॥ 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

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

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

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदव्यूत्तर द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, या विद्यापीठा अंतर्गत येणा–या सर्व संलग्नित महाविद्यालयामध्ये शैक्षणिक वर्ष २०२४–२५ पासून राष्ट्रीय शैक्षणिक धोरणानुसार पदव्यूत्तर द्वितीय वर्षाचे अभ्यासक्रम लागू करण्याच्या दृष्टीकोनातून विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत येणा–या अभ्यासमंडळांनी तयार केलेल्या पदव्यूत्तर द्वितीय वर्षाच्या अभ्यासक्रमांना मा. विद्यापरिषदेने दिनांक १५ मे २०२४ रोजी संपन्न झालेल्या बैठकीतील विषय क्रमांक १५/५९–२०२४ च्या ठरावाअन्वये मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील खालील एम. एस्सी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) लागू करण्यात येत आहेत.

1) M. Sc. II year Biotechnology (Affiliated College)
2) M. Sc. II year Biotechnology (Campus)
3) M. Sc. II year Bioinformatics (Sub Campus Latur)
4) M. Sc. II year Bioinformatics (Affiliated College)
5) M. Sc. II year Clinical Research (Affiliated College)
6) M. Sc. II year Botany (Campus)
7) M. Sc. II year Herbal Medicine
8) M. Sc. II year Boany (Affiliated College)
9) M. Sc. II year Geology (Campus)
10) M. Sc. II year Dairy Science
11) M. Sc. II year Electronics
12) M. Sc. II year Environmental Science
13) M. Sc. II year Environmental Science (Campus)
14) M. Sc. II year Geography (Campus)
15) M. Sc. II year Applied Mathematics
16) M. Sc. II year Mathematics
17) M. Sc. II year Mathematics (Campus)
18) M. Sc. II year Microbiology
19) M. Sc. II year Microbiology (Campus)
20) M. Sc. II year Statistics
21) M. Sc. II year Statistics (Campus)

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/एनइपी/विवत्रंविपदवी/२०२४–२५/१०९
दिनांक १२.०६.२०२४

डॉ. सरिता लोसरवार
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : १) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मुंल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) मा. संचालक, सर्व संकुले परिसर व उपपरिसर, प्रस्तुत विद्यापीठ
५) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदर परिपत्रक संकेतस्थळावर प्रसिध्द करण्यात यावे.

SWAMI RAMANAND TEERTH

MARATHWADA UNIVERSITY

NANDED

SYLLABUS

of

M.Sc. Second Year

DAIRY SCIENCE

(NEP)

CBCS Semester Pattern

Effective from June

2024-25

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Credit Framework for Two Year PG Program

Subject: Dairy Science

Year & Level 1	Sem. 2	Major Subject (DSC) 3	Major Subject (DSE) 4	RM 5	OJT / FP 6	Research Project 7	Practicals 8	Credits 9	Total Credits 10
2	3	**SMD DSC-301(4 Cr)** **SMD DSC-302(4 Cr)** **SMD DSC-303(4 Cr)**	**SMD DSCE-301(4 Cr)** (***From same Department / School)***	--		**SMD DSCRP-304 (4Cr)** Research Project	**SMD DSCP-301(1 Cr)** **SMD DSCP-302(1 Cr)**	**22**	**44**
	4	**SMD DSC-401(4 Cr)** **SMD DSC-402(4 Cr)**	**SMD DSCE-401 (4 Cr)** (***From same Department / School)***	**SMD DSCPE-403** Publication Ethics (2 Cr)		**SMD DSCRP-404 (6 Cr)** Research Project	**SMD DSCP-401(1Cr)** **SMD DSC-402(1Cr)**	**22**	
Total Credits		**20**	**08**	**02**		**10**	**04**	**44**	

M. Sc. Second Year Semester III *(Level 6.0)*

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	**SMD DSC-301**	Dairy Engineering	04	--	**04**	04	--
	SMD DSC-302	Dairy Microbiology	04	--	**04**	04	--
	SMD DSC-303	Packaging and Quality Assurance	04	--	**04**	04	--
Elective (DSE)	**SMD DSCE-301**	Dairy Plant Management	04	--	**04**	04	--
Research Project	**SMD DSCRP-304**	Research Project	04	--	**04**	04	
DSC Practical	**SMD DSCP-301**	Lab 09 Practical Based on SMDDSC-301(DE)	--	01	**01**	--	02
	SMD DSCP-302	Lab 10 Practical Based on SMDDSC-302(DM)	--	01	**01**	--	02
Total Credits			**20**	**02**	**22**	**20**	**04**

M. Sc. Second Year Semester III *(Level 6.0)*

Examination Scheme

[20% Continuous Assessment (***CA)*** and 80% End Semester Assessment (***ESA***)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits of 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)	**Test II (5)**	**Avg of (T1+T2)/2 (6)**	**Total (7)**	**CA (8)**	**ESA (9)**	
Major	**SMD DSC-301**	Dairy Engineering	20	20	20	80	--	--	100
	SMD DSC-302	Dairy Microbiology	20	20	20	80	--	--	100
	SMD DSC-303	Packaging and Quality Assurance	20	20	20	80	--	--	100
Elective (DSE)	**SMD DSCE-301**	Dairy Plant Management	20	20	20	80	--	--	100
Research Project	**SMD DSCRM-304**	Research Project	20	20	20	80	--	--	100
DSE Practical	**SMD DSCP-301**	Lab 09- Practical Based on SMDDSC-301(DE)	--	--	--	--	05	20	25
	SMD DSCP-302	Lab 10- Practical Based on SMDDSC-302(DM)	--	--	--	--	05	20	25

M. Sc. Second Year Semester IV *(Level 6.0)*

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	**SMD DSC-401**	Judging and Packaging of Milk and Milk Products	04	--	**04**	04	--
	SMD DSC-402	Quality Control and Sensory Evaluation of Milk and milk Products	04	--	**04**	04	--
Elective (DSE)	**SMD DSCE-401**	Dairy Business Management and Co-Operation	04	--	**04**	04	--
Publication Ethics	**SMD DSCPE-403**	Publication Ethics	02	--	**02**	02	
DSC Practical	**SMDDSCP-401**	Lab 11 Practical based on SMD DSC-401(JPMMP)	--	01	**01**	--	02
	SMD DSCP-402	Lab 12 Practical based on SMDDSC-402(QCSEMMP)	--	01	**01**	--	02
Research Project	**SMD DSCRP-404**	Research Project	--	06	**06**	--	06
Total Credits			**14**	**08**	**22**	**14**	**10**

M. Sc. Second Year Semester IV *(Level 6.0)*

Examination Scheme

[20% Continuous Assessment (***CA)*** and 80% End Semester Assessment (***ESA***)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits of 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)	**Test II (5)**	**Avg of (T1+T2)/2 (6)**	**Total (7)**	**CA (8)**	**ESA (9)**	
Major	**SMD DSC-401**	Judging and Packaging of Milk and Milk Products	20	20	20	80	--	--	100
	SMD DSC-402	Quality Control and Sensory Evaluation of Milk Products	20	20	20	80	--	--	100
Elective (DSE)	**SMD SCE-401**	Dairy Business Management and Co-Operation	20	20	20	80	--	--	100
Publication Ethics	**SMD DSCPE 403**	Publication Ethics	10	10	10	40	--	--	50
DSE Practical	**SMD DSCP-401**	Lab 11 Practical based on SMD DSC-401(JPMMP)	--	--	--	--	05	20	25
	SMD DSCP-402	Lab 12 Practical based on SMD DSC-402(QCSEMMP)	--	--	--	--	05	20	25
Research project	**SMD DSCRP-404**	**Research project**	--	--	--	--	30	120	150

Semester - III
Paper No- SMD DSC- 301
Dairy Engineering

Period per Week - 04 **Credits-4**

Objectives:

- To inculcate the knowledge regarding various engineering materials used in dairy industry.
- Installation and operations of various equipment's and machines used in dairy plant.
- Unit operations.
- Various Lay-out procedures.
- To know the installation and working principles of various equipment's and machineries.
- To know the conveying methods used in dairy plant.

UNIT – I : Dairy Engineering Materials, Lay-out and fluid flow. **15**

- Introduction to Dairy Engineering.
- Engineering properties of milk & milk products.
- Various materials for dairy plant, Machineries and equipment's.
- Design and Lay-out of dairy plant (Chilling Centre, Mini dairy plant, Composite milk processing plant

UNIT – II : Utility / Services for dairy plant. **15**

- Water supply, Quality of water, water softening treatment for boiler use. Boiler safety devices.
- Study of boilers, Type, installation, working operation.
- Boiler fuels
- Steam pipelines – Installation, care and maintenance Boiler safety regulation.

UNIT- III : Conveying systems: **15**

- Definition and objectives.
- Types of conveyors used in dairy industry
- Maintenance of conveying system.
- Calculations of conveying load.

Unit – IV: Washers: **15**

- Can washers – Types, installation, working and care and maintenance.
- Filters, Types, installation, working and maintenance.
- Bottle washers – Types, installation, working and maintenance.
- Create washers – Types, installation, working and maintenance.
- Sonic vibrators.
- CIP system.

Reference Books.

- A text book of Dairy Engineering – C. N. Hall
- Engineering for Dairy and Food products – E.M. Farral
- Dairy plant Engineering and management – Tufail Ahmad.
- Food engineering and Dairy Technology – Ing. H.C. Kessler.
- Modern Dairy Technology and engineering – Harpar and Hall
- UHT Processing of milk and milk products.
- Heat transfer – C. P. Gupta and Rajendra Prasad.
- Principles of unit operations – Alon S. Fouretal
- Fluid mechanics – Yuan
- Process equipment Design – Hasse and Ruston
- Refrigeration, Air Conditioning and environmental pollution control – Kadabmi
- Engineering properties of foods – M.A. Rao and S.S.H. Razwi
- Dairy engineering technology and Engg. Fo dairy plant operations – C.P.

Anantkrishna and simha N.N.

Semester - III

Paper No.-SMD DSC-302

Dairy Microbiology

Period per week – 04 **Credits: 04**

Objectives:

- To provide advanced knowledge of various aspects of dairy microbiology
- Study of advances in dairy microbiology
- To know recent techniques in microbiology
- Various Lay-out procedures.
- To study proposition of starter cultures.

Unit – I:

Historical and introductory Dairy Microbiology. **15**

- Introduction to cell biology
- Structural difference in Eukaryotic and prokaryotic cells.
- Historical background of microbiology
- Classification of various groups of microorganisms associated with industry.

Unit – II : Microbiology of western Dairy products. **15**

- Microbiology of cream, Butter.
- Microbiology of dialed milks : WMP, SMP and formula foods, conversed milk.
- Microbiology of cheese.
- Microbiology of Ice-cream of other frozen products.

UNIT – III : Microbiological standards **15**

- Microbiological standards for milk and milk products. BIS standards.
- USDA / FDA standards, UK standards, USPHS, APHA Standards.
- ICMFS, IDF / ISO / AOAC standards.

Unit – IV : Microbiology of milk **15**

- Sources of milk contamination and their control.
- Microfora of raw milk
- Microflora of market milk.
- Microbiology of pasteurized of sterilized milk
- Diseases transited through milk and milk products.']
- Milk products and human health.

Reference Books:

- Dairy microbiology I & II – R. K. Robinson
- Compressive dairy microbiology – Yadav, Batish and Grover.
- Fundamentals of Dairy microbiology: J. B. Prajapati
- Testing of milk and milk product : Atherton and Newlender

Semester – III

Paper No.-SMD DSC-303

Packaging and Quality Assurance

Periods Per week : 04 **Credits : 04**

Objectives :

- To know the utilities of packaging necessary for dairy industry.
- To study the various packaging materials for milk and milk products.
- To know the trends in packaging materials in dairy industry.
- To know the importance of quality assurance in dairy sector.

Unit – I : **15**

- Objectives of packaging.
- Packaging material used in dairy industry.
- Packaging of milk and it's types. Bottle capping and packaging, Tetra packs, cans,cones etc.
- Packaging of milk products.

Unit – II : **15**

- Study of form, fill and seal machines (Polypacks)
- Automation in packing of milk
- Automation in packing of different milk products.
- Recent trends in packaging materials used in dairy industry.

Unit – III : **15**

- Enrichment of shelf life of indigenous dairy products by the application of modern processing and packaging techniques.
- Sensory evaluation of Indian dairy products.
- Nutritional significance of unlue added dairy products.
- Reuse of packages, recycling of packaging materials and disposal of usedpackages.

Unit – IV : **15**

- Strategies for globalization of Indian dairy products.
- 3-A sanitary standards for the hygienic packaging of milk and milk products.
- HACCP for dairy industry and International food laws.
- ISO standards and quality of dairy products.
- International food safety and Quality system certification.
- Prevention of food adulteration act and rules.
- FSSAI (Food safety standards Authority India) Regulation in dairy industry.
- Crime and punishment for adulteration in milk and milk products.

Reference Books:

- Quality Assurance monograph SMC College of Dairy Science of Anand.
- ISI bulletin for analysis of milk and milk products – BIS publication.
- PFA and MMPO Handbook.
- Testing of milk and milk products – Atherton and Newlendor.
- Text book Dairy Chemistry – B. R. Ling.
- Food safety and standards Act 2006. Rules and Regulation – 2011 – P.M. Kulkarni
- Packaging Bulletin
- Handbook of pollution control management – Hurburt F. Bund.

Semester – III

Paper No.-SMD DSCE-301

Dairy Plant Management

Period per week – 04 **Credits: 04**

Objectives:

i) To study the principles & functions of Dairy Plant Management.
ii) To know the various ways and means of plant maintenance.
iii) To know the recent concept in the production management and food hygiene.
iv) To study the dairy plant design and types of dairy plant layout.
v) To study the process of sanitations and dairy waste disposal.

UNIT – I: **General Dairy Management:** **15**

- Management and Administration.
- Personal management, qualities of leader, manpower planning, recruitment, training, transfer, promotion policies, job specifications, job evaluation, job enhancement, job enrichment, MBO. The labour Union, profit system, Labour problems.
- Entrepreneurship Development.
- Entrepreneurial opportunities in India Dairying.
- Industrial legislation in India, particularly in dairy industry and statutory requirement for dairy industry-FSSAI, ISO-9001, ISO-22000, ISO-14000, ISO- 50000, HACCP, GMP, GHP, CAC, etc.

UNIT – II : **Plant Design:** **15**

- Types of plant layout, location of plant and selection of sites.
- Maintenance of dairy plant flooring and drainage lines, water supply, boiler house, service lines for electricity, water, steam and refrigeration.
- Dairy Equipment maintenance, plant maintenance and efficiency factors.
- Food hygiene, personal hygiene, plant hygiene, etc.

UNIT – III : **Plant Management :** **15**

- Principles and functions of production management, product planning and control.
- Work study and measurement motion and time study, production efficiency and factors losses, personnel management.
- Material losses of dairy plant and hazardous processes.
- Uses of common lubricants (Food grade).

UNIT – IV : **Cleaning, Sanitation and Dairy Waste Disposal :** **15**

- Different types of detergent and sanitizers required for cleaning in dairy industries.
- Cleaning in place and its types.
- Present trends in cleaning and sanitation in dairy plants i.e. Bio Detergents, ultrasonic technique, etc.
- Types of Dairy waste from different sections, waste treatment: primary and secondary treatment.
- RO-Technique for waste disposal, wastes recycling, etc.

Reference Book:

- Dairy plant design and layout.- Sunil M. Patel and A.G. Bhadania
- Dairy plant management and pollution control.- V. Vijaya Geetha
- Dairy Plant-Management and Engineering -Tufail Ahemad
- Technology of Dairy Plant Operation -K.P.S. Sangwan
- Dairy plant Management - D.B. Puranik
- Dairy plant Management - P.H. Tracy

Paper No.- SMD DSCP-301
(Lab 09 Practical Based on SMD DSC-301 DE)

One Practical of 3 Periods per week **Credits : 01**

1. Layout for different types of dairy plants
2. Preparation of detergent and sanitizer solutions
3. Study of compression, refrigeration system
4. Study of process equipment's: Chillers, Filters and clarifiers, Storage tanks and milk silos.
5. Study of CIP system.
6. Study of repairs and overhauls Study of packaging materials
7. Visits to:
   1. Processing plant
   2. Engineering workshop,
   3. Boiler unit,
   4. Refrigeration unit.

Paper No.- SMD DSCP-302
(Lab 10 Practical Based on SMD DSC-302 DM)

One Practical of 3 Periods per week **Credits : 01**

1. Microbiological analysis of milk & milk products by qualitative methods (SPC and DMC).
   a).Cream.
   b). Milk powder
2. Various staining techniques used to study. Morphological characteristics of microorganisms.
3. Preparation of media for staphylococci and coliforms in milk products.
4. Staining of bacteria from milk.
5. Rinse and Swab techniques.
6. Study of dairy effluent treatment plant
7. Estimation of BOD and COD in dairy effluent.
8. Study of plant Hygiene.
9. Study of Water Quality and electricity supply.
10. Study of spear parts inventory tools and lubricants.
11. Visits to:
    1. Processing plant.
    2. ETP

Paper No.- SMD DSCRP-304

Credits-04

Semester IV
Paper No.- SMD DSC-401

Judging and Packaging of Milk and Milk Products

Period per week – 04 **Credits 4**

Objectives

- To impart advanced knowledge about dairy product packaging to extend the shelf life of product by favorable appropriate packaging material and advanced techniques.
- To impart knowledge about the judging and grading of dairy product in the industrial level.
- This course provides knowledge on packaging materials used in dairy industry.
- Students will learn about the various properties of packaging materials and their effects over the packed food.
- Students will get idea regarding the threshold value, sensory evaluation and its methodologies in dairy products.

Unit I : **Judging and grading –** Defects in milk, score card and its uses – judging and grading of milk- judging and grading of fat rich products - judging and grading of frozen dairy products - judging and grading of concentrated milk products - Judging and grading of dried milk products - judging and grading of fermented milk products- judging and grading of indigenous milk sweets.

Unit II: **Packaging:** Concept, history, importance, Scope in relation to dairy industry. Present trends of packaging in dairy industry- Packaging materials, classification, characteristics, merits and demerits, Safety aspects of packaging, packaging materials in relation to human, animal and environment. Concept of coding and labeling procedures. Disposal of packaging materials. Recycling of packaging materials. packaging of heat and acid coagulated, cultured and desserts. Biodegradable packaging.

Unit III: **Packaging techniques**– Packaging technique like vacuum packaging, Modified atmospheric packaging (MAP) ,oxygen absorbers/scavengers,

Poly clip system, aseptic packaging. Compatibility and toxicity of packaging materials. Types of tests. Panel selection, screening and training judges, requirement of sensory evaluation, sampling procedures and sensory characteristic of food.

Unit IV: Emerging Trends and Technologies in Packaging:

• Modern and emerging packaging systems for Dairy products: Active packaging, Intelligent packaging, Nanotechnology packaging, Edible packaging, antimicrobial packaging, Smart packaging.

• Applications of edible film and coating in the dairy industries: Covering, Wrapping, Delivering, modifying

Reference Books :

1. Aneja.R.P, B.N Mathur, R.C Chandra and A.K. Banerjee 2002,Technology of Indian Milk and Milk Products, Dairy India Publication.
2. Dairy India year book 2007 & 2017, A- 25 Priyadarshini vihar, Delhi 110092,India.
3. Eeckless, C.H., Combs,W.B. and Macy, H., 1955, Milk and Milk Products, TataMcGraw-Hill Publishing Company Ltd., New Delhi.
4. SubhasishBiswas, Subhash Kumar Battacharyya, 2006, Milk and milk productstechnology, Jaypee Brothers medical publishers (P) Ltd, New Delhi.
5. Sukumar, De., 1980, Outlines of Dairy Technology, Oxford University Press,New Delhi.
6. Jung H. Han, (2013), Innovations in Food Packaging, Imprint: Academic Press.
7. Packaging of Dairy Products (agrimoon.com)

Semester – IV

Paper No.-SMD DSC-402

Quality Control and Sensory Evaluation of Milk and Milk Products

Periods per week: 4 **Credit: 04**

Objectives:

i) Study various terminology related to sensory evaluation of milk and milk products.

ii) Study acquaint about the 9-point hedonic scale of sensory evaluation.

iii) To check and maintain the quality of milk and milk products.

iv) Study of different quality management organizations.

v) To get information about role and functions of different organization for maintaining standards ofdifferent milk products.

Unit – I

- Concept and need of quality.
- Quality assurance: Meaning, scope.
- Inter relation of quality assurance and quality control.
- Quality control: Meaning, advantages and response.

Unit – II

- Management and quality control.
- Quality control and consumers.
- Various quality management systems i.e. ISO- 9000, TQM, HACCP.
- Various organization involved in quality control and their functioning. (National and International)

Unit – III

- Design, layout and requirements for quality control laboratory.
- Sensory evaluation: concept, meaning, scope, principle involved.
- Role of sense organs and its physiological considerations while evaluating test product i.e. skin, eye, tongue, nose and ear.
- Classification of taste, flavour, odour.

Unit – IV

- Terminology in relation to sensory evaluation.
- Score cards: milk and milk products.
- Score card structure, based on numerical value.
- Application of score card in sensory evaluation.
- Tabulation and interpretation of data.

Reference Books :

1. Judging dairy products, J.A. Nelson and G.M.Trout (1981) AVI Pub. Co.
2. Quality control in food Industry. Vol 1, S.M. Hersehedoerfer (1967) Acd.Press
3. Quality control in food Industry. A. Kremmer and B.A. Trigg (1970), AVI Pub. Co.
4. Glossary of general terms for sensory evaluation of foods, Part I and II : ISI
5. Guide for sensory evaluation for foods, : ISI

Semester –IV

Paper No. –SMD DSCE-403
Dairy Business Management and Co-operation

Period per week – 04 **Credits: 04**

Objectives :

i) To study the challenges and opportunities of dairy entrepreneurs in India.

ii) To know the various principle of cooperation and cooperative movement for dairyindustry.

iii) To study the demand and supply of milk and milk product.

iv) To study financial management and cost accounting with respect to dairyindustry.

v) To study the marketing management of milk and milk products and pricingpolicies of milk procurement.

UNIT – I : **11**

Business Administration and pricing policy:

- Resource planning and pricing policies of milk procurement.
- Sources of finance: study of financing agencies for dairying.
- Demand Analysis: Law of demand, Determinants of demand, types of demand,elasticity of demand, forecasting, etc. and law of supply.

UNIT – II : **11**

Finance Management:

- Financial management and cost Accounting: profit and loss statement, balancesheet, cash flow capital manage.
- Statements, BEP, inventory management, different cost concept, etc.

UNIT – III : **12**

Marketing Management:

- Definition, scope, function and importance of marketing management.
- Market planning, Market segmentations, Marketing mix-4 Ps, Marketing research,etc. with respect to milk and milk products.
- Types of marketing strategies and different channels mostly used for milkprocurement.
- Product recall strategy and market complaints redressed system.
- Advertisement and marketing channels in organized and unorganized sectors.
- Logistic management of milk and milk products.
- Recent trend in marketing and utilization of dairy products.

UNIT – IV : **11**

Co-operation:

- Definition and principle of cooperation – History and prospects.
- Structure of Dairy Cooperatives: Village level cooperatives, Taluka/District/Milkunions and state level marketing federation and their organization set up.
- Rights and duties of the chairmen, secretary and general body of the cooperativesociety.

Reference Books:

- Economics of dairy Farming in India-Ramkrishnappa V.
- Economics of milk marketing- Shojilal
- Dairy Farm business management-P.V. Rao
- Principles of dairy management- P.V.Rao

Semester IV

Paper No.- SMD DSCPE-403

PUBLICATION ETHICS **Credits02**

Semester IV

Paper No.- SMD DSCP-401

Lab-11 Practical based on SMD DSC-401 (JPM & MP)

Practical per week: 01 **Credit: 01**

1) Selection of judging the panels.
2) Training of judges for recognition of flavor and texture
3) Design, layout for judging sensory evaluation laboratory.
4) Legal aspects of packaging
5) Physico-chemical properties of packaging materials.
6) Testing of packaging materials.
   i) Thickness
   ii) Bursting strength
   iii) Sterilization of packaging materials.
   iv) Grease resistance.
7) Role of sense organs during evaluation of dairy products (skin, eye,tounge,nose & ear)
8) Score card structure for analysis of mild products (100 points, 20 points, 09 points, and 07 points hedonic scale)
9) Visit to packaging unit in dairy industry.

Semester IV

Paper No- SMD DSCP-402

Lab 12 Practical based on SMD DSC-402 (QC& SEMMP)

Practical Per week: 01 **Credit: 01**

1. Design and layout a hypothetical quality control laboratory.
2. Demonstration of sensory evaluation: concept, meaning, scope, principle involved.
3. Experiment on the role of sense organs (skin, eye, tongue, nose, and ear) in evaluating test products.
4. Classification exercise on taste, flavour, and odour of various milk products.
5. Practical use of scorecards for milk and milk products.
6. Application of scorecard in sensory evaluation of a variety of milk products.
7. Tabulation and interpretation of data collected from sensory evaluation.
8. Sensory Evaluation of Butter and Ghee
9. Sensory Evaluation of Shrikhand, Lassi and Dahi
10. Sensory Evaluation of Milk Powder and Paneer

Paper No.- SMD DSCRP-404

RESEARCH PROJECT **Credits-06**

DAIRY SCIENCE

List of Refereed, Peer reviewed and Indexed Journals with ISSN No

01	Journal of Food Science of Technology	:	ISSN 0022-115
02	Asian Journal of Dairy & Food Research	:	ISSN 09760563
03	The biosphere	:	ISSN 22517677
04	Journal of Animal production Advances	:	ISSN 2251-7219
05	Journal of Animal Science Advance	:	ISSN 1811-9751
06	International Journal of Dairy Science	:	ISSN 1557-4571
07	American Journal of food Technology	:	ISSN 2141-2448
08	International Journal of Livestock production	:	ISSN 1996-0794
09	African Journal of food science	:	ISSN 09715436
10	Indian Journal of Dairy and Bioscience	:	ISSN 22517685
11	Journal of Veterinary Advances	:	ISSN 09788988
12	Veterinary would (International Journal)	:	ISSN 0972-8988
13	Journal of Dairy Science	:	ISSN 0022-0302
14	Karnataka Journal of Agricultural Sciences	:	ISSN 13006045
15	American, European Journal Agricultural & Environmental Science	:	ISSN 18186769
16	New Zealand Journal of Dairy Science & Technology	:	ISSN 00288268
17	International Journal of Dairy Technology	:	ISSN 14710307
18	Journal of food science	:	ISSN 17503841
19	Pakistan Journal of Nutrition.	:	ISSN 16805194
20	International Journal of Food science and Technology	:	ISSN 13652621
21	Food science and Biotechnology	:	ISSN 20826456

22	Food Science and Nutrition	:	ISSN 248-7177
23	Emerald Nutrition and food science	:	ISSN 00346659
24	Dairy Science and Technology	:	ISSN 19585586
25	Italian journal of Animal Science	:	ISSN 15944077
26	Japanese journal and veterinary research	:	ISSN 00471917
27	Indian veterinary Journal	:	ISSN 0019-64799
28	Indian Journal of Animal Nutrition	:	ISSN 0970-3209
29	Patron	:	ISSN 09762310
30	International Journal of Agriculture innovations and Research	:	ISSN 2319-1473
31	Indian Dairyman	:	ISSN 0019-4603
32	Indian Journal of Dairy Science	:	ISSN 0019-5146
33	Animal Nutrition and Feed Technology	:	ISSN 0972-2963
34	Asian Journal of Microbiology, Biotechnology	:	ISSN 0972-3005
35	National Journal of life Sciences	:	ISSN 0972-995X
36	Asian Academic Research Journal of multidisciplinary	:	ISSN 2319-2801
37	periodic Research	:	ISSN 2231-0045
38	Journal of International Research for multidisciplinary (Impact Factor : 1.393)	:	ISSN 2320-5083
39	Golden Research Thoughts (Impact Factor : 1.2018)	:	ISSN 2231-5063
40	Indian Streams research Journal (Impact factor : 0.2105(GISI)	:	ISSN 2230-7850
41	Asian Resonance	:	ISSN 0976-8602
42	Review of Research Journal (Impact Fact : 1.6672 (UIF)	:	ISSN 2249-894X

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