Savitribai Phule Pune University

Shikshan Prasarak Sanstha's

S.N.Arts, D.J.M. Commerce and B.N.S. Science College, Sangamner 422 605

Three Year Bachelor of Vocational Degree Course in Science Faculty

Dairy Products and Processing (DPP)

UG Choice Based Credit System of Chemistry Programme for Affiliated College

1. Discipline : Science, Arts and Commerce

2. Name of the Course : Dairy Products and Processing

Title of the Programme-B. Voc.in
Dairy Product and Processing

Year	Semester	Course	Code	Title of the Course	Internal	External	Total Mark	Credit
1	I	**Theory**	DPP-101	English Communication &Soft Skills- I	50	50	100	4
			DPP-102	Market Milk Process Technology	50	50	100	4
			DPP-103	Livestock Production and Management	50	50	100	4
		Practical	DPP-104	**Practical –I** English Communication& Soft Skills I	75	75	150	6
			DPP-105	**Practical –II** Practical based on DPP-102	75	75	150	6
			DPP-106	**Practical –III** Practical based on DPP-103	75	75	150	6
	II	**Theory**	DPP-201	English Communication & Soft Skills II	50	50	100	4
			DPP-202	Chemistry Of Milk and Milk Products	50	50	100	4
			DPP-203	Principles of Animal Breeding	50	50	100	4
		Practical	DPP-204	**Practical I** - Communications & Soft Skills II	75	75	150	6
			DPP -205	**Practical II –** Practical based on DPP-202	75	75	150	6
			DPP -206	**Practical III**– Practical based on DPP- 203	75	75	150	6
2	III	**Theory**	DPP -301	Milk and Milk Products Technology Part -I	50	50	100	4
			DPP -302	Principles of Animal Nutrition	50	50	100	4
			DPP -303	Quality Control and Sensory Evaluation of Milk and Milk Products	50	50	100	4
		Practical	DPP -304	**Practical I** - Practical Based on DPP-301	75	75	150	6
			DPP -305	**Practical II –** Practical based on DPP-302	75	75	150	6
			DPP -306	**Practical III**– Practical based on DPP- 303	75	75	150	6

2	**IV**	Theory	DPP -401	Microbiology of Milk and Milk Products	50	50	100	4
			DPP -402	Milk processing and Integrated Livestock Farming	50	50	100	4
			DPP -403	Packaging of Milk and Milk Products	50	50	100	4
		Practical	DPP -404	**Practical I** - Practical based on DPP- 401	75	75	150	6
			DPP -405	**Practical II –** Practical based on DPP-402	75	75	150	6
			DPP -406	**Practical III**– Practical based on DPP- 403	75	75	150	6
3	V	**Theory**	DPP -501	Traditional and Value Added Dairy Products	50	50	100	4
			DPP -502	Poultry Production	50	50	100	4
			DPP -503	Milk and Dairy Products Analysis	50	50	100	4
		Practical	DPP -504	**Practical I** - Practical based on DPP- 501	75	75	150	6
			DPP -505	**Practical II –** Practical based on DPP-502	75	75	150	6
			DPP -506	**Practical III**– Practical based on DPP- 503	75	75	150	6
	VI	**Theory**	DPP -601	Food and dairy microbiology	50	50	100	4
			DPP -602	Sheep and Goat Production and Management	50	50	100	4
			DPP -603	Milk By product Technology	50	50	100	4
		Practical	DPP -604	**Practical I** - Practical based on DPP- 601	75	75	150	6
			DPP -605	**Practical II –** Practical based on DPP-602	75	75	150	6
			DPP -606	**Practical III**– Practical based on DPP- 603	75	75	150	6

B.Voc (Dairy Products and Processing)

Syllabus Structure B.Vocation (Dairy Products and Processing)

Course	First Year (Diploma)	Credits
	Semester I **Theory**	
DPP-101	English Communication &Soft Skills- I	**04**
DPP-102	Market Milk Process Technology	**04**
DPP-103	Livestock Production and Management	**04**
	Practical	
DPP-104	**Practical -I** EnglishCommunication & Soft Skills I	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
DPP-105	**Practical –II** Market Milk Process Technology	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
DPP-106	**Practical –III** Livestock Production and Management	**06**
	Lab Work	
	Field Work/Visit	
	Self-Learning	
One Month Industrial Training		
	Semester-II **Theory**	
DPP-201	English Communication & Soft Skills II	**04**
DPP-202	Chemistry Of Milk and Milk Products	**04**
DPP-203	Principles of Animal Breeding	**04**
	Practical	
DPP-204	**Practical I** - Communications & Soft Skills II	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
DPP-205	**Practical II**- Chemistry Of Milk and Milk Products	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
DPP-206	**Practical III-** Principles of Animal Breeding	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
	Industrial Training for One Months at dairy industry.	

Syllabus Structure B.Vocation (Dairy Product and Processing)

Course	Second Year(Advanced Diploma)	Credits
	Semester III Theory	
DPP-301	Milk and Milk Products Technology Part -I	**04**
DPP-302	Principles of Animal Nutrition	**04**
DPP-303	Quality Control and Sensory Evaluation of Milk and Milk Products	**04**
	Practical	
DPP-304	**Practical I -** Milk and Milk Products Technology Part -I	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
DPP-305	**Practical II -** Principles of Animal Nutrition	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
DPP-306	**Practical II -** Quality Control and Sensory Evaluation of Milk and Milk Products	**06**
	Practical Work	
	Field Work / Visit	
	Self Learning	
	Semester -IV Theory	
DPP-401	Microbiology of Milk and Milk Products	**04**
DPP-402	Milk processing and Integrated Livestock Farming	**04**
DPP-403	Packaging of Milk and Milk Products	**04**
	Practical	
DPP-404	**Practical I-** Microbiology of Milk and Milk Products	**06**
	Practical work	
	Field Work/Visit	
	Self-Learning	
DPP-405	**Practical II-** Milk processing and Integrated Livestock Farming	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
DPP-406	**Practical III -** Packaging of Milk and Milk Products	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
	Industrial Training(One Months)	

Syllabus Structure B.Vocation (Dairy Products and Processing)

Course	Third Year(B. Voc. Degree)	Credits
	Semester V **Theory**	
DPP-501	Traditional and Value Added Dairy Products	**04**
DPP-502	Poultry Production	**04**
DPP-503	Milk and Dairy Products Analysis	**04**
	Practical	
DPP-504	**Practical l -** Traditional and Value Added Dairy Products	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
DPP-505	**Practical –** Poultry Production	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
DPP-506	**Practical –III** Milk and Dairy Products Analysis	**06**
	Practical Work	
	Field Work/Visit	
	Self-Learning	
Semester-VI		
DPP-601	Food and dairy microbiology	**04**
DPP-602	Sheep and Goat Production and Management	**04**
DPP-603	Milk By product Technology	**04**
	Practical	
DPP-604	**Practical I** food and dairy microbiolog	**06**
	Practical Work	
	Field Work:	
	Self Learning	
DPP-605	**Practical II** - Sheep and Goat Production and Management	**06**
	Practical Work	
	Field Work /Visit	
	Self Learning	
DPP-606	**Practical II -** Milk By product Technology	**06**
	Practical Work	
	Field Work /Visit	
	Self Learning	

FIRST YEAR (DIPLOMA)

SEMESTER - I

SYLLABUS FOR B.VOCATIONAL (Dairy Products and Processing)

FIRST YEAR (Semester -I)

DPP: 101 Communication & Soft Skills (I)

Total Credit: 04 Total Periods: 60

Course Objectives

1. To develop the communicative skills of the students and thereby develop their proficiency in English language
2. To develop students' communicative competence
3. To develop oral and written communication skills so as to enable the students to present their ideas logically and effectively.
4. To encourage and enable the students to become proficient users of English language.
5. To introduce the different modes of Communication
6. To enhance their employability

Course Outcomes

1) The students are expected to increases Vocabulary and understand Grammar
2) Students develop their Listening skills, Speaking skills, Reading Skills and Writing skills
3) Improvement in students verbal communication
4) Improvement in students non verbal communication
5) Good English communication is expected

Communication and Soft Skills –I			
Unit No	**Topic**	**Learning Point**	**Periods**
1	**Communication**	Meaning and Definition Nature and scope of communication Importance of communication Process of communication Barriers to effective communication Overcoming the barriers Non verbal communication Body language Focus on English Skills- Vocabulary, Grammar Phonetics with Special reference to Grammar	**20**

2	**Communication Skills**	**Listening skills**: Types of listening, difference between listening and hearing, barriers to listening, principles of effective listening **Speaking skills**: Types of speaking, barriers to speaking, principles of effective speaking **Reading Skills**: Types of reading- skimming, scanning, extensive reading, intensive reading, Process of reading, barriers to reading, principles of effective reading **Writing skills**: Essentials of writing, barriers to writing, principles of effective writing	**10**
3	**Verbal Communication**	What is verbal communication? Types of verbal communication Oral communication Characteristics of oral communication Written communication Characteristics of written communication Difference between oral and written communication	**10**
4	**Non-verbal Communication**	What is non-verbal communication? Characteristics of non-verbal communication Types of non-verbal communication: Body language/kinesics, paralanguage/vocalic, space language/proxemics, sign language/symbols and signs, time language/chronemics, touch language/haptics, physical appearance Elements of Body language/kinesics Professional dressing and body language	**15**

5	**Feedback**	Types of feedback Principles of feedback Functions of feedback Significance of feedback in communication	**05**

References:-

1. Matila Treece: Successful Communication: Allyun and Bacon Pubharkat.
2. Jon Lisa Integrated skills in Tourist Travel Industry Logman Groups Ltd.
3. Robert T. Reilly- Effective Communication in Tourist Travel industry Dilnas Publication.
4. Boves. Thills Business Communication Today Mcycans Hills Publication.
5. Dark Studying International Communication Sage Publication.
6. Murphy Hidder and Thomas: effective Business Communication McGraw Hill.
7. Thorat,A. and Lokhandwala, M.(2009),Enriching Oral and Written Communication [OBS
8. Mohanraj J. and Mohanraj S. (2001), English Online [OBS]
9. Seely (2006), Oxford Guide to English speaking and writing [OUP]
10. Dutt, P. Kiranmal, GeethaRajeevan, CLN Prakash (2008), A Course in communication Skills [Foundation Books]
11. Anderson, Keith, John Maclean, Tony Lynch (2007), Study Speaking [CUP]
12. Goodale, Malcolm (2008), Professional Presentations [CUP]
13. Morley, David (2007), The Cambridge Introduction to Creative Writing [CUP]
14. Dutt, P. Kiranmal and Geetha Rajeevan (2007), A Course in Listening and Speaking
    (Vol. I & II) [Foundation Books]
15. Sasikumar, V., P. Kiranmal Dutt and Geetha Rajeevan (2007), Basic Communication
    Skills [Foundation Books]
16. O'Connor, J. D. – Better English Pronunciation (Latest Edition with CD)
17. Narayanswamy – Strengthen Your Writing (OBS)

DPP: 102 Market Milk Process Technology

Credit - 04 **Period - 60**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.

Sr. No.	Name of Topic	No. of Periods
1	Present status related to milk production, processing by organized Unorganized and private sector.	03
2	Milk utilization pattern scope for export of market milk.	04
3	Technology mission on dairy development in India and abroad in relation to past present and future.	06
4	operation flood programme, MMPO etc	04
5	Procurement pattern of milk- organized, unorganized and private sector	06
6	Pricing policy for procurement of milk	03
7	Role of bulk coolers in extension of shelf life and reduction of losses of raw milk	03
8	Alternative practices for preservation of raw milk i.e. LP system, zero-energy chamber	06
9	Quality assessment of milk- Chemical and microbial standards	05
10	Quality control measures for market milk: detection of adulteration, HACCP etc.	05
11	Processing of liquid milk: cooling, separation, standardization, homogenization, pasteurization and alternative processes like UHT, sterilization, bactofugation, packaging and cold storage	05
12	Processing of liquid milk and alternative processes like UHT, sterilization, bactofugation, packaging and cold storage	03
13	Disposal pattern of market milk- organized and unorganized sector	04

References Book:

1. Outline of Dairy Technology - Sukumar De, Oxford University Press 2008
2. The fluid milk industry- Hederson JL ,AVI Publishing Co, USA
3. Indian Dairy Industry - K. S. Ranagappa and K.L. Acharya, Asia Publishing house , Mumbai
4. Technology of Milk processing- Khan QA and Padmanabhan, ICAR, New Delhi.
5. Principle of Dairy Processing- J. N. Warner, Wiley Eastern Ltd. New Delhi.

DPP: 103 Livestock Production and Management

Total Credit: 04 **Total Periods: 60**

Objectives:

1) Study various livestock terminology

2) Study various managemental techniques to enhance production of animals

3) Study the various measures to improve the productivity of animals

4)Study of care and managemental practices of every category of animal

Sr. No.	Name of Topic	No. of Periods
1	Role and status of livestock in Agriculture	04
2	Study of cattle and Buffalo breeds	05
3	Characteristics of ideal dairy farm	02
4	Selection of elite animals	02
5	Management of calf	03
6	Management of heifers	03
7	Management of milking cows/buffaloes	03
8	Management of dry cows/buffaloes	03
9	Management of pregnant cows/buffaloes	03
10	Management of breeding bulls	04
11	Stress management of livestock.	06
12	Computation of ration for different categories of livestock	05
13	Culling and disposal of animals	05
14	Preparation of animals for show	03
15	Animal health management	06
16	Milking systems and hygienic milk production	04

References Book:

1. Thomas C.K. and Sastry N.S.R. (1991) Dairy Bovine production 1st edition
2. Text Book Of Animal Husbandry By G.C.Banerjee
3. Kalyani Publication Ludhiana, India.
4. Bath D. L., (1978) Dairy cattle Principles practices problems profits 2nd ed , Lea and Febiger publishing house Philadelphia U.S.A.
5. Sastry N.S.R. Thomas C.K. and Singh R.A. (1976) Farm Animal management and poultry production, vikas publishing House Ltd, 5., Ansari Road, New Delhi 110 016
6. Hafez E.S.E. (1989) (Indian ed) Reproduction in farm animals K.M. Verghese Co., Po. Box No. 7119, Mumbai 31
7. Cooper G.M. (1998) Building construction Estimation Mc Graw Hill Book Publishing Co. Inc., New York USA

DPP: 104 (Practical Based On DPP-101)

Communication & Soft Skills (I)

Credit- 06 **Period- 90**

Objectives:

1) Development of Oral Skill in students
2) Improvevocabulary of students
3) Improvement in grammar
4) Develop the English writing skill in students

Communication and Soft Skills –I			
Unit	**Topic**	**Learning Points**	**Period**
1	**Vocabulary**	1.1Synonyms 1.2antonyms Literal and figurative meaning of words Word confused most obtained	**20**
2	**Grammer**	nouns and its types verbs 2.3adjective 2.4adverbs 2.5 auxiliaries, articles, prepositions, cnojunctions, tense	**20**
3	**Writing Skill**	3.1notice 3.2Formal letter 3.3Email 3.4Biodata 3.5Report(survey and investigative report) 3.6Descriptive and narratative paragraph 3.7Public notice, prepararing information brochure 3.8Preparaing a newspaper advertisemet	**20**
4	**Oral Skill**	facing an interview giving presentation using audio visual aids speech group discussion telephone conversion conversion skill (Greeting and responses, introducing onself and others, requsting , thanking, apologing, talking leave etc.	**30**

References Book:

1. High school English Grammar, Wrin and Martin
2. Enriching Oral and Return communication,Thorat A and Munira
3. In English (Orient Blackaswan) ,lokhandwala (2009)
4. English Online,Mohanraj J. and Mohanraj.
5. 4. Oxford Guide to English speaking ,Seely (2006).
6. Study speaking (CUP) ,Anderson, Keith, Tony
7. Lynch (2007).

DPP: 105 : (Practical Based On DPP-102)

Market Milk Process Technology

Credit- 6 **Period- 90**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students

Sr. No.	Title of Practical	No. of Practical
1	Study of various platform test on receiving of milk: i.e. organoleptic evaluation- verification of container, temperature, odour, dirt & dust, taste, acidity, COB, etc.	12
2	Sampling of milk- procedure, collection, sample preservation	06
3	Determination of physico chemical constituent of milk fat, SNF, pH, acidity.	12
4	Detection of adulterants in milk- starch, sugar, urea, soap, neutralizer	12
5	Standardization of milk for various purposes using Pearson square technique	06
6	Assessment of organoleptic, chemical character of unsold & returned milk.	06
7	Reprocessing of unsold & returned milk. i.e. product manufacture- Khoa, Paneer / Chhana, Dahi, Butter, Ghee etc.	18
8	Cleaning and sanitization of dairy equipment / utensils	06
9	Visit to modern milk processing plant to study various operations.	12

Reference Book :

1. A Text Book of Dairy Engineering ,C.N. Hall
2. Engineering for Dairy and Food Products , E.M. Farral
3. Dairy Plant Engineering & Management , Tufail Ahemed
4. Food Engineering and Dairy Technology , Ing. H.G. Kessler
5. Modern Dairy Technology Vol I & II, R.K. Robinson
6. Principles of Dairy Processing, J. N. Warner
7. Dairy Technology and Engineering, Harpar and Hall
8. Ultra-high Temperature Processing of milk and milk,C.P. Gupta and Ralendra Prasad products. Heat Transfer
9. Principles of Unit operations , Alan, S. Fourtet. al.
10. Fluid Mechanics ,Yuan

DPP: 106 : (Practical Based On DPP-103)

Livestock production and management

Credit- 6 **Period- 90**

Objectives:

1) Study various livestock terminology

2) Study various management techniques to enhance production of animals

3) Study the various measures to improve the productivity of animals

4) Study of care and manage mental practices of every category of animal

Sr. No.	Name of Topic	No. of Lectures
1	Routine and periodic livestock farm operations	06
2	Care and Management of growing animal and calf	06
3	Care and Management of Heifer	06
4	Care and Management of milking and pregnant cows	06
5	Care and Management of Breeding Bulls	06
6	Different farm structures on livestock farm and its management	06
7	Methods of Identification marks and Dehorning of Animals	06
8	Recording of physiological Indices i.e. Pulse, Respiration and Temperature	06
9	Systems of milking and clean milk Production	06
10	Preventive measures for health Management	06
11	Visit to modern livestock farms, livestock markets and fairs	06
12	Disposal and utilization of dairy farm waste.	06
13	Different records maintained at Dairy farm.	06
14	Field Visit	12

References Book:

1. Thomas C.K. and Sastry N.S.R. (1991) Dairy Bovine production 1st edition
2. Text Book Of Animal Husbandry By G.C.Banerjee
3. Kalyani Publication Ludhiana, India.
4. Bath D. L., (1978) Dairy cattle Principles practices problems profits 2nd ed , Lea and Febiger publishing house Philadelphia U.S.A.
5. Sastry N.S.R. Thomas C.K. and Singh R.A. (1976) Farm Animal management and poultry production, vikas publishing House Ltd, 5., Ansari Road, New Delhi 110 016

SYLLABUS FOR B.VOCATIONAL (Dairy Products and Processing)

FIRST YEAR (Semester - II)

DPP:201 Communication & Soft Skills II

Total Credit: 04 Periods: 60

Objectives:

1. To develop the communicative skills of the students and thereby develop their proficiency in English language
2. To develop students' communicative competence
3. To encourage and enable the students to become proficient users of English language.
4. To introduce the different modes of Communication
5. To enhance their employability
6. To develop oral and written communication skills so as to enable the participants to present their ideas logically and effectively.

Communication and Soft Skills –II			
Unit No	**Topic**	**Learning Point**	**Periods**
1	**Employment Communication**	Resume Resume Style Resume Writing Elements of an Effective Resume Writing application letters Other employment Messages Job	**10**
2	**Interview Skills**	Interview Purpose Types Interview Skills- Before, During and After Interview Interview Dressing Mock Interviews-Following up an Application Accepting an Interview Invitation Following up an Interview Accepting Employment 2.10Resigning from a Job	**5**
3	**Introduction to Personality Development**	Elements of Good Personality Importance of soft skills Introduction to Corporate Culture Professionalism in Service Industry Group Discussion –Structure and Types Mocks GD using Video Samples	**05**
4	**Presentation Skills and Techniques**	Personal Grooming and Business Etiquettes Corporate Etiquette, Social Etiquette and Telephone Etiquette Role Play and body language Impression Management	**10**

5	**Business Reports**	Types and Characteristics Components of a Formal Report Business Proposals-Types, Contacts, Elements.	**20**
6	**Information Technology for Communication**	Word processor Telex 5.3Facsimile 5.4Electronic mail 5.5Voice mail 5.6Internet 5.7Multimedia 5.8Teleconferencing Mobile phone conversation 5.10Video conferencing Short messaging services \SMS	**10**

References Book:

1. Matila Treece: Successful communication: Allyun and Bacon Pubharkat.
2. Jon Lisa Interatid skills in Tourist Travel Industry Longman Group Ltd.
3. Robert T. Reilly – Effective communication in tourist travel Industry Dilnas Publication.
4. Boves. Thill Business Communication Today Mcycans Hills Publication.
5. Dark Studying International Communication Sage Publication.
6. Murphy Hidderandt Thomas Effective Business Communication Mc Graw Hill
7. Thorat, A.andLokhandwala,M.(2009),Enriching Oral and Written Communication [OBS
8. Mohanraj J. and Mohanraj S. (2001), English Online [OBS]
9. Seely (2006), Oxford Guide to English speaking and writing [OUP]
10. Dutt, P. Kiranmal, GeethaRajeevan, CLN Prakash (2008), A Course in CommunicationSkills [Foundation Books]
11. Anderson, Keith, John Maclean, Tony Lynch (2007), Study Speaking [CUP]
12. Goodale, Malcolm (2008), Professional Presentations [CUP]
13. Morley, David (2007), The Cambridge Introduction to Creative Writing [CUP]
14. Dutt, P. Kiranmal and GeethaRajeevan (2007), A Course in Listening and Speaking(Vol. I & II) [Foundation Books]
15. Sasikumar, V., P. KiranmalDutt and GeethaRajeevan (2007), Basic CommunicationSkills [Foundation Books]
16. O'Connor, J. D. – Better English Pronunciation (Latest Edition with C
17. Narayanswamy – Strengthen Your Writing (OBS)
18. Cross-Cultural and Intercultural Communication, William B. Gudykunst
19. Beyond Language: Cross Cultural Communication, Deena R. Levine M.A., Mara B. Adelman
20. The 7 Habits of Highly Effective People, Stephen Covey

DPP: 202 Chemistry of Milk and Milk Products

Credits: 04 **Periods: 60**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.

Sr. No.	Name of Topic	No. of Periods
1	Gross chemical composition of milk of various livestock species- cow, buffalo, goat, sheep etc.	06
3	Nutritional importance of milk and its constituents.	05
4	Milk lipid: definition, fatty acid composition, essential fatty acids.	05
5	Types of fatty acids- saturated, unsaturated, short chain medium chain and long chain fatty acids	04
6	Physical properties of milk lipids.	05
7	Role of milk lipids in manufacture of various dairy products.	08
8	Milk proteins: Types of proteins i.e. casein, whey protein, minor proteins. Fractions of individual proteins.	05
9	Importance of proteins in product manufacturing.	04
10	Lactose: Chemical structure form of lactose, state in milk, class of lactose i.e. mono and disaccharide etc.	04
11	Role of lactose in dairy product.	06
12	Physical changes taking place during manufacture of various products in individual milk constituents.	05
13	Desirable and undesirable changes due to processing and storage.	03

Reference Book :

11. A Text Book of Dairy Engineering ,C.N. Hall
12. Engineering for Dairy and Food Products , E.M. Farral
13. Dairy Plant Engineering & Management , Tufail Ahemed
14. Food Engineering and Dairy Technology , Ing. H.G. Kessler
15. Modern Dairy Technology Vol I & II, R.K. Robinson
16. Principles of Dairy Processing, J. N. Warner
17. Dairy Technology and Engineering, Harpar and Hall
18. Ultra-high Temperature Processing of milk and milk,C.P. Gupta and Ralendra Prasad products. Heat Transfer
19. Principles of Unit operations , Alan, S. Fourtet. al.
20. Fluid Mechanics ,Yuan

DPP: 203 Principles of Animal Breeding

Credits: 04 Total Periods: 60

Objectives:

1)Study common terminology used in Animal Breeding

2) To study various methods of animal selection

3)To get information about various types of inheritances

4)To know about important breeding methods used in animal genetics

5)To get information about the current breeding policy of government for increase production

Sr. No.	Name of Topic	No. of Lectures
1	Study of common terms used in genetics	04
2	Chromosome, gene, mutation	06
3	Gene action	05
4	Variations, its causes and importance	06
5	Definition of Inheritance, Concept of Inheritance	02
6	Definition of sex linked characters and Concept of sex linked characters	03
7	Definition of sex influenced characters and Concept of sex influenced characters	03
8	Definition of sex limited characters and Concept of sex limited characters characters	03
9	Concept of selection and basis of selection	04
10	Take review of various Methods of animal selection	03
11	Study of Sire evaluation methods	03
12	Detailed study of various important Breeding systems	04
13	Study of Genotypic and phenotypic effects	04
14	Study of Heterosis and its practical uses	05
15	Breeding policy for livestock	05

Suggested Readings

1. Lasley J.S. (1978) Genetics of livestock improvement, New Delhi, Prentice House of India.
2. Kanakraj, P, (2001) A text book of Animal Genetics I, International Book Distributing Co. Lucknow. India.
3. Jagdish Prasad, (1996) Animal genetics and breeding practices, International Book Distribution co Lucknow, India
4. Rice V.A. And Andrews F.N., (1964) Breeding and improvement of farm animals 6th ed.
5. Falconer, D.S. (1981) introduction to quantitative genetics, English language book Society, England
6. Tomar S.S., (1998) A text book of population genetics Vol. I and II Kalyani publisher, Ludhiana, India.

DPP: 204 (Practical Based on DPP-201)
Communication & Soft Skills II

Credit- 4 **Period- 90**

Objectives:

1) Increase the communication in English among the students
2) Improvement in Interview Skills
3) Improvement in students Personality

Communication & Soft Skills II			
Unit	**Topic**	**Learning Points**	**Periods**
1	**Employment Communication**	Communication Skill Punctuality to task Honesty to job profile	**25**
2	**Interview Skills**	Self Introduction Confidence eye contact Personality discipline Subject Knowledge Food pickup areas	**25**
3	**Introduction to Personality Development**	Uniform Properties of good personality Introduction to Corporate Culture Professionalism in Service Industry Group Discussion –Structure and Types Mocks GD using Video Samples	**20**
4	**Self learning**	Group discussion Round table meeting	**20**

References:

1. Lillicrap & Cousins , ELBS Food and Beverage service
2. John Fuller , Hutchinson Modern Restaurant service
3. Brian Varghese Food and beverage service management
4. Heppner & Deegan Introduction Food and Beverage service – Brown
5. Brian Varghese professional food and Beverage service management
6. Sudhir Andrews, Tata McGraw Hill Food and Beverage service training manual.

DPP: 205 (Practical Course based on DPP- 202)

Chemistry of Milk and Milk Products

Credits: 06 Periods: 90

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.

Sr. No.	Title of Practical	No. of Practical
1	Manufacture of evaporated milk product i.e Basundi	06
2	Manufacture of evaporated milk product i.Rabdi	06
3	Manufacture of evaporated milk product i.e Kheer	06
4	Manufacture of condensed milk product i.e Khoa	06
5	Manufacture of condensed milk product i.e Pedha	06
6	Manufacture of condensed milk product i.e Burfi	06
7	Preparation of Fermented milk product i.e Curd /Dahi	06
8	Preparation of Fermented milk product i.e Chakka	06
9	Preparation of Fermented milk product i.e Shrikhand	06
10	Study of cleaning and sanitization of dairy equipments	12
11	Study of cream separator and separation of cream	06
12	Visit and to study the various product processing activities in dairy plant	06
13	Field Visit	12

Reference Book :

1. A Text Book of Dairy Engineering ,C.N. Hall
2. Engineering for Dairy and Food Products , E.M. Farral
3. Dairy Plant Engineering & Management , Tufail Ahemed
4. Food Engineering and Dairy Technology , Ing. H.G. Kessler
5. Modern Dairy Technology Vol I & II, R.K. Robinson
6. Principles of Dairy Processing, J. N. Warner
7. Dairy Technology and Engineering, Harpar and Hall
8. Ultra-high Temperature Processing of milk and milk,C.P. Gupta and Ralendra Prasad products. Heat Transfer
9. Principles of Unit operations , Alan, S. Fourtet. al.
10. Fluid Mechanics ,Yuan

DPP: 206 (Practical Course based on DPP- 203)

Principles of Animal Breeding

Credits: 06 **Periods: 90**

Objectives:

1) Study common terminology used in Animal Breeding
2) To study various methods of animal selection
3) To get information about various types of inheritances
4) To know about important breeding methods used in animal genetics
5) To get information about the current breeding policy of government for increase production

Sr. No.	Name of Topic	No. of Periods
1	To study the animal cell structure	10
2	Estimation of gene and genotypic frequency	10
3	Estimation of Regression coefficient	10
4	Estimation of heterosis	06
5	Estimation of Genetic Gain	06
6	Study of Sire Index	06
7	Estimation of genetic and phenotypic correlations.	06
8	Study of Biometric Methods of animal identification	06
9	Study of various methods of animal selection	06
10	Study of important breeding systems	06
11	Estimation of Most probable producing ability and Breeding values of cows	06
12	Field Visit to Rahuri semen station	12

Suggested Readings

1. Lasley J.S. (1978) Genetics of livestock improvement, New Delhi, Prentice House of India.
2. Kanakraj, P, (2001) A text book of Animal Genetics I, International Book Distributing Co. Lucknow. India.
3. Jagdish Prasad, (1996) Animal genetics and breeding practices, International Book Distribution co Lucknow, India
4. Rice V.A. And Andrews F.N., (1964) Breeding and improvement of farm animals 6th ed.
5. Falconer, D.S. (1981) introduction to quantitative genetics, English language book Society, England
6. Tomar S.S., (1998) A text book of population genetics Vol. I and II Kalyani publisher, Ludhiana, India.

SECOND YEAR

(ADVANCED DIPLOMA)

SEMESTER – IIIrd

DPP: 301 – Milk and Milk Products Technology Part -I

Credit -4 **Period- 60**

Objectives:

1) To improve employment opportunities in the dairy industry.
2) To encourage income generating potential of the students.
3) To acquaint the students about the causes of milk spoilage and prevention of milk and milk products from spoilage.
4) To introduce the students about the working of different equipment's used in dairy industries.
5) Students acquire knowledge about the how to prepare different types of milk products

Sr. No.	Name of Topic	No. of Lectures
1	**Status of dairy industries in India.** ➢ Introduction of white revolution. ➢ Importance of dairy industry ➢ opportunities of employment in the Dairy Industry.	10
2	**Overview of Food Spoilage:** ➢ Bacterial and fungal food spoilage. ➢ Main causes of milk spoilage. ➢ Preventions of milk and milk products from spoilage (Microbialspoilage)	10
3	➢ Definition of milk. ➢ Composition and physico-thermal property of milk. ➢ Collection of raw milk. ➢ Method of Sampling of raw milk. ➢ Plat form test. ➢ Quality of raw milk. ➢ Different products made from the milk.	15
4	Study and working of equipments used e.g. 1. Single and two stage homogenizers. 2. Batch, Flash, and Continues pasteurizer. 3. Spray Drier and Drum Drier. 4. Evaporators (Different Type) 5. Cream Separator. 6. Deep freezer. 7. Butter churner. 8. Boiler. 9. Centrifugal Machine.	15
5	➢ Principle of thermal processing of milk ➢ Pasteurization and Sterilizations of milk. ➢ UHT Processing of milk. ➢ Methods for production of different types of milks - pasteurized, standardized, toned,double toned, flavored milk. ➢ Ingredients of special ,Evaporated fermented and concentrated milk Products	10

Suggested Reading:

1. Sukumar, Dc. (2005) Outline of Dairy Technology. OxfordUniv. Press, New Delhi
2. Bhandari, V., (2001) Ice cream Manufacture and Technology. Tala Me Graw-Hill publishing Co,Ltd, New Delhi.
3. Arbuckle, W.S., (1972) Ice Cream, A,Vl publication, Westpord.Aulhor, La Grange llinoisHall, C.W. and Hedrick. T.ly (1971) Drying of milk and milk products, AVI publishing Co, Weeport.
4. Sangu, K.P.S (2002) Dairy Processing Technology

DPP: 302 Principles of Animal Nutrition
Credit- 04 Period-60

Objectives:

1) To get knowledge about the classification of Carbohydrates, fats, protein.
2) To acquaint the students about the role of nutrients in animal body.
3) To study about the energy and protein requirement for different stages of animals.
4) To acquaint student about the balanced ration for livestock.

Syllabus:

Sr. No.	Name of Topic	No. of Periods
1	History of Animal nutrition	**05**
2	Classification of carbohydrates, fat and proteins	**08**
3	Role of nutrients in animal body	**03**
4	Digestion, absorption and metabolism o carbohydrates in ruminants and non ruminants	**05**
5	Digestion, absorption and metabolism of fat in ruminants and non- ruminants	**05**
6	Digestion, absorption and metabolism of proteins in ruminants and non ruminants.	**05**
7	Significance of crude fiber	**03**
8	Rumen degradable and undegradable proteins and kinetic	**03**
9	Feed energy and its partitioning	**03**
10	Systems of expressing protein values of feeding stuffs	**03**
11	Energy and protein requirement for maintenance,	**03**
12	Energy and protein requirement for growth	**03**
13	Energy and protein requirement for pregnancy	**03**
14	Energy and protein requirement for lactation in ruminants	**03**
15	Metabolic disorders in ruminants and non ruminants	**05**

References:

1.Boor, K. J., 2001, ADSA Foundation Scholar Award; fluid dairy product quality and safety: looking to the future. Journal of Dairy Science, 84: 1-11

2.Champagne, C. P., Laing, R.R., Roy, Dennis, Mafu, Akier Assanta, Griffiths, Mansel W. 1994 Psychrotrophs in Dairy Products: Their Effects and Their Control. Critical Reviews in Food Science and Nutrition, 34: 1-30.

3.Department of Agriculture and Markets Division of milk Control and Dairy Services n New York State Dairy Statistics, 2001 Annual Summary. 1 Winners Circle, Albany NY 12235

4.Lewis, M., Heppell, N., 2000. Continuous Thermal Processing of Foods; Pasteurization and UHT Sterilization.Aspen Publishers, Gaithersburg, MD

5.Muir DD, 1996. The shelf-life of dairy products .1. Factors influencing raw milk and fresh products Journal of the Society of Dairy Technology 49 (1): 24-32

6.Pasteurized Milk Ordinance (PMO), Potter, N., Hotchkiss, J. H., 1995 Milk and milk products. In: Food Science, 5th Edition, Chapman and

DPP: 303 Quality Control and Sensory Evaluation of Milk and Milk Products

Total Credit: 04 Total Periods: 60

Objectives:

1) Study various terminology related to sensory evaluation of milk and milk products.
2) Study acquaint about the 9-point hedonic scale of sensory evaluation.
3) To check and maintain the quality of milk and milk products.
4) Study of different quality management organizations.
5) To get information about role and functions of different organization for maintaining standards of different milk products.

Sr. No.	Name of Topic	No. of Lectures
1	Concept and need of quality.	02
2	Quality assurance: Meaning, scope.	04
3	Inter relation of quality assurance and quality control.	04
4	Quality control: Meaning, advantages and response.	02
5	Management and quality control.	02
6	Quality control and consumers.	02
7	Various quality management systems i.e. ISO- 9000, TQM, HACCP.	05
8	Various organization involved in quality control and their functioning. (National and International)	05
9	Design, layout and requirements for quality control laboratory.	04
10	Sensory evaluation: concept, meaning, scope, principle involved.	04
11	Role of sense organs and its physiological considerations while evaluating test product i.e. skin, eye, tongue, nose and ear.	04
12	Classification of taste, flavour, odour.	03
13	Terminology in relation to sensory evaluation.	04
14	Score cards: milk and milk products.	04
15	Score card structure, based on numerical value.	04
16	Application of score card in sensory evaluation.	04
17	Tabulation and interpretation of data.	03

Reference Book:

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

DPP: 304 (Practical Course based on DPP- 301)
Milk and Milk Products Technology Part -I

Credits: 06 **Total Periods: 90**

Objectives:

1) Development of entrepreneurship in students.
2) Improvestudents' knowledge about dairy industries.
3) Students are trained for the manufacturing of different milk products.
4) To acquainted about the determination of Fat, SNF,Acidity of milk.
5) To detect the adulteration in milk.

Sr. No.	Title of Practical	No. of Practical
1	Determination of Fat and SNF	12
2	Determination of PH Of Milk	06
3	Determination of Acidity Of Milk	06
4	Estimation of adulteration in milk	06
5	Preparation of Dahi	06
6	Preparation of Lassi	06
7	Preparation of Shrikhand	06
8	Preparation of Khoa	06
9	Preparation of Pedha	06
10	Preparation of Burffi	06
11	Preparation of Gulabjamun	06
12	Study of chemical composition of goat, sheep, buffalo and cow milk.	06
13	Field Visit	12

References Book:

1. Chemistry , N. C. Ganguly
2. Principles of Dairy Chemistry, Jeneess & patton
3. Hand book of Dairy Science, K.C.Mahanta
4. Dictionary of Dairying, Davis & Leonard Hill
5. Dairy Chemistry, Fox
6. Dairy Processing , James Warner
7. Indigenous milk products , ICAR pub

DPP: 305 - Practical Course based on DPP- 302
Principal of Animal Nutrition
Credit- 6 Period-90

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the preparation and conservation of feed products for livestocks.
3) To help the students for making ideal dairy farms.
4) To create income generating potential for the students .

Sr. No.	Title of Practical	No. of Practical
1	Identification of various feeds and fodder	06
2	Study of desirable characteristics of Ideal ration	06
3	Study of Digestive system of Ruminants	12
4	Evolution of nutritive value of various feed and fodder by proximate analysis	12
5	Study of conservation methods of silage making	06
6	Conservation of fodder by silage making	06
7	Study of azola production	06
8	Study of Hydroponics production	08
9	Study of integrated livestock production viz. Biogas production	08
10	Study of vermicomposting,vermiculture and vermiwash production	08
11	Visit to Ideal dairy farm	12

Reference Book :

1. Thomas C.K. and Sastry N.S.R. (1991) Dairy Bovine production 1st edition
2. Text Book Of Animal Husbandry By G.C.Banerjee
3. Kalyani Publication Ludhiana, India.
4. Bath D. L., (1978) Dairy cattle Principles practices problems profits 2nd ed , Lea and Febiger publishing house Philadelphia U.S.A.
5. Sastry N.S.R. Thomas C.K. and Singh R.A. (1976) Farm Animal management and poultry production, vikas publishing House Ltd, 5., Ansari Road, New Delhi 110 016
6. Hafez E.S.E. (1989) (Indian ed) Reproduction in farm animals K.M. Verghese Co., Po. Box No. 7119, Mumbai 31
7. Cooper G.M. (1998) Building construction Estimation Mc Graw Hill Book Publishing Co. Inc., New York USA

DPP: 306 (Practical Based on DPP- 303)

Quality Control and Sensory Evaluation of Milk and Milk Products

Credit- 06 **Period- 90**

Objectives:

1) Study various terminology related to sensory evaluation and quality control of milk and milk produsts.
2) Study various quality management originations to enhance production and quality of milk products.
3) Study Nof design of sensory evaluation laboratory and its working.
4) To learn about the judging of different milk products.

Sr. No.	Title of Practical	No. of Practical
1	Guidelines for setting sensory evaluation laboratory.	06
2	Testing of Raw milk for chemical quality standards	06
3	Designing sensory evaluation laboratory.	09
4	Lay out for sensory evaluation laboratory.	09
5	Requirements for sensory evaluation laboratory.	06
6	Desirable and undesirable parameters of dairy products in relation to sensory evaluation.	09
7	Score cards – 20 point, 100 points, 9 point hedonic scale etc.	06
8	Testing of raw milk for chemical quality standards.	09
9	Testing of raw milk for microbial quality standards	06
10	Judging of Khoa and khoa based products	06
11	Judging of Dahi and Fermented Dairy products	09
12	Judging of channa and channa based products	09

Suggested Readings:

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

SYLLABUS FOR B.VOCATIONAL (Dairy Plant and Processing)

SECOND YEAR (Semester – IV)

DPP: 401 – Microbiology of Milk and Milk Products

Credit- 04 **Period -60**

Objectives:

1. To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2. To learn about how to destruct microbial population for maintain milk quality.
3. To develop the marginal skills to start dairy industrial
4. To enhance their employability
5. To acquaint the students about the pathogen and spoilage organisms in milk to reduce milk spoilage.
6. To create income generating potential for the students.

Sr. No.	Name of Topic	No. of Periods
1	Microorganism associated with milk and milk products i.e. bacteria, yeast and mould.	06
2	Morphological studies of microorganism viz., size, shape, colony characters etc.	04
3	Biochemical characteristics of microorganism i.e. grams reaction, catalase reaction, sugar requirement, fermentation etc. and Requirements-temperature, growth media	05
4	Spoilage of milk and milk products by microorganism yeast, mould and bacteria.	05
5	Pathogenic organism associated with milk and milk products and their significance.	06
6	Control of pathogenic and spoilage microorganism.	06
7	Definition of fermentation and types of fermentation.	04
8	Desirable and undesirable fermentation – Lactic acid, alcoholic, propionic acid, butyric acid, citric acid fermentation.	04
9	Antimicrobial systems in milk- Ig, LF, phagocytosis and LP system etc.	05
10	Microbiology of Indigenous milk product, Cream and butter, Ice-cream, Yoghurt Cheeses	05
11	Microbial defects in milk and milk products and its control.	04
12	Micro organism associated with packaging material, their effect on quality and its control.	06

Reference Book:

1. Yadav J.S; Grover S. and Batish V.K. (1993) A comprehensive Dairy Microbiology. Metropolitan. Metropolitan, New Delhi (Inidia) 110 002.
2. Foster, E.M. (1958) Dairy microbiology, Macmillan & co. Ltd; London.
3. Robinson, R.K. (1991) Dairy Microbiology Vol. l, The microbiology of milk, Applied Science publisher, London.
4. Robinson, R.K. (1981) Dairy Microbiology Vol. ll – The microbiology of milk products, Applied Science publisher, London.
5. Elmer. H. Marth and Same, S.L. Applied Dairy Microbiology, 2nd ed., Steele Mared Dekkar, lnc. New York.
6. Richardson Gary H. Standard methods for the examination of Dairy Products, 15th ed. American Public health Association, Washinnton D.C.

DPP: 402 –Milk processing and Integrated Livestock Farming

Credit- 04 **Period- 60**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in Integrated Livestock Farming for increasing income with combination of different resources
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.
6) To improve awareness among the students about different enterprises

Sr. No.	Name of Topic	No. of Lectures
1	Introduction of basic unit operations involved in the processing of milk and milk products.	**04**
2	Cream: Composition, production and defects. Different types of creams and their production method.	**04**
3	Butter: Composition, method of production, theories of churning, grading and prevention of defects. Quality of butter.	**04**
4	Ghee: Compositions, Different methods of Ghee production Quality of ghee.	**04**
5	Indian dairy products: Rabri, kulfi, srikhand, lassi, Mawa, Dahi , Butter milk, Channa	**12**
6	Principle of homogenization. Application of homogenization in dairy industry.	**03**
7	Ice cream: Definition and composition, Role of ingredients used, Principles and Technology of ice-cream manufacturing, grading and prevention of defects in ice creams.	**03**
8	**Food regulations** **:**Overview of Food Safety and Standards Act, 2006 BIS, ISO-22000, Agmark, HACCP, International Food Standards GMP. Importance of personal Hygiene, Cleaning	**08**
9	Selection and use of dairy cleaners and sanitizers. • Cleaning in place system (CIP), • Various chemical used for CIP of dairy plant. • Factor affecting washing operation	**08**
11	Scope and limitation of integrated farming systems	**04**

12	Sustainability of integrated livestock farming systems and their economic importance.	**02**
13	Livestock enterprises viz; cattle, buffalo,	**02**
14	Livestock enterprises viz; sheep, goat,	**02**

Reference Book:

1. Chemistry , N. C. Ganguly
2. Principles of Dairy Chemistry, Jeneess & patton
3. Hand book of Dairy Science, K.C.Mahanta
4. Dictionary of Dairying, Davis & Leonard Hill
5. Dairy Chemistry, Fox
6. Dairy Processing , James Warner
7. Indigenous milk products , ICAR pub

DPP: 403 Packaging of Milk and Milk Products

Credits: 04 **Total Periods: 60**

Objectives:

1) Study common terminology used in Packaging of milk and milk products
2) To learn about how to increase the selling of milk and milk products by attractive packages.
3) To learn about how to increase products demand in market by using different package techniques.
4) To study various packaging materials, its forms and legal requirements.
5) To get information about methods sterilization of packaging material.
6) To know about importance of coding and labelling of packages.

Packaging of Milk and Milk Products			
Unit	**Topic**	**Learning Points**	**Periods**
1	**Introduction and History of Packaging Development**	History of Package Development Importance of packaging	**03**
2	**Packaging Materials**	Selection of Packaging Materials Characteristics of Paper, corrugated paper, fiber board and wood Characteristics of Glass Characteristics of Metals and Metallic Containers Characteristics of Plastics Sources of different plastic materials and process of manufacture Forms of different plastic material Newer forms with combination of two or more ingredientsFoils and Laminates – Characteristics and Importance in Food Industry Characteristics of Retort Pouches	**05**
3	**Package Forms**	3.1 Forms of packages used for packaging of food and dairy products	**04**
4	**Legal Requirement**	4.1 Safety requirements of packaging materials and product information	**04**

5	**Packaging of Milk and milk Products**	Pasteurized Milk UHT-Sterilized milk Aseptic packaging Fat Rich Dairy Products – Butter and Ghee Coagulated and Desiccated Indigenous Dairy Products and their Sweetmeats Concentrated and Dried Milks Including Baby Foods	**08**
6	**Modern Packaging Techniques**	Vacuum and Modified Atmosphere Packaging (MAP) Eco Friendly Packaging 6.3Active Packaging	**06**
7	**Principles and Methods of**	7.1Different Methods of Package Sterilization, Importance of such methods and Principles	**08**

	Package Sterilization		
8	**Coding and Labelling of Food Packages**	8.1 Different Methods of Coding and Standards of Labelling of food packages	**08**
9	**Aseptic Packaging**	Scope of Aseptic Packaging and Pre-Requisite Conditions for Aseptic Packaging. Description of Equipments (Including Aseptic Tank) and Machines. Micro-processor Controlled Systems Employed for Aseptic Packaging- Package Conditions and Quality Assurance Aspects of Aseptic Packaging.	**08**
10	**Microbiological Aspects of Packaging Materials**	10.1Microbial Standards, Packaging material as Sources of Contamination	**06**

References:

1. Boor, K. J., 2001, ADSA Foundation Scholar Award; fluid dairy product quality and safety: looking to the future. Journal of Dairy Science, 84: 1-11
2. Champagne, C. P., Laing, R.R., Roy, Dennis, Mafu, Akier Assanta, Griffiths, Mansel W. 1994 Psychrotrophs in Dairy Products: Their Effects and Their Control. Critical Reviews in Food Science and Nutrition, 34: 1-30.
3. Department of Agriculture and Markets Division of milk Control and Dairy Services n New York State Dairy Statistics, 2001 Annual Summary. 1 Winners Circle, Albany NY 12235
4. Lewis, M., Heppell, N., 2000. Continuous Thermal Processing of Foods; Pasteurization and UHT Sterilization.Aspen Publishers, Gaithersburg, MD
5. Muir DD, 1996. The shelf-life of dairy products .1. Factors influencing raw milk and fresh products Journal of the Society of Dairy Technology 49 (1): 24-32
6. Pasteurized Milk Ordinance (PMO), Potter, N., Hotchkiss, J. H., 1995 Milk and milk products. In: Food Science, 5th Edition, Chapman and

DPP: 404 (Practical Course based on DPP- 401)

Microbiology of Milk and Milk Products

Credit- 6 **Period-90**

Objectives:

1) To learn about the microorganisms associated with milk and milk products.
2) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
3) To acquaint the students about the opportunities in dairy field.
4) To help human resource development (HRD) state as well as National Level.
5) To create income generating potential for the students.
6) To develop the marginal skills to start dairy industrial job.

Sr. No.	Name of Topic	No. of Lectures
1	Microorganism associated with milk and milk products i.e. bacteria, yeast and mould.	06
2	Microbial defects in milk and milk products and its control.	06
3	Defects in Cream, their causes and Preventive measures	06
4	Defects in Butter, their causes and Preventive measures	06
5	Defects in Ghee, their causes and Preventive measures	06
7	Control of pathogenic and spoilage microorganism.	06
8	Definition of fermentation and types of fermentation.	08
9	Preparation of chocolate milk	06
10	Preparation of flavored milk (pista,vanilla etc)	06
11	Preparation of Mango lassi	12
12	Preparation of Paneer	12
13	Preparation of Soya milk using soybean seeds	10

DPP: 405 (Practical Course on DPP- 402)

Milk processing and Integrated Livestock Farming

Credits: 06 **Periods: 90**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students by preparing different by products from milk.To develop the marginal skills to start dairy industrial job

Sr. No.	Name of Topic	No. of Lectures
1	Conduct market survey of different dairy Products available.	**06**
2	To prepare different types of ice cream from a commercially available ice cream mix and to study defects in ice cream. Quality evaluation of ice cream.	**09**
3	Application of HACCP and GMP in a Dairy plant. Utilization of dairy industry wastes: Whey utilization; production of casein and lactose	**09**
4	Washing of equipments used in dairy industry. • Maintenance of can washer. • Steam sterilization of canes. • CIP of dairy equipments.	**06**
5	Preparation of mawa	**06**
6	Preparation of Buttermilk	**06**
7	Common vices of different livestock species	**12**
8	Study of preparation of composting	**06**
09	Study of preparation of vermicomposting	**06**
10	Study of preparation of Silage	**06**
11	Study of preparation of Hydroponics	**06**
12	Field Visit	**12**

DPP: 406 (Practical Course on DPP- 403)

Packaging of Milk and Milk Products

(Semester – IV)

Credit- 04 **period- 90**

Objectives:

1) Study common terminology used in Packaging of milk and milk products
2) To learn about how to increase the selling of milk and milk products by attractive packages.
3) To learn about how to increase products demand in market by using different package techniques.
4) To study various packaging materials, its forms and legal requirements.
5) To get information about methods sterilization of packaging material.
6) To know about importance of coding and labelling of packages.

Packaging of Milk and Milk Products			
Unit	**Topic**	**Learning Points**	**Periods**
1	**Introduction and History of Packaging Development**	History of Package Development Importance of packaging	**05**
2	**Packaging Materials**	Selection of Packaging Materials Characteristics of Paper, corrugated paper, fiber board and wood Characteristics of Glass Characteristics of Metals and Metallic Containers Characteristics of Plastics Sources of different plastic materials and process of manufacture Forms of different plastic material Newer forms with combination of two or more ingredientsFoils and Laminates – Characteristics and Importance in Food Industry Characteristics of Retort Pouches	**09**
3	**Package Forms**	3.1 Forms of packages used for packaging of food and dairy products	**06**
4	**Legal Requirement**	4.1 Safety requirements of packaging materials and product information	**09**

5	**Packaging of Milk and milk Products**	Pasteurized Milk UHT-Sterilized milk Aseptic packaging Fat Rich Dairy Products – Butter and Ghee Coagulated and Desiccated Indigenous Dairy Products and their Sweetmeats Concentrated and Dried Milks Including Baby Foods	**09**
6	**Modern Packaging Techniques**	Vacuum and Modified Atmosphere Packaging (MAP) Eco Friendly Packaging 6.3Active Packaging	**09**

7	**Principles and Methods of Package Sterilization**	7.1Different Methods of Package Sterilization, Importance of such methods and Principles	**09**
8	**Coding and Labelling of Food Packages**	8.1 Different Methods of Coding and Standards of Labelling of food packages	**10**
9	**Aseptic Packaging**	Scope of Aseptic Packaging and Pre-Requisite Conditions for Aseptic Packaging. Description of Equipments (Including Aseptic Tank) and Machines. Micro-processor Controlled Systems Employed for Aseptic Packaging- Package Conditions and Quality Assurance Aspects of Aseptic Packaging.	**12**
10	**Microbiological Aspects of Packaging Materials**	10.1Microbial Standards, Packaging material as Sources of Contamination	**12**

THIRD YEAR

(B. Voc. DEGREE)

SEMESTER

V

THIRD YEAR (Semester -V)

DPP: 501 Traditional and Value Added Dairy Products

Credits: 04 **Total Periods: 60**

Objectives:

1) Study common terminology used in Packaging of milk and milk products
2) To learn about how to increase the selling of milk and milk products by attractive packages.
3) To learn about how to increase products demand in market by using different package techniques.
4) To study various packaging materials, its forms and legal requirements.
5) To get information about methods sterilization of packaging material.
6) To know about importance of coding and labelling of packages.

Sr. No.	Name of Topic	No. of Periods
1	Present status of Indigenous traditional milk products	06
2	Scope for globalization of traditional dairy products	05
3	Govt. policies for manufacture and marketing of traditional dairy products	04
4	Classification of traditional dairy products- Heat desiccated, Heat concentrated, Heat and acid coagulated, Fermented and frozen	06
5	Process improvement of traditional milk products	06
6	Processing and process improvement of milk sweets	06
7	New products based on fruits, vegetable, cereals etc.	06
8	Establishment of commercial dairy plant	05
9	Use of natural preservatives in traditional dairy foods	03
10	Use of permitted synthetic preservatives in traditional dairy foods	04
11	Scope for packaging of traditional dairy foods	06
12	New packaging systems for traditional dairy foods	03

References:

1. Milk Testing, J.G.Davis
2. Dairy Microbiology, K.C.Mahanta
3. Dairy Bacteriology, Hammer
4. Fundamentals of Dairy Microbiology , J.B.Prajapati
5. Standard Methods for Examination of Dairy Products ,Gary H. Richerdson
6. Market Milk Industry, C.L. Rhodhouse & J.L. Henderson.
7. Comprehensive Dairy Microbiology , Yadav, Batish & Grover.
8. A Text Book of Animal Husbandry , J.C. Banerjee
9. The Fluid Milk Industry, Handerson.
10. ISI Specifications ,BIS Publication

THIRD YEAR (Semester - V)

DPP: 502 Poultry Production

Credits: 04 **Total Periods: 60**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in Integrated Livestock Farming for increasing income with combination of different resources
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.
6) To improve awareness among the students about different enterprises

Sr. No.	Name of Topic	No. of Periods
1	Common terminology used in Poultry keeping	02
2	Importance of poultry keeping in India	02
3	Scope of poultry production in India and Abroad	02
4	Study of Classification of chicken	04
5	Important breeds and varieties of chicken	03
6	Selection and care of hatching eggs	02
7	Housing systems of poultry	03
8	Incubation of eggs	03
9	Hatchery management	02
10	Care and management of chicks	04
11	Care and management of growers	04
12	Care and management of layers	02
13	Care and management of broilers	06
14	Thermal stress in poultry during summer	06
15	Care and management of ducks	06
16	Care and management of quails	06
17	Care and management of geese and guinea fowl	03

Suggested reading:

1. Jull, M.A. (1951). Poultry husbandry Mc Grow Hill Co New York
2. Singh R.A. 2001. Poultry Production Kalyani Publishers New Delhi
3. Pand, B. 1985 Poultry Production
4. Anonymous 1996. Advances in poultry production processings of 20th world poultry congress.
5. Gupta S. 2001. Indian Poultry year book, new Delhi
6. Banargee G.C. 1976. Poultry Oxford and IBH publication Co. New Delhi
7. Jagdish Prasad 2000. Poultry production and management, Kalayani Publishers, New Delhi

Newman, T. Principles and Practices of poultry husbandry Green World Publication Co. Lucknow

1. Saxena U.C. 2000. Hand book of poultry feeding and management PIXE Publications, Karnal
2. Narhari D. 2000. Poultry economics and Projects New Print and Process

THIRD YEAR (Semester - V)
DPP: 503 - Milk and Dairy Product Analysis

Credits: 04 **Total Periods: 60**

Objectives:

1. To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2. To learn about how to destruct microbial population for maintain milk quality.
3. To develop the marginal skills to start dairy industrial
4. To enhance their employability
5. To acquaint the students about the pathogen and spoilage organisms in milk to reduce milk spoilage.
6. To create income generating potential for the students.

Dairy Product Analysis			
Unit	**Topic**	**Learning Points**	**Periods**
1	**Liquid Milk**	1. Preparation of Sample of Milk 2. Detection of Adulterants in Milk 3. Detection and Quantification of Cane Sugar 4. Detection and Quantification of Starch in Milk 5. Detection of Added Urea in Milk 6. Test for Presence of Skimmed milk Powder in Natural milk(Cow, buffalo, goat, sheep) 7. Test for Detection of Gelatine in Milk 8. Determination of Fat in Milk by Gerber Method	**30**
2	**Cream, Including Sterilized Cream, Whipped Cream and Malai**	a. Preparation of Cream b. Determination of Fat in Cream c. Rose Gottlieb Method. d. Werner Schmidt Method	**09**
3	**CREAM POWDER**	a. Preparation of Cream Powder b. Determination of Moisture in Cream Powder c. Determination of Fat Content in Cream Powder d. Determination of Milk Protein in Milk Solids not Fat of Cream Powder As per AOAC Method	**09**
4	**Curd Or Dahi**	a. Preparation of Dahi b. Determination of Fat in Dahi c. Test for the Presence of Starch in Dahi d. Determination of Total Solids in Dahi	**06**

5	**CHHANNA OR PANEER**	a. Preparation of Channa/Paneer b. Determination of Moisture in Channa/Paneer c. Determination of Fat (by Acid Digestion Method) in Channa/Paneer d. Detection of Starch in Channa	**06**

References:

1. Food Reviews International Publication details, including instructions for authors and subscription information: http://www.tandfonline.com/loi/lfri20 Preservation of Milk and Milk Products forAnalytical Purposes.
2. Milk Testing, J.G. Davis
3. Dairy Microbiology, K.C. Mahanta
4. Dairy Bacteriology, Hammer
5. Fundamentals of Dairy Microbiology , J.B. Prajapati
6. Standard Methods for Examination of Dairy Products ,Gary H. Richerdson
7. Market Milk Industry, C.L. Rhodhouse & J.L. Henderson.
8. Comprehensive Dairy Microbiology , Yadav, Batish & Grover.
9. A Text Book of Animal Husbandry , J.C. Banerjee
10. The Fluid Milk Industry, Handerson.
11. ISI Specifications ,BIS Publication

DPP: 504 (Practical Course Based on DPP- 501)
Traditional and Value Added Dairy Products

Credits: 06 **Total Periods: 90**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in Integrated Livestock Farming for increasing income with combination of different resources
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.
6) To improve awareness among the students about different enterprises

Sr. No.	Title of Practical	No. of Practical
1	Manufacture of Khoa	06
2	Manufacture of Rabadi	09
3	Manufacture of Basundi	12
4	Manufacture of Paneer	06
5	Manufacture of Chhana	06
6	Manufacture of Dahi and Lassi	12
7	Manufacture of Khoa—Burfi	09
8	Manufacture of Pedha	06
9	Manufacture of Gulabjamun	06
10	Peparation of Makhan and Ghee	06
11	Field Visit	12

References:

1. Milk Testing, J.G.Davis
2. Dairy Microbiology, K.C.Mahanta
3. Dairy Bacteriology, Hammer
4. Fundamentals of Dairy Microbiology , J.B.Prajapati
5. Standard Methods for Examination of Dairy Products ,Gary H. Richerdson
6. Market Milk Industry, C.L. Rhodhouse & J.L. Henderson.

7. Comprehensive Dairy Microbiology , Yadav, Batish & Grover.
8. A Text Book of Animal Husbandry , J.C. Banerjee
9. The Fluid Milk Industry, Handerson.
10. ISI Specifications ,BIS Publication

DPP: 505 (Practical Course Based on DPP- 502)
Poultry Production

Credits: 06 **Total Periods: 90**

Objectives:

1) Study common terminology used in Packaging of milk and milk products
2) To learn about how to increase the selling of milk and milk products by attractive packages.
3) To learn about how to increase products demand in market by using different package techniques.
4) To study various packaging materials, its forms and legal requirements.
5) To get information about methods sterilization of packaging material.
6) To know about importance of coding and labelling of packages.

Sr. No.	Name of Topic	No. of Periods
1	Study of all Body parts of adult chicken	09
2	Study of all Body parts of duck	09
3	Study of all Body parts of turkey	09
4	Routine management practices of poultry farm viz., fumigation, incubation, brooding, debeaking and sanitation	10
5	Study of Hatching of eggs and chick sexing	04
6	Care and Management of chicks	05
7	Care and Management of pullets and growers	05
8	Care and Management of layers	05
9	Care and Management of broilers	04
10	Study of various Selection and culling methods in poultry	04
11	Feed and feed formulation and management	04
12	Different housing regimes	05
13	Vaccination	05
14	Field Visit to M.P.K.V Rahuri	12

Suggested reading:

1. Jull, M.A. (1951). Poultry husbandry Mc Grow Hill Co New York
2. Singh R.A. 2001. Poultry Production Kalyani Publishers New Delhi
3. Pand, B. 1985 Poultry Production
4. Anonymous 1996. Advances in poultry production processings of 20th world poultry congress.

5. Gupta S. 2001. Indian Poultry year book, new Delhi
6. Banargee G.C. 1976. Poultry Oxford and IBH publication Co. New Delhi
7. Jagdish Prasad 2000. Poultry production and management, Kalayani Publishers, New Delhi
8. Newman, T. Principles and Practices of poultry husbandry Green World Publication Co. Lucknow
9. Saxena U.C. 2000. Hand book of poultry feeding and management PIXE Publications, Karnal
10. Narhari D. 2000. Poultry economics and Projects New Print and Process

DPP: 506 (Practical Course Based on DPP- 503)
Milk and Dairy Product Analysis

Credits: 06 **Total Periods: 90**

Objectives:

1) Study common terminology used in Packaging of milk and milk products
2) To learn about how to increase the selling of milk and milk products by attractive packages.
3) To learn about how to increase products demand in market by using different package techniques.
4) To study various packaging materials, its forms and legal requirements.
5) To get information about methods sterilization of packaging material.

To know about importance of coding and labelling of packages

Sr.No	Practical	No. of Periods
1	Detection of Adulterants in Milk	06
2	Detection and Quantification of Cane Sugar	06
3	Detection and Quantification of Starch in Milk	06
4	Detection of Added Urea in Milk	06
5	Test for Presence of Skimmed milk Powder in Natural milk(Cow, buffalo, goat, sheep)	06
6	Test for Detection of Gelatine in Milk	06
7	Determination of Fat in Milk by Gerber Method	06
8	Preparation of Rasagulla	12
9	Preparation of Chakka/Shrikhand	12
10	Preparation of Amrakhand	12
11	Preparation of Fruitkhand	12

Reference Books -

1. Milk Testing, J.G. Davis
2. Dairy Microbiology, K.C. Mahanta
1. 4.Dairy Bacteriology, Hammer
2. 5.Fundamentals of Dairy Microbiology , J.B. Prajapati
3. 6. Standard Methods for Examination of Dairy Products ,Gary H. Richerdson
4. 7.Market Milk Industry, C.L. Rhodhouse & J.L. Henderson.
5. 8.Comprehensive Dairy Microbiology , Yadav, Batish & Grover.
6. 9.A Text Book of Animal Husbandry , J.C. Banerjee
11. The Fluid Milk Industry, Handerson.
12. ISI Specifications ,BIS Publication

SEMESTER

VI

SYLLABUS FOR B.VOCATIONAL (Dairy Products and Processing)

THIRD YEAR (Semester -VI)

DPP: 601 FOOD AND DAIRY MICROBIOLOG

Credits: 04 **Total Periods: 60**

Objectives:

1. To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2. To learn about how to destruct microbial population for maintain milk quality.
3. To develop the marginal skills to start dairy industrial
4. To enhance their employability
5. To acquaint the students about the pathogen and spoilage organisms in milk to reduce milk spoilage.
6. To create income generating potential for the students.

Basic Dairy Microbiology			
Unit	**Topic**	**Learning Points**	**Periods**
1	**Dairy Development in India**	➢ Role of National Dairy Development Board (NDDB), ➢ National Dairy Research Institute (NDRI), ➢ Military dairy farm, ➢ Indian Dairy Corporation (IDC), ➢ Dairy Co-operatives, ➢ Milk Grid, ➢ Operation Flood.	**10**
2	**Milk Chemistry and Constituents**	➢ Definition and Composition of milk ➢ Types of Milk (skimmed, toned and homogenized). Concept of clean milk ➢ Factors affecting quality and quantity of milk. ➢ Nutritive value of milk ➢ Physico-Chemical properties of milk.	**10**
3	**Microbiology of milk**	➢ Common micro-organisms found in milk ➢ Fermentation and spoilage of milk ➢ Milk borne diseases	**10**
4	**Preservation of Milk by Pasteurization & its storage:**	➢ Methods of Pasteurization – LTH, HTST, UHT ➢ Storage specifications after pasteurization ➢ Phosphatase test and its significance	**10**
5	**Microbial analysis of milk**	➢ Dye reduction test (using methylene blue and resazurin) ➢ Total bacterial count. ➢ Brucella ring test and tests for mastitis. ➢ Somatic cell count	**05**
6	**Classification of Foods based on stability:**	➢ Perishable, ➢ Semi-perishable ➢ Stable	**05**

7	**Food spoilage:**	➢ Chemical and physical properties of food affecting microbial growth ➢ Sources of food spoilage micro-organism Spoilage of i. Meat and Poultry products ii. Bread iii. Fruits and Vegetables iv. Eggs v. Sea foods vi. Canned foods	**10**

References:

1. Ajay Singh, Owen P. Ward, 2004 edition, Applied Bioremediation and Phytoremediation (Soil Biology). Springer;

2. Banwart G. J. (1989). Basic Food microbiology, 2nd Edn. Chapman and Hall. International Thompson Publishing.

3. Charles R. Lane, Paul Beales, Kelvin J. D. Hughes (2012). Fungal Plant Pathogens.1st Edn. CABI Publishing.

4. Clarence Henry Eckles, Willes Barnes Combs, Harold Macy (1943). Milk and milk products, 4th Ed. McGraw-Hill book Company, Incorporated.

5. David S. Ingram, N.F. Robertson (1999). Plant Disease.1st Edn.: Collins

6. George Nicholas Agrios (2005).Plant Pathology.5th Edn. Academic Press Inc

. 7. James M. Jay, Martin J. Loessner, David A. Golden (2005). Modern food microbiology, 7th Edn. Springer Science & Business.

8. John Postgate, (1998). Nitrogen Fixation. Cambridge University Press

9. K. S. Bilgrami, H. C. Dube (1984).A textbook of modern plant pathology. 7th Edn.

SYLLABUS FOR B.VOCATIONAL (Dairy Products and Processing)

THIRD YEAR (Semester -VI)

DPP: 602 Sheep and Goat Production and Management

Credits: 04 **Total Periods: 60**

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in Integrated Livestock Farming for increasing income with combination of different resources
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students.
5) To develop the marginal skills to start dairy industrial job.
6) To improve awareness among the students about different enterprises

Syllabus:

Sr. No.	Name of Topic	No. of Lectures
1	Importance of sheep and goat in India	**04**
2	Present status of sheep and goat in India	**05**
3	Breeds of sheep and goat	**06**
4	Establishment of commercial sheep and goat farm	**06**
5	Care and management of young stock	**04**
6	Care and management of breeding stock	**06**
7	Care and management of pregnant and lactating animals	**04**
8	Improvement and utilization of pasture and Grassland	**04**
9	Silvipasture for sustainable sheep and goat production,	**05**
10	Utilization of top feeds and non conventional feed and fodder resources,	**04**
11	Common diseases of sheep and goat and their control,	**07**
12	Hygienic slaughtering of sheep and goat for meat	**05**

Suggested Readings :

1. Bhattacharya N.K. (1989) Goat Produciton CIRG Makhadoom
2. Kurag C.K. (1985) Management practices for goats NDRI Karnal
3. Jindal (1984) Goat production Falcon book Publication Co. new Delhi
4. Kaushik S.K. (1988) Sheep production in tropics and subtropics
5. Devendra, C. and Burns, (1970) Goat production in tropics
6. Acharya R.M. (1982) Breeding strategy for sheep in India
7. Ranjan, S.K. (1989) Text Book Quality meat production Vikas publication house, New Delhi.

SYLLABUS FOR B.VOCATIONAL (Dairy Products and Processing)

THIRD YEAR (Semester - VI)

DPP: 603 Milk by- Products Technology

Credits: 04 **Total Periods: 60**

Sr. No.	Name of Topic	No. of Practical
1	Types of various by-products and their chemical composition.	05
2	Dairy by- products, nutrient loss, environment pollution.	05
3	Present scenario- availability and/or utilization pattern.	05
4	Scope for utilization of dairy by-products.	05
5	Technology availability and its impact.	08
6	Innovative Technology in existence.	08
7	Application of Technology for conversion of by products for suitable utilization.	08
8	Manufacture of whey based products	08
9	Manufacture of ghee residues based products .	08
10	Manufacture of butter milk or related products.	10

References:

1. Alderman, H. 1987. Cooperative dairy development in Karnataka, India: an assessment. Research Report 64. Washington, DC, International Food Policy Research Institute.

2. Arimond, M., Hawkes, C., Ruel, M.T., Sifri, Z., Berti, P.R., Leroy, J.L., Low, J.W., Brown, L.R. & Frongillo, E.A. 2011.

3. Agricultural interventions and nutrition: lessons from the past and new evidence. In FAO. Combating micronutrient deficiencies: Food-based approaches, by B. Thompson & L. Amoroso, eds. Rome, FAO; Wallingford, UK, CABI.

4. Ayalew, W., Gebriel, Z.W. & Kassa, H. 1999. Reducing vitamin A deficiency in Ethiopia: linkages with a women-focused dairy goat farming project.

DPP: 604 (Practical Course Based on DPP- 601)
FOOD AND DAIRY MICROBIOLOG

Credits: 06 **Total period :90**

Sr. No.	Name of Topic	No. of Lectures
1	Microorganism associated with milk and milk products i.e. bacteria, yeast and mould.	06
2	Microbial defects in milk and milk products and its control.	06
3	Defects in Cream, their causes and Preventive measures	06
4	Defects in Butter, their causes and Preventive measures	06
5	Defects in Ghee, their causes and Preventive measures	06
7	Control of pathogenic and spoilage microorganism.	06
8	Definition of fermentation and types of fermentation.	08
9	Preparation of chocolate milk	06
10	Preparation of flavored milk (pista,vanilla etc)	06
11	Preparation of Mango lassi	12
12	Preparation of Paneer	12
13	Preparation of Soya milk using soybean seeds	10

References:

1.Alderman, H. 1987. Cooperative dairy development in Karnataka, India: an assessment. Research Report 64. Washington, DC, International Food Policy Research Institute.

2. Arimond, M., Hawkes, C., Ruel, M.T., Sifri, Z., Berti, P.R., Leroy, J.L., Low, J.W., Brown, L.R. & Frongillo, E.A. 2011.

3.Agricultural interventions and nutrition: lessons from the past and new evidence. In FAO. Combating micronutrient deficiencies: Food-based approaches, by B. Thompson & L. Amoroso, eds. Rome, FAO; Wallingford, UK, CABI.

4. Ayalew, W., Gebriel, Z.W. & Kassa, H. 1999. Reducing vitamin A deficiency in Ethiopia: linkages with a women-focused dairy goat farming project.

DPP: 605 (Practical Course Based on DPP- 602)

Sheep and goat Production and management

Credits: 06 Total Periods: 90

Objectives:

1) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
2) To acquaint the students about the opportunities in dairy field.
3) To help human resource development (HRD) state as well as National Level.
4) To create income generating potential for the students by preparing different by products from milk.To develop the marginal skills to start dairy industrial job

Sr. No.	Name of Topic	No. of Lectures
1	Routine and periodic farm operations followed on sheep and goat farms	**09**
2	Management calendar for sheep	**09**
3	Management calendar for goat	**06**
4	Recording of data on Production and reproduction	**06**
5	Economic rearing of kids and lambs	**04**
6	Grazing behaviour and feeding practices for sheep and goat,	**04**
7	Selection and breeding of sheep and goats	**04**
8	General care and management of pregnant and lactating does	**04**
9	General care and management of pregnant and lactating ewes	**06**
10	Shearing management,	**09**
11	Systems of housing	**09**
12	Farm equipments used at goat and sheep farm	**06**
13	Slaughter and carcass evaluation,	**06**
14	Cost of production of mutton, wool and milk	**06**
15	Rearing of sheep and goat on silvipastural system	**06**
16	Preparation of proposal for commercial sheep and goat farm.	**06**
17	Field Visit to M.P.K.V. Rahuri	**12**

Suggested Readings :

1. Bhattacharya N.K. (1989) Goat Produciton CIRG Makhadoom
2. Kurag C.K. (1985) Management practices for goats NDRI Karnal

J indal (1984) Goat production Falcon book Publication Co. new Delh Kaushik S.K. (1988) Sheep production in tropics and subtropics

1. Devendra, C. and Burns, (1970) Goat production in tropics
2. Acharya R.M. (1982) Breeding strategy for sheep in India

DPP: 606 (Practical Course Based on DPP- 60)

Milk by- Products Technology

Credits: 06 **Total Periods: 90**

Objectives:

1) To learn about the microorganisms associated with milk and milk products.
2) To develop trained and semiskilled/ skilled man power required in the various sectors of dairy industry.
3) To acquaint the students about the opportunities in dairy field.
4) To help human resource development (HRD) state as well as National Level.
5) To create income generating potential for the students.
6) To develop the marginal skills to start dairy industrial job.

Sr. No.	Title of Practical	No. of Periods
1	Manufacture of Khoa	06
2	Manufacture of Rabadi	06
3	Manufacture of Basundi	06
4	Manufacture of Paneer	06
5	Manufacture of Chhana	05
6	Manufacture of Dahi and Lassi	06
7	Manufacture of Khoa—Burfi	05
8	Manufacture of Pedha	06
9	Manufacture of Gulabjamun	05
10	Peparation of Makhan and Ghee	06
11	Peparation of Rasamalai	05
12	Peparation of Sandesh	06
13	Peparation of Rasagulla	05
14	Peparation of Kalakand	06
15	Peparation of whey Drink	05
16	Peparation of Shrikhand	06

Reference Books -

7. 4.Dairy Bacteriology, Hammer
8. 5.Fundamentals of Dairy Microbiology , J.B. Prajapati
9. 6. Standard Methods for Examination of Dairy Products ,Gary H. Richerdson
10. 7.Market Milk Industry, C.L. Rhodhouse & J.L. Henderson.
11. 8.Comprehensive Dairy Microbiology , Yadav, Batish & Grover.
12. 9.A Text Book of Animal Husbandry , J.C. Banerjee
13. The Fluid Milk Industry, Handerson.
14. ISI Specifications ,BIS Publication

15.