but invite several other initiatives. Establishing industry-institute linkages and initiating internship, on job training for the graduates in reputed industries are some of the important steps that the University would like to take in the coming time. As a result, revision of the curriculum was the need of the hour and such an opportunity was provided by the New Education Policy 2020. National Education Policy 2020 (NEP 2020) aims at equipping students with knowledge, skills, values, leadership qualities and initiates them for lifelong learning. As a result the students will acquire expertise in specialized areas of interest, kindle their intellectual curiosity and scientific temper, and create imaginative individuals.

The curriculum given in this document has been developed following the guidelines of NEP-2020 and is crucial as well as challenging due to the reason that it is a transition from general science based to the discipline-specific-based curriculum. All the recommendations of the ***Sukanu Samiti*** given in the **NEP Curriculum Framework-2023** have been followed, keeping the disciplinary approach with rigor and depth, appropriate to the comprehension level of learners. All the Board of Studies (BoS) under the Faculty of Science and Technology of this university have put in their tremendous efforts in making this curriculum of international standard. They have taken care of maintaining logical sequencing of the subject matter with proper placement of concepts with their linkages for better understanding of the students. We take this opportunity to congratulate the Chairman (s) and all the members of various Boards of Studies for their immense contributions in preparing the revised curriculum for the benefits of the stakeholders in line with the guidelines of the **Government of Maharashtra regarding NEP-2020**. We also acknowledge the suggestions and contributions of the academic and industry experts of various disciplines.

We are sure that the adoption of the revised curriculum will be advantageous for the students to enhance their skills and employability. Introduction of the mandatory ***On Job Training, Internship program*** for science background students is praise worthy and certainly help the students to imbibe first hand work experience, team work management. These initiatives will also help the students to inculcate the workmanship spirit and explore the possibilities of setting up of their own enterprises.

Dr. M. K. Patil
Dean
Faculty of Science and Technology
Swami Ramanand Teerth Marathwada University, Nanded

From Desk of Chairman, Board of Studies of the Subject Dairy science

PREAMBLE

The B.Sc. Dairy Science semester pattern programme is being conducted in affiliated colleges of Swami Ramanand Teerth Marathwada University, Nanded. The programme has been designed to meet emerging academic, professional and societal demands in the field of Dairy Science and allied sectors. It aims at holistic development of students to face competitive challenges in higher education, research, entrepreneurship and dairy industries.

The curriculum has been framed in accordance with National Education Policy (NEP)–2020, incorporating Major Core (C), Minor (M), Generic Electives (GE), Vocational and Skill Enhancement Courses (V/SEC) to provide multidisciplinary, skill-oriented and outcome-based education. The content of each theory paper is systematically organized into modules and units with appropriate titles and sub-titles, indicating teaching hours, credits and evaluation weightage. Laboratory practicals linked with theory courses, field exposure, industrial visits and experiential learning components have been integrated to strengthen practical competence.

The curriculum clearly defines course objectives, learning outcomes, programme outcomes and programme specific outcomes, enabling students to choose electives according to their interests and career aspirations while broadening knowledge and skills in Dairy Science. The programme also supports preparation for higher studies, research, teaching and employment opportunities in dairy and allied sectors.

This curriculum framework has been developed with a student-centric, outcome-oriented and curiosity-driven pedagogy, emphasizing conceptual understanding, innovation, critical thinking and practical application rather than rote learning. Special emphasis has been given to experiential learning, industry relevance, entrepreneurship development and sustainable dairy production systems. Inclusion of Generic Electives, Vocational and Skill Enhancement Courses further enhances employability, technical skills and practical exposure among students.

The Board of Studies sincerely hopes that this curriculum will contribute to producing competent dairy professionals, researchers and entrepreneurs capable of addressing the needs of society and the dairy sectors.

OBJECTIVES OF THE B.Sc. DAIRY SCIENCE PROGRAMME:

The objectives of this program are:

1. Provide fundamental and advanced knowledge in dairy science, including milk production, processing, quality control, and dairy technology.
2. Develop scientific temper, analytical ability, and practical skills in dairy production, processing, and management.
3. Equip students with technical competency in dairy chemistry, microbiology, engineering and product technology.
4. Promote experiential learning through laboratory practical's, field exposure, industrial training, and problem-solving approaches.
5. Develop employability, entrepreneurship, and self-reliance in dairy and allied sectors.
6. Prepare graduates for higher education, research, teaching, and professional careers in dairy industries and related fields.
7. Inculcate professional ethics, environmental awareness, and social responsibility.

PROGRAM-SPECIFIC OUTCOMES (PSO) OF B.Sc.DAIRY SCIENCE:

By the end of the programme the students will be able to:

PO1: Demonstrate sound knowledge of principles and practices of Dairy Science and allied disciplines.

PO2: Apply scientific and technical skills in milk production, processing, preservation and quality assurance.

PO3: Analyze and solve practical problems related to dairy production, processing and management using scientific approaches.
PO4: Perform laboratory, field and industrial operations with competence and adherence to safety and quality standards.
PO5: Use modern tools, emerging technologies and digital applications in dairy science and dairy industry.
PO6: Demonstrate critical thinking, innovation, and research aptitude for addressing challenges in the dairy sector.
PO7: Develop entrepreneurial skills and pursue employment or self-employment opportunities in dairy and allied enterprises.
PO8: Communicate effectively and function as responsible professionals with ethical, social and environmental awareness.
The program enables the students to face NET, SET, MPSC, UPSC, and other competitive examinations successfully.

PROGRAM-SPECIFIC OUTCOMES (PSOs) OF B.Sc. DAIRY SCIENCE

By the end of the programme, students will be able to:
PSO1: Apply principles of dairy production, milk processing, and dairy product technology in practical and industrial settings.
PSO2: Perform quality evaluation, safety assurance, and laboratory analyses related to milk and dairy products.
PSO3: Demonstrate technical competency in dairy engineering, dairy microbiology, dairy chemistry, and processing operations.
PSO4: Utilize scientific knowledge and modern technologies for efficient dairy farm and dairy plant management.
PSO5: Develop solutions for sustainable dairy production, value addition, and quality improvement.
PSO6: Explore opportunities in dairy entrepreneurship, research, extension services, and professional employment in dairy and allied sectors.

Dr. PandurangTukaram Gangasagare
Chairman,
Board of Studies in Dairy Science
Swami Ramanand Teerth Marathwada University, Nanded

स्वामी रामानंद तीर्थ
मराठवाडा विद्यापीठ, नांदेड

Details of the Board of Studies Members in the subject Dairy Science under the faculty of Science & Technology of S.R.T.M. University, Nanded

Sr No	Name of the Member	Designation	Address	Contact No.
1.	Dr. Pandurang T.Gangasagre	Chairman	Adarsh College, Hingoli, Tq. & Dist. Hingoli.	9822575427
2	Dr. Rajkumar S.Sonwane	Member	Yeshwant Mahavidyalaya, Nanded	8888592956
3	Dr. Suresh N. Landge	Member	Maharashtra Udyagiri Mahavidyalya , Tq. Udgir, Dist. Latur.	9673761858
4	Dr. Gajenra K Londhe	Member	VNMAU, Parbhani	7588571600
5	Dr. Vasant V.Niras	Member	Vivakanand College,Chhatrapati Sambhajinagar	9422712087

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology (Three Optional in the First Year)

Credit Framework for Four Year Multidisciplinary Degree Program with Multiple Entry and Exit

Subject: DSC (Major)/DSM (Minor1 and Minor 2)

Year & Level	Semester	Optional1 (Major) *(From the same Faculty)*	Optional 2 (Minor1) *(From the same Faculty))*	Optional 3 (Minor2) *(From the same Faculty)*	Generic Elective (GE) (select from Basket 3 of *Faculties other than Science and Technology*)	Vocational &Skill Enhancement Course	Ability Enhancement Course (AEC) (Basket 4) Value Education Courses (VEC) / Indian Knowledge System (IKS) (Basket 5) *(Common across all faculties)*	Field Work / Project/Internship/OJT/ Apprenticeship / Case Study Or Co-curricular Courses (CCC) (Basket 6 for CCC) *(Common across all faculties)*	Credits	Total Credits
1	2	3	4	5	6	7	8	9	10	11
1 (4.5)	I	SDRSCT1101 (T2Cr) SDRSCP1101 (P2Cr) 4 Credits	SCHECT1101 (T 2Cr) SCHECP1101 (P 2Cr) 4 Credits	SELECT1101 (T 2Cr) SELECP1101 (P 2Cr) 4 Credits	SDRSGE1101 (2cr)	SDRSSC1101 2 Credits	AECENG1101(2Cr) ACEMIL1101 (MAR/HIN/URD /KAN/PAL)(2Cr) IKSXXX1101(2Cr) 6 Credits	--	22	44
	II	SDRSCT1151 (T2Cr) SDRSCP1151 (P2Cr) 4 Credits	SCHECT1151 (T 2Cr) SCHECP1151 (P 2Cr) 4 Credits	SELECT1151 (T 2Cr) SELECP1151 (P 2Cr) 4 Credits	SDRSGE1151 (2cr)	SDRSSC1151 2 Credits	AECENG1101(2Cr) ACEMIL1151 (MAR/HIN/URD /KAN/PAL)(2Cr) VECCOI1151 (2Cr) *Constitution of India* 6 Credits	--	22	
	Cum. Cr.	08	08	08	04	04	12	00	44	

Exit option **: UG Certificate in Opt1, Opt 2andOpt3 on completion of 44credits** and additional **4credits from NSQF/ Internship**

B. Sc. First Year Semester I *(Level 4.5)*

Teaching Scheme

	Course Code	Course Name	CreditsAssigned			TeachingScheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SDRSCT1101	**Perspectives of livestock farming in India**	02	--	**04**	02	--
	SDRSCP1102	**Practical Based on SDRSCT 1101**	-	02			04
Optional 2	SDRSMT1101		02	--	**04**	02	--
	SDRSMP1102		-	02			04
Optional 3	SDRSMT1101		02	--	**04**	02	--
	SDRSMP1102		-	02			04
Generic Electives *(from other Faculty)*	SDRSGE1101	Routine Management Practices in Farm Animals	02	--	**02**	02	--
Skill Based Course (related to Major)	SDRSSC1101	Preparation of Feed and Fodder	--	02	**02**	--	04
Ability Enhancement Course	AECENG1101	L1 – Compulsory English	02	--	**02**	02	--
Indian Knowledge System (IKS)	IKSXXX1101	Select from (**Basket 5)**	02	--	**02**	02	--
Community Engagement Services (CES)	CCCXXX1101	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness **(Basket 6)**	-	02	**02**	--	04
Total Credits			**14**	**08**	**22**	**12**	**20**

B. Sc. First Year Semester I *(Level 4.5)*

Examination Scheme

[40% Continuous Assessment (*CA)* and 60% End Semester Assessment (*ESA*)]

(For illustration we have considered a paper of 02 credits, 50 marks, needs to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	Course Name (3)	Theory					Practical		Total Col (6+7) / Col (8+9) (10)
				Continuous Assessment (CA)			ESA			
			Test I (4)	Assignment, Presentation, Viva, Quiz, Open Book (5)	Attendance (6)	(CA) Total (4)+(3)+(6)	Total (7)	CA (8)	ESA (9)	
Optional 1	SDRSCT1101	**Perspectives of Livestock farming in India**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSCP1102	**Practical Based on SDRSCT 1101**	--		--	--	--	**20**	**30**	**50**
Optional 2	SDRSMT1101		**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSMP1102		--	**6**	**4**	--	--	**20**	**30**	**50**
Optional 3	SDRSMT1101		**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSMP1102		--	**6**	**4**	--	--	**20**	**30**	**50**
Generic Elective	SDRSGE1101	**Routine Management Practices in Farm Animals**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Skill-Based Course	SDRSSC1101	**Preparation of Feed and Fodder**	**10**	**6**	**4**	**20**	**--**	**20**	**30**	**50**
Ability Enhancement Course	AECENG1101	L1 – Compulsory English	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Indian Knowledge System	IKSXXX1101	Select from **Basket 5**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Community Engagement Services (CC)	**CCCXXX1101**	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education **/ Fitness (Basket 6)**	--		--	--	--	**20**	**30**	**50**

B. Sc. First Year Semester II *(Level 4.5)*

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SDRSCT1151	**Chemical Quality Assurance of Milk**	02	--	**04**	02	--
	SDRSCP1152	**Practical Based on SDRSCT 1151**	-	02			04
Optional 2	SDRSMT1151		02	--	**04**	02	--
	SDRSMP1152		-	02			04
Optional 3	SDRSMT1151		02	--	**04**	02	--
	SDRSMP1152		-	02			04
Generic Electives *(from other Faculty)*	SDRSGE1151	**Clinical Practices of Livestock**	02	--	**02**	02	--
Skill Based Course (related to Major)	SDRSSC1151	**Milk Procurement**	--	02	**02**	--	04
Ability Enhancement Course	AECENG1151	L1 – Compulsory English	02	--	**02**	02	--
Indian Knowledge System (IKS)	IKSXXX1151	Select from (**Basket 5)**	02	--	**02**	02	--
Community Engagement Services (CES)	CCCXXX1151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness (Basket 6)	-	02	**02**	--	04
Total Credits			**14**	**08**	**22**	**12**	**20**

B. Sc. First Year Semester II *(Level 4.5)*

Examination Scheme

[40% Continuous Assessment (*CA)* and 60% End Semester Assessment (*ESA*)]

(For illustration we have considered a paper of 02 credits, 50 marks, needs to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	CourseName (3)	Theory					Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)				ESA			
			Test I (4)	Assignment, Presentation, Viva, Quiz, Open Book (5)	Attendance (6)	(CA) Total (4)+(3)+(6)	Total (7)	CA (8)	ESA (9)	
Optional 1	SDRSCT1151	**Chemical Quality Assurance of Milk**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSCP1152	**Practical Based on SDRSCT 1151**	--		--	--	--	**20**	**30**	**50**
Optional 2	SDRSMT1151		**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSMP1152		--	**6**	**4**	--	--	**20**	**30**	**50**
Optional 3	SDRSMT1151		**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
	SDRSMP1152		--	**6**	**4**	--	--	**20**	**30**	**50**
Generic Elective	SDRSGE1151	**Clinical Practices of Livestock**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Skill-Based Course	**SDRSSC1151**	**Milk Procurement**	**10**	**6**	**4**	**20**	--	**20**	**30**	**50**
Ability Enhancement Course	AECENG1151	L1 – Compulsory English	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Indian Knowledge System	IKSXXX1151	Select from (**Basket 5)**	**10**	**6**	**4**	**20**	**30**	**--**	**--**	**50**
Community Engagement Services (CC)	CCCXXX1151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness **(Basket 6)**	--		--	--	--	**20**	**30**	**50**

National Education Policy 2020

B.Sc. Dairy Science, I Year (Semester - I)

Major Core Theory Course

Course Code – SDRSCT-1101

Title of the Course: Perspectives of livestock farming in India

[No. of Credits: 2 Credit] [Total:30 Hours]

Course Outcomes (COs)

After successful completion of the course, students will be able to:

- Explain the significance of livestock farming in the Indian agricultural economy and rural livelihood systems.
- Describe the status, distribution, and production performance of major livestock species in India.
- Analyze different livestock production systems practiced in India, including dairy, poultry, sheep and goat farming, piggery, and mixed farming systems.
- Evaluate the role of livestock in food security, nutritional security, employment generation, poverty alleviation, and women empowerment.
- Identify emerging challenges and future prospects in Indian livestock farming with emphasis on sustainability, climate resilience, animal welfare, and value addition.

Programme Outcomes (POs)

Upon completion of the programme, students will be able to:

- Demonstrate comprehensive knowledge of livestock production systems, management practices, and their contribution to the national economy.
- Analyze livestock production data, socio-economic issues, and constraints affecting sustainable livestock development.
- Apply managerial and technical skills for establishing livestock-based enterprises and self-employment ventures.
- Promote environmentally sustainable and climate-smart livestock farming practices.
- Communicate scientific information effectively to farmers, stakeholders, and rural communities.
- Recognize the role of livestock farming in rural development, gender equity, nutritional security, and poverty reduction.

Curriculum Details: SDRSCT-1101 – Perspectives of Livestock Farming in India

Module No	Unit No	Topic	Hrs
1.			08
	1.1	Introduction to the subject.	
	1.2	Common terminology used in animal husbandry	
	1.3	Taxonomic classification of Dairy animals.	
	1.4	Argo-climatic zones in India.	
2			07
	2.1	Establishment of Dairy farm.	
	2.2	Site selection for Dairy farming	
	2.3	Water supply, light and ventilation.	
	2.4	Types of housing for Dairy animals.	
3			08
	3.1	Study of Dairy farming system in India.	
	3.2	Cattle development programme through five year plan.	
	3.3	Role of NDDB in Dairy development in India.	
	3.4	Role of livestock in manpower employment, Socioeconomic development	
4			07
	4.1	Production and potentiality of buffalo in India.	
	4.2	Recycling of wastes.	
	4.3	Maintenance of sanitary and hygienic conditions on farm.	
	4.4	Capital- Types of capital and ways of capital rise.	
Total Periods			**30**

Books/ References.

1. Reproduction in Farm Animals - C.N. Sane & Others.
2. A textbook of Animal Husbandry - G.C. Banerjee.
3. Livestock production and management. - NSR Sastri & Thomas.
4. Principles and practices of dairy farm management - Jagdish Prasad.
5. A textbook of animal Husbandry & Dairy Science - Jagdish Prasad.

Curriculum details: SDRSCP-1101 Perspectives of Livestock Farming in India

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1.	Morphology of cattle, Buffalo, Sheep and Goat.	5
2.	Linear body measurement, Body wedges and estimation of body weight.	5
3.	Study of physical characters of cattle.	5
4.	Study of common appliances used on the animal farm.	5
5.	Casting, restraining and handling of farm animals.	5
6.	Study of castration of Cattle.	5
7.	Study of Identification marks of cattle.	5
8.	Study of health record of Pregnancy Cow.	5
9.	Care and Management of Newly Born Calves.	5
10.	Drenching of farm animals.	5
11.	Dressing of farm animals.	5
12.	Visit to Regional cattle farm, Hospital	5
	Total	**60**

Text Books and Reference Books:

1. Reproduction in Farm Animals - C.N. Sane & Others.
2. A textbook of animal husbandry - G.C. Banerjee.
3. Livestock production and management. - NSR Sastri & Thomas.
4. Principles and practices of dairy farm management - Jagdish Prasad.
5. A textbook of animal husbandry & dairy science - Jagdish Prasad.

National Education Policy 2020

B.Sc. Dairy Science, I Year (Semester - I)

Major Core Theory Course

Course Code – SDRSGE-1101

Title of the Course: Routine Management Practices in Farm Animals (**Generic**)

[No. of Credits: 2 Credit] **[Total:30 Hours]**

Course Outcomes (COs)

After successful completion of the course, students will be able to:

- Explain the principles and importance of routine management practices in farm animals for maintaining health, productivity, and welfare.
- Demonstrate knowledge of identification, handling, housing, grooming, and sanitation practices for different farm animal species.
- Apply routine health care practices including vaccination, deworming, disease prevention, and biosecurity measures in livestock farms.
- Describe feeding, watering, milking, breeding, and reproductive management practices adopted in dairy and livestock farms.
- Perform common management operations such as castration, dehorning, hoof trimming, tagging, and record keeping following animal welfare guidelines.
- Evaluate farm management practices and recommend measures for improving animal productivity, welfare, and farm profitability.

Programme Outcomes (POs)

Upon completion of the programme, students will be able to:

- Demonstrate knowledge of livestock production systems, animal management, and farm operations.
- Apply scientific principles and technical skills in routine livestock management and animal husbandry practices.
- Identify management-related problems and implement suitable solutions for improving farm efficiency.
- Apply ethical and welfare-oriented practices for ensuring animal health, comfort, and productivity.
- Communicate livestock management technologies effectively to farmers and stakeholders.
- Promote environmentally sound livestock farming practices and efficient resource utilization.

Curriculum Details SDRSGE-1101
Routine Management Practices in Farm Animals (Generic)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.		**Module 1**	07
	1.1	Introduction to the subject.	
	1.2	Identification marks of cattle & Buffalo.	
	1.3	Docking and dipping in Sheep.	
	1.4	Control of licking and chewing of old leathers.	
2.		**Module 2**	08
	2.1	Shoeing of dairy farm animals.	
	2.2	Livestock census and cattle population.	
	2.3	Drying off lactating cows, methods of drying.	
	2.4	Management of Newly born calves.	
3.		**Module 3**	**07**
	3.1	Preparation of animal for milking and methods of milking.	
	3.2	Trimming of hoofs in Cattle & Buffalo.	
	3.3	.Suckling and Weaning of calves.	
	3.4	Keeping of health Records.	
4.0		**Module 4**	**08**
	4.1	Cleaning and sanitation of livestock houses.	
	4.2	Collection and utilization of manure.	
	4.3	Sewage of dairy waste.	
	4.4	First aid measures	
Total			**30**

Text Books

1. Banerjee, G. C. (2018). *A textbook of animal husbandry* (8th ed.). Oxford & IBH Publishing.
2. Sastry, N. S. R., & Thomas, C. K. (2005). *Livestock production management* (4th ed.). Kalyani Publishers
3. Landge S.N(2024).- गुरांचे नियमित व्यवस्थापन" गुरुमाऊली प्रकाशन, उदगीर

National Education Policy 2020
B.Sc. Dairy Science, I Year (Semester - I)
Major Core Practical Course
Course Code – SDRVSC-1101
Title of the Course:
Preparation of Feed and Fodder (Skill)
[No. of Credits: 2 Credit] **[Total:60 Hours]**

Course Outcomes (COs)

After successful completion of the course, students will be able to:

- Explain the importance of feed and fodder resources in livestock production and their role in animal nutrition, health, and productivity.
- Identify different types of feed ingredients, fodder crops, crop residues, and unconventional feed resources used in livestock feeding.
- Prepare balanced livestock feeds and formulate rations according to the nutritional requirements of different classes of farm animals.
- Apply techniques for silage making, hay preparation, feed enrichment, and feed quality evaluation to improve feed utilization efficiency.

Programme Outcomes (POs)

Upon completion of the programme, students will be able to:

- Demonstrate comprehensive knowledge of feed ingredients, fodder crops, and livestock nutritional requirements.
- Apply scientific principles and practical skills in feed preparation, fodder cultivation, conservation, and storage.
- Plan and manage feed and fodder enterprises for improving farm profitability and sustainability.
- Communicate feed and fodder production technologies effectively to farmers and stakeholders.
- Utilize modern technologies and alternative feed resources for improving feed availability and quality.

Curriculum details: SDRVSC-1101

Preparation of Feed and Fodder (Skill):

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1.	Collection of feed and fodder sample.	5
2.	Preparation of Silage.	5
3.	Preparation of Hay.	5
4.	Computation of Ration for milking animal.	5
5.	Feeding Standards to different categories of animal.	5
6.	Preparation of calf starter.	5
7.	Preparation of milk re placer.	5
8.	Cultivation of Maize.	5
9.	Study of lucern and Berseem.	5
10.	Preparation of compound feed for animals.	5
11.	Study of Roughages and Concentrate feeds	5
12.	Visit to Silage making Plant/Feed Processing Unit/Sugar cane Industry.	5
Total		**60**

Textbooks

1. Banerjee, G. C. (2018). A textbook of animal husbandry (8th ed.). Oxford & IBH Publishing.
2. Ranjhan, S. K. (2014). Animal nutrition and feeding practices in India (6th ed.). Vikas Publishing House.
3. Indian Council of Agricultural Research. (2013). Handbook of animal husbandry (4th ed.). ICAR.

Reference Books

1. McDonald, P., et al. (2022). Animal nutrition (9th ed.). Pearson.
2. Church, D. C., & Kellems, R. O. (2010). Livestock feeds and feeding (6th ed.). Pearson Education.
3. Sastry, N. S. R., & Thomas, C. K. (2015). Livestock production management. Kalyani Publishers.

Semester – II
B.Sc. I Year
Dairy Science
As Per National Education Policy- 2020

National Education Policy 2020

B.Sc. Dairy Science, I Year (Semester - I)

Major Core Theory Course

Course Code – SDRSCT-1151

Title of the Course: Chemical Quality Assurance of Milk

[No. of Credits: 2 Credit] [Total:30Hours]

Course Outcomes (COs)

After successful completion of the course, students will be able to:

- Analyze major milk constituents such as fat, protein, lactose, minerals, vitamins, and their significance in quality assessment.
- Perform chemical tests for determination of milk quality parameters including acidity, pH, fat, SNF, protein, lactose, and mineral content.
- Detect common adulterants, preservatives, neutralizers, and contaminants in milk using standard analytical methods.
- Apply national and international quality standards, regulations, and quality assurance protocols for milk and milk products.

Programme Outcomes (POs)

Upon completion of the programme, students will be able to:

- Apply laboratory techniques and analytical methods for milk quality evaluation and quality control.
- Interpret analytical results and solve quality-related problems in dairy production and processing.
- Implement quality assurance systems, food safety standards, and regulatory requirements in dairy industries.
- Prepare laboratory reports and communicate quality assessment findings effectively.

Curriculum Details: SDRSCT-1151, Chemical Quality Assurance of Milk

Module No	Unit No	Topic	Hrs. Required to cover the contents
1.		**Milk**	07
	1.1	Introduction to the subject.	
	1.2	Composition of Buffalo Milk.	
	1.3	Physic-chemical properties of milk.	
	1.4	Collection and Transportation of milk .	
2.		**Morphology and Anatomy of Udder**	08
	2.1	Heat stability of milk.	
	2.2	Pasteurization of milk and Methods.	
	2.3	Platform (RMRD) test of milk.	
	2.4	Milk lipids (fat), Importance in milk .	
3.		**Physiology of Lactation**	07
	3.1	Milk proteins, Types of milk proteins and their structure.	
	3.2	Acidity of milk and their role in body of milk .	
	3.3	Clean milk production.	
	3.4	Factors affecting clean Milk Production	
4.		**Growth of Udder ,Synthesis of Milk, Contamination of milk**	08
	4.1	Properties of milk constituents.	
	4.2	Bacteria, Classification of Bacteria.	
	4.3	Detergent used in dairy industry.	
	4.4	Clot on Boiling test of milk	
Total			**30**

Text Books:

1. De, S. (2021). Outlines of dairy technology (24th ed.). Oxford University Press.

Reference Books:

1. Harding, F. (2018). Milk quality. Springer.
2. Tetra Pak Processing Systems AB. (2015). Dairy processing handbook. Tetra Pak International

National Education Policy 2020

B.Sc. Dairy Science, I Year (Semester - II)

Major Core Practical Course

Course Code – SDRSCP-1151

Title of the Course: Chemical Quality Assurance of Milk

[No. of Credits: 2 Credit] **[Total:60 Hours]**

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1.	Constituents of Milk.	5
2.	Chilling of milk, methods of milk Chilling.	5
3.	Straining, Filtration& Clarification of Milk,.	5
4.	Pricing of Milk and Pricing policy.	5
5.	Packaging of Milk.	5
6.	Heat Stability test of milk.	5
7.	Determination of acidity of milk.	5
8.	Determination of Specific Gravity of milk.	5
9.	Determination of Fat and Solid not fat.	5
10.	Determination of pH of Milk.	5
11.	Visit to Milk Collection Center	5
12.	Visit to Dairy Farm.	5
	Total	**60**

Text Books

1. De, S. (2001). *Outlines of dairy technology* (1st Indian ed.). Oxford University Press.
2. Aneja, R. P., Mathur, B. N., Chandan, R. C., & Banerjee, A. K. (2002). Technology of Indian milk products. Dairy India Publications.

Reference Books:

1. Market Milk Manual published by National Dairy Research Institute (NDRI), Karnal
2. Practical Dairy Chemistry-R.K. Robinson

National Education Policy 2020

B.Sc. Dairy Science, I Year (Semester - II)

Major Core Theory Course

Course Code – SDRSGE-1151

Title of the Course: -Clinical Practices of Livestock (Generic)

[No. of Credits: 2 Credit] **[Total:30 Hours]**

Course Outcomes (COs)

After successful completion of the course, students will be able to:

- Explain the basic principles of clinical examination, diagnosis, and health management of livestock animals.
- Perform routine clinical procedures including physical examination, recording of vital signs, animal restraint, and handling techniques.
- Identify common diseases, disorders, and health problems of farm animals based on clinical signs and symptoms.
- Apply appropriate preventive and therapeutic measures including vaccination, deworming, first aid, and basic treatment protocols under veterinary guidance.
- Demonstrate proficiency in sample collection, clinical record maintenance, and disease reporting procedures.
- Evaluate livestock health management practices and recommend measures for improving animal health, welfare, and farm productivity.

Programme Outcomes (POs)

Upon completion of the programme, students will be able to:

- Apply clinical and diagnostic skills for assessment and management of livestock health.
- Analyze health-related problems and develop appropriate solutions for disease prevention and control.
- Utilize modern tools, techniques, and technologies in livestock health care and farm management.
- Communicate effectively with farmers, veterinarians, and stakeholders regarding animal health issues.
- Contribute to sustainable livestock production through effective disease prevention and health management strategies.

Curriculum Details: SDRSGE-1151 Clinical Practices of Livestock (Generic):

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.		**Module 1**	08
	1.1	Introduction to the subject.	
	1.2	Terminology used in clinical practices in livestock.	
	1.3	Identification of Sick animals and isolation.	
	1.4	Symptoms of Healthy animals.	
2.		**Module 2**	07
	2.1	General Measures for prevention of Diseases.	
	2.2	Normal clinical values of livestock.	
	2.3	Vaccination schedule for Cattle.	
	2.4	2.4 Preparation of ointment, lotion etc.	
3.		**Module 3**	08
	3.1	Drenching of drugs to calves and Heifers.	
	3.2	Casting and Restring of livestock.	
	3.3	Deworming of calves.	
	3.4	Disbudding and Dehorning of cattle.	
4.		**Module 4**	07
	4.1	Methods of Castration in Livestock.	
	4.2	Handling of clinical instrument.	
	4.3	Bandaging of wounds.	
	4.4	Disposal of clinical wastage	
Total			**30**

Text Books

1. Radostits, O. M., Gay, C. C., Hinchcliff, K. W., & Constable, P. D. (2007). *Veterinary medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats* (10th ed.). Saunders Elsevier.
2. Standard Veterinary Treatment Guidelines for Livestock & Poultry DAHD, Govt. of India (2024)
3. Sastry, N. S. R., & Thomas, C. K. (2005). *Livestock production management* (4th ed.). Kalyani Publishers.

Reference Books

1. Singh, G. R., & Tyagi, R. P. S. (Eds.). (2014). *Ruminant surgery*. CBS Publishers & Distributors.
2. Tyagi, R. P. S., & Singh, J. (2010). *Ruminant surgery* (11th ed.). CBS Publishers & Distributorsminor

National Education Policy 2020
B.Sc. Dairy Science , III Year (Semester - VI)
Major Core Practical Course
Course Code – SDRVSC-1151
Title of the Course: Milk Procurement (Skill)
[No. of Credits: 2 Credit] [Total:60 Hours]

Course Outcomes (COs)

On successful completion of this course, students will be able to:

CO1: Compare and explain the chemical composition of cow and buffalo milk and its significance in dairy processing. *(Practical Exercise: Composition of Cow and Buffalo Milk; Bloom's Level: Understanding)*

CO2: Demonstrate correct procedures for collection and transportation of milk while maintaining hygiene and cold chain integrity. *(Practical Exercise: Collection and Transportation of Milk; Bloom's Level: Application)*

CO3: Apply grading standards and pricing principles to assess milk quality and calculate procurement value accurately. *(Practical Exercise: Grading of Milk and Pricing; Bloom's Level: Application)*

CO4: Describe the layout and functional units of a milk processing plant and explain the flow of operations. *(Practical Exercise: Layout of Milk Processing Plant; Bloom's Level: Understanding)*

CO5: Perform quality analysis of raw milk using standard physicochemical and microbiological tests. *(Practical Exercise: Quality Analysis of Milk; Bloom's Level: Analysis)*

CO6: Execute accurate weighing and systematic recording of milk received at a dairy processing plant. *(Practical Exercise: Weighing of Milk in Processing Plant; Bloom's Level: Application)*

CO7: Carry out filtration and clarification of milk using appropriate equipment and techniques to remove impurities. *(Practical Exercise: Filtration and Clarification of Milk; Bloom's Level: Application)*

CO8: Standardize milk to desired fat and SNF levels using Pearson's Square or Displacement Method. *(Practical Exercise: Standardization of Milk; Bloom's Level: Application)*

CO9: Identify and evaluate different packaging materials used for milk packaging considering safety, cost, and shelf life. *(Practical Exercise: Packaging Material for Milk Packaging; Bloom's Level: Evaluation)*

CO10: Explain methods of milk distribution and plan an efficient distribution system for a dairy plant. *(Practical Exercise: Distribution of Milk and Method of Distribution; Bloom's Level: Analysis)*

Programme Outcomes (POs)

On successful completion of the B.Sc. Dairy Science programme, graduates will be able to:

PO1 – Disciplinary Knowledge: Demonstrate comprehensive knowledge of dairy science principles, milk chemistry, microbiology, and processing technology relevant to the dairy industry.

PO2 – Critical Thinking and Problem Solving: Apply analytical and scientific reasoning to evaluate dairy processes, interpret quality data, and resolve operational challenges effectively.

PO3 – Practical and Laboratory Skills: Perform dairy laboratory analyses and plant operations with competency, accuracy, and strict adherence to standard protocols and safety norms.

PO4 – Communication Skills: Communicate technical information effectively through written reports, oral presentations, and professional interpersonal interactions in dairy and food science contexts.

PO5 – Research Aptitude: Design experiments, collect and analyse data, and interpret results to contribute meaningfully to dairy and food science research.

PO6 – Societal and Environmental Awareness: Understand the social, economic, and environmental impact of dairy industry practices and adopt sustainable and responsible approaches.

PO7 – Ethics and Professional Values: Uphold scientific integrity, food safety standards, and professional ethics in all aspects of dairy industry practice and research.

PO8 – Lifelong Learning: Develop the ability to independently upgrade knowledge and adapt to evolving dairy technologies, industry demands, and policy frameworks.

Curriculum Details: SDRVSC-1151
Milk Procurement (Skill)

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1.	Composition of cow and Buffalo milk.	5
2.	Collection and Transportation of milk.	5
3.	Rating of milk and Pricing.	5
4.	Layout of milk processing plant.	5
5.	Quality analysis of milk .	5
6.	Weighing of milk in processing plant.	5
7.	Filtration and Clarification of Milk.	5
8.	Standardization of milk.	5
9.	Packaging Material for milk packaging.	5
10.	Distribution of milk and Method of Distribution.	5
11.	Visit to Milk cooling Unit.	5
12.	Visit to Milk Processing plant.	5
Total		**60**

Text Books

1. De, S. (2021). *Outlines of dairy technology* (24th ed.). Oxford University Press.
2. Walstra, P., Wouters, J. T. M., & Geurts, T. J. (2006). *Dairy science and technology* (2nd ed.). CRC Press.
3. Spreer, E. (1998). *Milk and dairy product technology*. Marcel Dekker.

Reference Books

1. Harding, F. (2018). *Milk quality*. Springer.
2. Fox, P. F., McSweeney, P. L. H., Uniacke-Lowe, T., & O'Mahony, J. A. (2015). *Dairy chemistry and biochemistry* (2nd ed.). Springer.
3. Robinson, R. K. (Ed.). (2002). *Dairy microbiology handbook: The microbiology of milk and milk products* (3rd ed.). Wiley.
4. Tetra Pak Processing Systems AB. (2015). *Dairy processing handbook*. Tetra Pak International.