ACADEMIC (1-BOARD OF STUDIES) SECTION

Phone: (02462) 229542  
Fax: (02462) 229574  
Website: www.srtmun.ac.in  
E-mail: bos.srtmun@gmail.com

संलगित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विभागांतील पदवी स्वार्थी प्रश्न वर्षांना CBCS Pattern नुसार अभ्यासक्रम शैक्षणिक वर्ष 2019-20 पापून लागू करण्यात आलेले आहेत.

1. Agricultural Microbiology  
2. Agrochemicals & Fertilizers  
3. Analytical Chemistry  
4. B.C.A.  
5. B.Voc. (Food Processing, Preservation and Storage)  
6. B.Voc. (Web Printing Technology)  
7. Biochemistry  
8. Bioinformatics  
9. Biophysics  
10. Biotechnology (Vocational)  
11. Biotechnology  
12. Botany  
13. Chemistry  
14. Computer Application (Optional)  
15. Computer Science (Optional)  
16. Computer Science  
17. Dairy Science  
18. Dyes and Drugs  
19. Electronics  
20. Environmental Science  
21. Fishery Science  
22. Food Science  
23. Geology  
24. Horticulture  
25. Industrial Chemistry  
26. Information Technology (Optional)  
27. Mathematics  
28. Microbiology  
29. Network Technology  
30. Physics  
31. Software Engineering  
32. Statistics  
33. Zoology

सदरील परिपत्र व अभ्यासक्रम प्रस्तुत विभागांत्या www.srtmun.ac.in या वेबसाइटवर उपलब्ध आहेत. तरी सदरील बाबत ही सर्व संबंधितांच्या निर्देशांनास आणणाऱ्या दाखवी.

आयुष्य पर्याप्त,  
विनोबा, नाशिक – 423 606.  
आ.क्र.: शैक्षणिक – 09/परिपत्रक/पदवी–संबंधितांक अभ्यासक्रम/ 2019-20/292

दिनांक : 03.07.2019.

प्रत माहिती व मुद्रील कार्यालाहीताच वाची.
1) मा. कृतसंहिता याचे कार्यालय, प्रस्तुत विभागांत.
2) मा. संस्थापक, पत्ता व मुद्रित मांडल याचे कार्यालय, प्रस्तुत विभागांत.
3) प्रायां, सर्व संबंधित संलगित महाविद्यालयांचे प्रस्तुत विभागांत.
4) सहायक कृतसंहिता, पदवीनुसार विभाग, प्रस्तुत विभागांत.
5) उपकुलसंहिता, पत्ता विभाग, प्रस्तुत विभागांत.
6) सिस्टम एस्सार्टी, शैक्षणिक विभाग, प्रस्तुत विभागांत.
SYLLABUS

Of
B.Sc. – I Year
Choice Based Credit System (CBCS)
(Semester Pattern)

DAIRY SCIENCE

Effective from June - 2019
Distribution of credits for B.Sc. Dairy Science (optional)
Under Faculty of Science

B. Sc. Syllabus structure
Semester Pattern effective from June 2019

Subject: Dairy Science

<table>
<thead>
<tr>
<th>Semester</th>
<th>Paper No.</th>
<th>Name of the Course</th>
<th>Instruction Hrs/week</th>
<th>Total period</th>
<th>Internal Evaluation</th>
<th>Marks of Semester</th>
<th>Total Marks</th>
<th>Credits</th>
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<tbody>
<tr>
<td>I</td>
<td>CCDS I (Section A)</td>
<td>Dairy Farming in India (PI))</td>
<td>03</td>
<td>45</td>
<td>10</td>
<td>40</td>
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<td></td>
<td>CCDS I (Section B)</td>
<td>Milk and Physiology of Lactation (PII)</td>
<td>03</td>
<td>45</td>
<td>10</td>
<td>40</td>
<td>50</td>
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<tr>
<td>II</td>
<td>CCDS II (Section A)</td>
<td>Processing Technology of Milk (P-III)</td>
<td>03</td>
<td>45</td>
<td>10</td>
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<td>2</td>
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<tr>
<td></td>
<td>CCDS II (Section B)</td>
<td>Farm Animal Health Management (PIV)</td>
<td>03</td>
<td>45</td>
<td>10</td>
<td>40</td>
<td>50</td>
<td>2</td>
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<td></td>
<td>CCDSPI [CCDS I &amp; II (Section A &amp; B)]</td>
<td>Practical's based on Section A &amp; Section B of CCDS I &amp; CCDS II (PV)</td>
<td>04</td>
<td>20 Practical</td>
<td>20</td>
<td>80</td>
<td>100</td>
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Total credits semester I and II: 12

| III      | CCDS III (Section A) | Dairy Animal Management (P-VI) | 03 | 45 | 10 | 40 | 50 | 2 |
|          | CCDS III (Section B) | Technology of Indigenous Milk Products (P-VII) | 03 | 45 | 10 | 40 | 50 | 2 |
|          | CCDSPI III [CCDS III & IV (Section B)] | Practical’s based on P-VI & P-VII & P-VIII (P-X) | 04 | 10 | 40 | 50 | 50 | 2 |
|          | CCDSPI II [CCDS III & IV (Section B)] | SEC I (1 Skill/optional) | 15×3 = 45 | - | - | (02)* |

| IV       | CCDS IV (Section A) | Sheep, Goat, Pig and Poultry Farming (P-VIII) | 03 | 45 | 10 | 40 | 50 | 2 |
|          | CCDS IV (Section B) | Technology of Western Dairy Products (P-IX) | 03 | 45 | 10 | 40 | 50 | 2 |
|          | CCDSPI II [CCDS III & IV (Section A)] | Practical’s based on P-VII & P-IX (P-XI) | 04 | 20 practical | 10 | 40 | 50 | 2 |
|          | CCDSPI III [CCDS III & IV (Section B)] | SEC II (1 Skill) | 15×3 = 45 | - | - | (02)* |

Total credits semester III and IV: 12(04)*
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course No.</th>
<th>Name of the Course</th>
<th>Instruction Hrs/ week</th>
<th>Total period</th>
<th>Internal Evaluation</th>
<th>Marks of Semester</th>
<th>Total Marks</th>
<th>Credits</th>
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<tr>
<td>V</td>
<td>DECDS I (Section A)</td>
<td>Animal Nutrition (P-XII)</td>
<td>03</td>
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<td>DECDS I (Section B)</td>
<td>Reproduction in Farm Animals (P-XIII)</td>
<td>03</td>
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<td>DECDSPII) (DECDS I &amp; II (Section B))</td>
<td>Practical's based on P-XII &amp; P-XIV (P-XVI)</td>
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<td>20 Practical</td>
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<td></td>
<td>DECDSPII (Section B)</td>
<td>SEC III (1 Skill/optional)</td>
<td>15 × 3 = 45</td>
<td>-</td>
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<td>-</td>
<td>(02)*</td>
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<tr>
<td>VI</td>
<td>DECDS II (Section A)</td>
<td>Forage Production, Feeds and Feeding (P-XIV)</td>
<td>03</td>
<td>45</td>
<td>10</td>
<td>40</td>
<td>50</td>
<td>2</td>
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<tr>
<td></td>
<td>DECDS II (Section B)</td>
<td>Animal Genetics and Breeding (P-XV)</td>
<td>03</td>
<td>45</td>
<td>10</td>
<td>40</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
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<td>DECCDSP I (DECDS I &amp; II (Section A))</td>
<td>Practical's based on P-XIII &amp; P-XV (P-XVII)</td>
<td>04</td>
<td>20 Practical</td>
<td>10</td>
<td>40</td>
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<td>2</td>
</tr>
<tr>
<td></td>
<td>DECDSP II(Section B)</td>
<td>SEC IV (Project))</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>(2)*</td>
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</tr>
</tbody>
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Total credits semester V and VI: 12(04)*
Swami Ramanand Teerth Marathwada University, Nanded

B.Sc. First Year DAIRY SCIENCE

Choice Based Credit System (CBCS) - Semester Pattern

Objectives :-

The course is planned to acquaint the students with
I. Farming aspects in livestock and poultry so as to prepare themselves for future

Prospectus

II. Geographical distribution & trends in population growth

III. Role in national economy

IV. Their socio-economic aspects

V. Role of NDDB, Co-Op. Society, Role of OFP.

VI. Sanitary and hygienic conditions in Animal farm

VII. Establishment of Dairy Farm

VIII. Study of various diseases and disorders in livestock

IX. Milk, its composition, properties & nutritive Values

X. Physiology of Lactation

XI. Milk utilization trends in India

XII. Disposal of farm waste & Carcass, Recycling of waste.
**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY**

**NANGED**

**Choice Based Credit System (CBCS)**

**Semester Pattern**

**DAIRY SCIENCE**

**B.Sc. F.Y.-CCDS I and Semester -I**

**Section A**

**Theory Paper I**

**Title – Dairy Farming in India**

<table>
<thead>
<tr>
<th>Marks – 50/Credit</th>
<th>3 Periods per week</th>
<th>Total Periods</th>
<th>No. of periods</th>
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</thead>
<tbody>
<tr>
<td>2+0</td>
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<td>45</td>
<td></td>
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</tbody>
</table>

**Unit – I**

- Introduction to Dairy farming in India.  
- History of Domestication of Dairy animals.  
- Taxonomic classification of Dairy animals.  
- Common terminologies used in Animal husbandry.  

**Unit – II**

- Animal husbandry regions in India.  
- Animal adaptation and behavioral patterns.  
- Cattle and Buffalo : Role in national Economy  
- Study of Dairy farming system in India  
- Role of Dairy co-operatives, NDDB and OFP in enhancing milk production

**Unit – III**

- Establishment of Dairy farm  
- Selection of site.  
- Different structures and their location and space requirement and housing materials.  
- Capital – Types, ways of raising.

**Unit – IV**

- Types of housing for Dairy animals.  
- Water supply, light & ventilation, Drainage system.  
- Disposal of Carcass and Recycling of Dairy animal Wastes  
- Maintenance of sanitary and hygienic conditions on farm.
<table>
<thead>
<tr>
<th>Unit – I</th>
<th>3 Periods per week</th>
<th>Total periods 45</th>
<th>No. of periods</th>
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<tbody>
<tr>
<td>Introduction to the subject</td>
<td></td>
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<td>08</td>
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<tr>
<td>Production and Utilization trends of milk in India</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactation, Lactation Period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphology and anatomy of Udder</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Unit – II                     |                    |                  | 15            |
| Endocrine glands and Hormones in milk secretion |                    |                  |               |
| Theories of milk secretion    |                    |                  |               |
| Physiology of milk secretion  |                    |                  |               |
| Milk: Definition, Composition. |                    |                  |               |

| Unit – III                    |                    |                  | 12            |
| Study of major milk constituents |                    |                  |               |
| Water – physical state of milk |                    |                  |               |
| Proteins in milk              |                    |                  |               |
| Lactose in milk               |                    |                  |               |
| Lipids in milk                |                    |                  |               |
| Study of minor constituents of milk |                |                  |               |
| Nutritive value of milk       |                    |                  |               |

| Unit – IV                     |                    |                  | 10            |
| Factors affecting quality and quantity of milk |                    |                  |               |
| Physical and chemical properties of milk    |                    |                  |               |
| Sources of contamination in milk |                    |                  |               |
| Clean milk production |                    |                  |               |
| Classification of Bacteria and Fermentation of Milk. |                    |                  |               |
Choice Based Credit System (CBCS)
Semester Pattern

DAIRY SCIENCE
B.Sc. F.Y.-CCDS II and Semester -II

Section A
Theory Paper III
Title – Processing Technology of Milk

<table>
<thead>
<tr>
<th>Marks – 50/Credit</th>
<th>3 Periods per week</th>
<th>Total periods -- 45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit – I</td>
<td>No. of periods</td>
<td></td>
</tr>
<tr>
<td>2+0</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

- Procurement of milk : Collection and Transportation, Cooling of milk 13
- Milk Processing – a) Straining, Filtration, Clarification  
  b) Pasteurization LTLT, HTST  
  c) Homogenization  
  d) Sterilization

UNIT – II  12

- Legal standards – HACCP, FSSAI, Judging & Grading of milk.  
- Pricing policy  
- Standardizing and toning of milk.  
- Storage and milk packaging  
- Distribution of milk

UNIT- III  10

- Layout of milk processing plant  
- Flooring, Ventilation, Doors, Windows  
- Drainage system, washing unit  
- Rodent control  
- Maintenance of hygiene

UNIT – IV  10

- Milk and Metals used in Dairy Industry.  
- Steam: Forms, Generation & Uses.  
- Refrigeration  
- Dairy effluent treatment and Disposal
Title – Farm Animal Health Management

Marks – 50/Credit 2+0  3 Periods per week  Total periods 45

Unit – I

<table>
<thead>
<tr>
<th>No. of periods 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of sick animals.</td>
</tr>
<tr>
<td>Study of healthy conditions in farm animals.</td>
</tr>
<tr>
<td>Classification of Diseases</td>
</tr>
<tr>
<td>Common terminologies used in animal treatment; like ointment, purgatives &amp; laxatives, tonics, lotions, emulsion, astringent, liniments, enema, disinfectants.</td>
</tr>
<tr>
<td>Immunology : Definition, concept, types.</td>
</tr>
</tbody>
</table>

Unit-II

| 14 |
| Study of diseases of economic importance (With reference to causative organism, pathogenesis, etiology, symptoms, prevention, treatment and measures) FMD, RP, HS, BQ, Anthrax, Brucellosis. |
| Dystokia, prolapsed of uterus and vagina |
| Diseases of Lactating cows : Mastitis, Milk fever, Ketosis. |

Unit-III

| 10 |
| Diseases of calf : Pneumonia, calf scours, diarrhea, Joint ill, Naval ill, Worm infestation, Rickets |
| Parasitic and protozoan diseases: Theilariosis, Babesiosis, Trypansomiasis, Trichomoniasis. |
| Control of Ecto and Endo parasites of animals. |

Unit-IV

| 10 |
| Diseases of sheep and Goat : PPR, blue tongue. |
| Diseases of pigs : swine fever / Hog cholera |
| Diseases of poultry : Ranikhet, Coccidiosis, Marek’s, Gumboro. |
Choice Based Credit System (CBCS)

Semester Pattern

DAIRY SCIENCE

B.Sc. F.Y.-CCDSP-I and Annual Pattern

Practical Paper V

Practicals based on CCDS – I (Section A & B) And CCDS – II (Section A & B)

Marks  – 100/Credit 0+4

4 Periods per week

1) Morphology of cattle and buffalos
2) Linear Body measurements – Body wedges and estimations of body weight.
3) Study of Udder
4) Recording Temperature, pulse rate, respiration, Heart rate and Auscultation
5) Drenching, Injections and Vaccinations.
6) Pathological tests – Blood tests, Urine tests, Test for mastitis.
7) Preparation of drugs like, ointment/liniment/bolus
8) Sampling of Milk
9) Organoleptic evaluation of milk / platform tests.
10) Determination of Specific gravity.
11) Determination of Acidity and pH.
12) Determination of Viscosity.
13) Determination Electrical conductivity and Refractive Index
14) Determination of Fat.
15) Determination of SNF, TS.
16) Record keeping.
17) Farm layout.
18) Visit to – Dairy farm, Dairy plant, Agricultural and Veterinary College, Veterinary Hospital.
List of Equipments, Glass ware's materials for Practical's

Models/ Charts / Photographs of cattle and buffalo.

Various types of sanitizers, disinfectants
Thermometer, Stethoscope
Digital balance
Equipments and materials for preparation of various drugs
Glucometer, aemoglobinometer, glass wares and equipments for various pathological tests.
Housing models
Injection-vaccination equipments
Model of Udder,
figures showing internal and external structure
Platform test equipment
Centrifugal fat testing machine,
milk – o – tester, Milk analyzer
pH meter, pH paper
Oven, Viscometer
Electrical conductivity meter
Laboratory glass wares and required chemicals Richmand’s scale for TS
Refractomater
- List of Reference Books -

2. Advances in Dairy animal Productions - Mudgal
3. Animal Husbandry and Rural Development - Kar
4. Dairy cattle and Milk production - Eckles
5. Disease of Animal Transmissible to man - Thpliyal
6. Fundamentals of Animal Hygiene and Epidemiology - Thpliyal
8. Instant veterinary Drug Index - Dabax
9. Poultry Diseases of Farmers - Vegad and Suresh
10. Handbook of Veterinary Physicians - Sapre
12. Livestock and Poultry Production - Singh & Moore
15. Treaties and Treatment Vol I & II - Srinivasn
16. Livestock Health and Housing - David and Peter
17. Dairy Cattle Science - Ensmiger
18. Veterinary Medicine - Blood and Henderson
20. A Student Laboratory manual of veterinary physiology - Sharma
22. Multiple Choice Questions in Animal Husbandry - K.G. Dande & Gaikwad S. M.
23. Management of Animals - Satish Kulkarni
25. Milk and Milk Products - Eckless, Combs and Macacy
27. Dairy Chemistry - M.M.Rai
28. Principals of Dairy Chemistry - Jeneess & Patton
31. Dairy Chemistry - Fox
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Author(s)</th>
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<tbody>
<tr>
<td>32.</td>
<td>Dairy Processing</td>
<td>James Warner</td>
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<td>34.</td>
<td>Dictionary of Dairying</td>
<td>Davis &amp; E.M. Farrell</td>
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<td></td>
<td>LeonardHill Engineering for Food and Dairy Processing</td>
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<tr>
<td>35.</td>
<td>Dairy Plant-Management and Engineering</td>
<td>TufaiAhemad</td>
</tr>
<tr>
<td>37.</td>
<td>Milk Testing</td>
<td>J.G. Davis</td>
</tr>
<tr>
<td>38.</td>
<td>Dairy Microbiology</td>
<td>K.C. Mahanta</td>
</tr>
<tr>
<td>39.</td>
<td>Dairy Bacteriology</td>
<td>Hammer</td>
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<td>40.</td>
<td>Fundamentals of Dairy Microbiology</td>
<td>J.B. Prajapati</td>
</tr>
<tr>
<td>41.</td>
<td>Standard Methods for Examination of Dairy Products</td>
<td>Gary H. Richardson</td>
</tr>
<tr>
<td>42.</td>
<td>Market Milk Industry</td>
<td>C.I. Rhodhouse &amp; J.L. Henderson</td>
</tr>
<tr>
<td>43.</td>
<td>Comprehensive Dairy Microbiology</td>
<td>Yadav, Batish and Grover</td>
</tr>
<tr>
<td>44.</td>
<td>A Text Book of Animal Husbandry</td>
<td>G.C. Banerjee</td>
</tr>
<tr>
<td>45.</td>
<td>The Fluid Milk Industry-Henderson</td>
<td>ISI Specifications - BISPublication</td>
</tr>
<tr>
<td>46.</td>
<td>Technology of Dairy plant operations</td>
<td>K.P.S. Sangwan</td>
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<tr>
<td>47.</td>
<td>Technology of milk processing</td>
<td>C.P. Anantakrishnan,</td>
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<td></td>
<td>A.Khan And P.N. Padmanabhan</td>
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<td>48.</td>
<td>Milk and Its properties</td>
<td>S.M. Srivastava</td>
</tr>
<tr>
<td>49.</td>
<td>Chemical &amp; Microbiological Analysis of Milk &amp; Milk projects</td>
<td>Ramakant Sharma</td>
</tr>
</tbody>
</table>

Dr. A.S. Hembade  
Chairman  
(Board of Studies in Dairy Science)
Q.1 Spotting – (10 spots) Dairy equipments / Glasswares / specimen/model 20

Q.2 Linear body measurements and estimation of body weight/ Study of Udder 10

Q.3 Taking Body Temperature, Pulse rate, respiration rate, Heart rate/ Pathological tests/Sensory evaluation of milk 10

Q.4. Determination of specific gravity /acidity and PH/electrical conductivity and Refractive Index. 15

Q.5. Determination of milk fat/TS & SNF/Viscosity 15

Q.6. Preparation of Ointment/Liniment/Vaccination schedule/ Submission of farm layout. 10

Internal /CA : Record Book & Viva-voce 10

Excursion Report / Visit Report. 10