

मुळा एज्युकेशन सोसायटी

कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई

ता. नेवासा, जि. अहमदनगर - ४१४१०५. फोन/फॅक्स (०२४२७) २३१३८४
E-mail : sonaicollege@yahoo.co.in Website - www.acssonaicollege.com

सावित्रीबाई फुले पुणे विद्यापीठ संलग्नीत (आय.डी.पी.यू./ए.एन./ए.एस.सी./०३१/१९८९)
नॅक पुनर्मुल्यांकीत 'अ' श्रेणी आयएसओ ९००१ : २००८ प्रमाणित



YASH GROUP
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Date:- 12/10/2020

ACSC/ 169 /2020-21

प्रति,

उप कुलसचिव

शैक्षणिक विभाग

सावित्रीबाई फुले पुणे विद्यापीठ, पुणे

विषय: बॅचलर ऑफ व्होकेशन (B.Voc, Food Processing) सुधारित अभ्यासक्रम

मंजूरी बाबत

संदर्भ: 1. युजीसी नवी दिल्ली मंजूरी पत्र No.F.4-12/2018(NSQF).Date:01/08/2018.

2.महाराष्ट्र शासन उच्च व तंत्र शिक्षण विभाग आदेश क्र .एनजीसी

२०१८/(३२२/१८)मशी-४ दिनांक:०४मार्च,२०२०

3. आपले पत्र पत्र क्र.सी.बी.एस/1159 दि. ३१/१०/२०१८.

4. महाराष्ट्र शासन मान्यता पत्र क्र.ससं/उशि/पुवि/बी.व्होक/विषय -अभ्यासक्रम/
साफु/पुवि/२०२०/२०२४. दि.३०/०९/२०२०.

महोदय ,

वरील संदर्भीय विशायानवये युजीसी नवी दिल्ली यांचेकडून आमचे महाविद्यालयात बी.व्होक फुड प्रोसेसिंग (B.Voc, Food Processing) हा कोर्स वर्ष 2018-19 पासून सुरु करण्यात आलेला आहे.या कोर्सचा अभ्यासक्रम महाविद्यालयाच्या अभ्यास समितीच्या दि .१०/१०/२०२० झालेल्या सभेत सर्वानुमते मंजूर करून आपणाकडे मंजूरीसाठी (Boards of Science & Technology) पाठवित आहोत. तरी कृपया त्याचा स्वीकार करून त्यास मान्यता मिळावी ही विनंती.

कळावे,

सोबत:

१. बी .व्होक फुड प्रोसेसिंग सुधारित अभ्यासक्रम

२. युजीसी व महाराष्ट्र शासन मान्यता पत्र

आपला

Principal

Mula Education Society's
Art's, Commerce & Science College
Sonai, Tal.Newasa, Dist.Ahmednagar

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Mula Education Society's
Arts, Commerce & Science College, Sonai
Tal. Newasa Dist. Ahmednagar 414105
Syllabus Framing Committee
Bachelor of Vocational Courses
Duration: Year 2018-19 to Year 2022-23

Sr. No	Name of the member	Post	Subject	Office address
1	Pri .Dr.S.L.Laware	Chairman	Botany	Arts,Commerce &Science College,Sonai
2	Pri. Dr.V.E .Deshmukh	Member	Pharma.chemistry	College of Pharmacy,Sonai
3	Dr.D.E.Zine	Member	Economics	Arts,Commerce &Science College,Sonai
4	Mr.G.R.Antre	Member	Dairy Science	Mahatma Phule Krishi Vidyapeet,Rahuri
5	Mr.S.A.Najan	Member	Chemistry	Arts,Commerce &Science College,Sonai
6	Dr.R.R.Dandawate	Member	Zoology	Arts,Commerce &Science College,Sonai
7	Mr.A.S.Jadhav	Member	Food Technology	Arts,Commerce &Science College,Sonai


Principal
Mula Education Society's
Art's, Commerce & Science College
Sonai, Tal.Newasa, Dist.A'Nagar





शैक्षणिक विभाग,
गणेशखिंड, पुणे-४११ ००७
दुरध्वनी क्र.: ०२०-२५६०९२५७/५८
ई-मेल : boards@pun.unipune.ac.in
संकेतस्थळ : www.unipune.ac.in

सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)
Savitribai Phule Pune University
(Formerly University of Pune)

Academic Section
Ganeshkhind, Pune-411 007
Phone: 020-25601257/58
E-mail: boards@pun.unipune.ac.in
Website: www.unipune.ac.in

संदर्भ क्र.: सी.बी.एस./ ५६२

दिनांक: ०५.१०.२०२०

प्रति,

मा. प्राचार्य,
सावित्रीबाई फुले पुणे विद्यापीठांतर्गत
बी.व्होक महाविद्यालये

विषय:— बॅचलर ऑफ व्होकेशनल (B.Voc.) अभ्यासक्रम सुधारित (Revise) करणेबाबत....

महोदय/महोदया,

उपरोक्त विषयास अनुसरून विद्यापीठ अनुदान आयोगाने एन.ए.ए.क्यू.एफ. अंतर्गत विद्यापीठाशी संलग्नित फक्त विज्ञान (Science) अभ्यासक्रमांच्या महाविद्यालयांना शैक्षणिक वर्ष २०१९-२० साठी मंजूर केलेल्या बॅचलर ऑफ व्होकेशनल (B.Voc.) अभ्यासक्रमांना चालविणा-या महाविद्यालयांना कळविण्यात येत आहे की, Life Sciences, Chemical and Pharmacy [LCP] या बी.व्होक तदर्थ अभ्यासमंडळांतर्गत येणा-या अभ्यासक्रमांमध्ये एकसंधता (Uniformity) आणण्यासाठी Common Syllabus Structure, Rules and Regulations तयार केले आहेत. सदर नियमावली Syllabi - Revised Syllabus from the Academic Year 2020 (New Syllabus) - Faculty: Faculty of Science & Technology - Course: VI B.Voc. या संकेत स्थळावर उपलब्ध आहे. तरी सदर नियमावलीनुसार संबंधित महाविद्यालयांनी प्रथम वर्षाचा संपूर्ण अभ्यासक्रम (F.Y.Detailed Syllabus) व प्रथम ते तृतीय वर्षांचा अभ्यासक्रम आराखडा (Three Year Syllabus Structure) एकत्रित तयार करून मंजुरीसाठी दि. १३ ऑक्टोबर, २०२० पूर्वी पोस्टाद्वारे शैक्षणिक विभागातील विद्याशाखा व अभ्यासमंडळे कक्षाकडे पाठवावा. तसेच अभ्यासक्रमांची सॉफ्ट कॉपी (both Word & PDF File) boards@pun.unipune.ac.in या मेलवर पाठवावी.

सदर प्राप्त अभ्यासक्रम अभ्यासमंडळाच्या व मा. विद्याशाखेच्या मंजूरीनंतर दि. ३ नोव्हेंबर, २०२० ला होणा-या मा. विद्यापरिषदेच्या सभेमध्ये मान्यतेस्तव ठेवण्यात येणार आहेत. यापूर्वी निर्गमित केलेले परिपत्रक क्र २१७/२०१८ अन्वये अभ्यासक्रमांना मान्यतेसाठी लागणारा कालावधी साधारणतः आठ महिने असा आहे. सदर कालावधीचा विचार करता आपले प्रस्ताव दि. १३ ऑक्टोबर, २०२० पूर्वी प्राप्त झाल्यास चालू शैक्षणिक वर्षात अभ्यासक्रमास मान्यता देण्याची कार्यवाही पूर्ण करता येईल. सबब तद्नंतर प्राप्त होणा-या अभ्यासक्रमांचा चालू शैक्षणिक वर्षासाठी विचार केला जाणार नाही यानी नोंद घ्यावी.

- Note: 1. Kindly Mention the Reference Books for each subject individually.
2. Relevant Websites, Links should be included in reference lists for subjects.
3. In view of corona pandemic situation, Colleges are advised to develop minimum 70% of syllabuses as E-Content. This would not hamper academics and will help students to pursue the course.

कळावे,

To Mr. R. R. Pandwale
8/10/2020

आपला,

उपकुलसचिव

कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई सा. नेवासा, जि. अ. नर, वि. नं. १४०१०५ आयक क्र. - ३४२ - ११/१०/२०१९ ४०११९११९.२००
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**B.Voc. Courses list which comes under
Life Sciences, Chemical and Pharmacy (LCP)
Vocational Ad hoc Board**

No	College Name	Course Name	Under Which Faculty	Adhoc Board
1	Arts, Science and Commerce College, CIDCO, Uttamnagar, Nashik-422008	1. Food Processing Technology	Science and Technology	LCP
2	Annasaheb Awate Arts, Commerce Hutatma Babu Genu Science College, Manchar, Ambegaon Pune-410503	1. Food Processing and Quality Management	Science and Technology	LCP
3	Mula Education's Arts, Commerce and Science College, Sonai, Tal Nevasa, Ahmednagar-414105	1. Food Processing (Dairy Milk)	Science and Technology	LCP
4	Sangamner Nagarpalika Arts, D J Malpani Commerce and B N Sarda Science College, Sangamner, Ahemdnagar- 422605	1. Dairy Products and Processing 2. Agriculture and Soil Science	Science and Technology Science and Technology	LCP LCP
5	Dada Patil Mahavidyalaya, Arts, Commerce and Science, Karjat, Ahmednagar-414402	1. Medicinal Plants Grower	Science and Technology	LCP
6	Karmaveer Abasaheb Alias N M Sonawane Arts, Commerce and Science College, Satana, Tal- Baglan, Nashik-423301	1: Agriculture and Horticulture	Science and Technology	LCP
7	Vidya Pratishthan's Arts, Science and Commerce College, Vidyanagari, Bhigwan Road, Baramati, Pune-413133	1. Food Technology	Science and Technology	LCP
8	T C College, Arts, Science and Commerce, Barmati-413102	1. Dairy Technology	Science and Technology	LCP
9	Mahatma Gandhi Vidya Mandir's Loknete Vyankatrao Hiray College, Panchavati, Nashik-422003	1. Food Processing Technology	Science and Technology	LCP
10	Netaji Shikshan Sanstheche Subhash Baburao Kul Mahavidyalaya, Kedgaon, Tal. Daund, Pune-412203	1. Food Processing	Science and Technology	LCP



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Ph. No. 011-23604284



शतमेव सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
(मानव संसाधन विकास मंत्रालय, भारत सरकार)
बहादुरशाह ज़ाफर मार्ग, नई दिल्ली - 110 002

University Grants Commission
(Ministry of Human Resource Development, Govt. of India)
Bahadurshah Zafar Marg, New Delhi - 110 002

No. F. 4-12/2018(NSQF)

1st August, 2018

The Principal
Arts, Commerce and Science College
At-Sonai, Tal.-Newasa,
Dist. Ahmednagar
Maharashtra - 414 105

Subject: Approval of programmes/courses under NSQF

Dear Sir/Madam,

This is with reference to your proposal for introducing vocational courses under NSQF. I am directed to convey approval of the UGC for the following programmes/courses to be run by your institution under NSQF from the academic session 2018-19:

- B.VOC
- Food Processing
 - Hospitality & Tourism

It is further informed that the institution may admit 50 students per course, and appoint faculty and staff as per the provisions of the NSQF Guidelines.

You are requested to kindly ensure compliance of the terms and conditions/provisions as laid down in the Guidelines for providing Skill-based Education under National Skill Qualification Framework. You are also requested to convey your confirmation to start the course/s from the academic session 2018-19 along with the course-wise actual intake of students to UGC at the earliest.

Yours faithfully,


(Mriganka Sekhar Sarma)
Education Officer


Principal
Mula Education Society's
Art's, Commerce & Science College
Sonai, Tal. Newasa, Dist. A' Nagar

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बी.व्होक अभ्यासक्रमांना
मान्यता देणेबाबत.

महाराष्ट्र शासन
उच्च व तंत्र शिक्षण विभाग
शासन आदेश क्रमांक: एनजीसी २०१८/(३२२/१८)/मशि-४
मंत्रालय विस्तार भवन, मुंबई ४०० ०३२
दिनांक : ०४ मार्च, २०२०.

- संदर्भ: १. कुलसचिव, सावित्रीबाई फुले पुणे विद्यापीठ, पुणे यांचे पत्र क्र. संदर्भ क्र. सीए/१४६६ दिनांक: २०.०९.२०१९
२. कुलसचिव, शिवाजी विद्यापीठ, कोल्हापूर यांचे पत्र क्र. जा. क्र. संलग्नता /टी-२/B.Voc./२०१९-२० दिनांक: २१.११.२०१९
३. उपकुलसचिव, राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर यांचे पत्र क्र.रातुमनावि/म.वि.वि./१९/५४८२ दिनांक: २५.११.२०१९
४. कुलसचिव, संत गाडगे बाबा अमरावती विद्यापीठ, अमरावती यांचे पत्र क्र.संगाबाअवि/८/सी-२२७२/२०१९ दिनांक: ०७.१२.२०१९
५. उपकुलसचिव (शैक्षणिक उपविभाग), डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद यांचे पत्र क्र.संदर्भ क्र.शैक्षणिक/एमसीएम/२०१९-२०/४७८१-८२ दिनांक: २०.११.२०१९
६. कुलसचिव, मुंबई विद्यापीठ, मुंबई यांचे पत्र क्र.संलग्नता/आय.सी.डी./२०१९-२०/१६७२ दिनांक: २८.११.२०१९
७. कुलसचिव, स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड यांचे पत्र क्र.जा.क्र.शैक्षणिक/संलग्न-०३/बी.व्होक प्रस्ताव/२०१९-२०/१९६० दिनांक: १९.११.२०१९
८. कुलसचिव, पुण्यश्लोक अहिल्यादेवी होळकर सोलापूर विद्यापीठ, सोलापूर यांचे पत्र क्र. जा.क्र. पुअहोसोविसो/संलग्नता/२०१९/८७७६
९. उपकुलसचिव, (अति. कार्य.), संलग्नता विभाग, कवयित्री वहिणाबाई चौधरी उत्तर महाराष्ट्र विद्यापीठ, जळगाव यांचे पत्र क्र.जा.क्र.कबचौउमवि/५/संलग्नता/५१८/२०१९

शासन आदेश

केंद्र शासनाच्या मनुष्यबळ विकास मंत्रालयाने National Vocational Education Qualification Framework या नावाचा कौशल्य विकास कार्यक्रम २०११ मध्ये सुरू केलेला आहे. त्यानुसार केंद्र शासनाच्या वित्त



क्र.	संस्थेचे व महाविद्यालयाचे नाव	अभ्यासक्रम	
		बी.व्होक	कम्युनिटी कॉलेज
सावित्रीबाई फुले पुणे विद्यापीठ, पुणे			
१	एन.डी.एम.व्ही.पी समाजाचे कला, विज्ञान व वाणिज्य महाविद्यालय, सिडको, उत्तमनगर, जिल्हा नाशिक-४२२ ००८	1) Food Processing 2) Electrical Appliances Maintenance and Repairing	-
२	रयत शिक्षण संस्थेचे आण्णासाहेब आवटे कला, वाणिज्य, हुतात्मा बाबू गेनू विज्ञान महाविद्यालय, मंचर, ता. आंबेगाव, जि. पुणे-४१० ५०३	1) Food Processing and Quality Management 2) Accounting & Taxation	-
३	मुळा एज्युकेशन सोसायटीचे कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई, ता. नेवासा, जि. अहमदनगर-४१४ १०५	1) Food Processing	-
४	शिक्षण प्रसारक संस्थेचे संगमनेर नगरपालिका कला, डी.जे.मालपाणी वाणिज्य व बी.एन.सारडा विज्ञान महाविद्यालय, संगमनेर, ता. संगमनेर जि. अहमदनगर-४२२ ६०५	1) Dairy Product and Processing 2) Agriculture and Soil Science 3) Accounting And Taxation	-
५	मराठा विद्या प्रसारक समाजाचे के.आर.टी.आर्ट्स, बी.एच. वाणिज्य व एम.म. विज्ञान महाविद्यालय, गंगापूर मार्ग, शिवाजीनगर, नाशिक-४२२ ००२	1) Direct and Indirect Tax 2) Mass Media 3) Dramatics	-
६	अहमदनगर जिल्हा मराठा विद्या प्रसारक समाजाचे न्यू आर्ट्स, कॉमर्स, अॅण्ड सायन्स कॉलेज, पारनेर, जि.अहमदनगर-४१४ ३०२	1) Renewable Energy Tech. and Management 2) Software Development	-
७	महात्मा गांधी विद्यामंदिर, नाशिक संचलित, महाराजा सयाजीराव गायकवाड	1) Retail Management	१) Mass Communication

अभ्यासक्रम मंजूर करण्यात आलेल्या महाविद्यालयांनी विद्यापीठ अनुदान आयोगाच्या (अॅफिलिएशन ऑफ कॉलेजेस वाय युनिव्हर्सिटीज) रेग्युलेशन २००९ नुसार संलग्नीकरण देण्याबाबत विहित केलेल्या निकषांची पूर्तता केली असल्याचे विद्यापीठ व सहसंचालकांनी खातरजमा करावी.

५. भविष्यात विद्यापीठ अनुदान आयोगाची आर्थिक मदत बंद झाल्यानंतर राज्य शासन या अभ्यासक्रमाचे कोणतेही आर्थिक दायित्व स्विकारणार नाही.

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नावाने,



(द. व. खारके)

कार्यासन अधिकारी, महाराष्ट्र शासन

प्रत.

- १) संचालक, उच्च शिक्षण, महाराष्ट्र राज्य, पुणे.
- २) सर्व विभागीय सहसंचालक, महाराष्ट्र राज्य.
- ३) कुलसचिव, सर्व अकृषी विद्यापीठे.
- ४) संबंधित महाविद्यालये (विद्यापीठांमार्फत)
- ५) निवड नस्ती (मशि-४)



Principal
Mule Education Society's
Art's, Commerce and Science College
Sonal, Tal. ... Dist. A'Nagar



सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)

शैक्षणिक विभाग

शाखिड, पुणे-४११ ००७

दफ्तरी क्र. : ०२०-२५६०१२५७/५८/५९

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दिनांक : ०५/११/१९

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(Formerly University of Pune)

Academic Section

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दिनांक : ३१/१०/२०१८

परिपत्रक क्र. २०० / २०१८

विषय: विद्यापीठ अनुदान आयोग, नवी दिल्ली यांच्या एन.एस.क्यु.एफ.
(N.S.Q.F.) योजनेअंतर्गत बॅचलर ऑफ व्होकेशनल (B.Voc.)
अभ्यासक्रमांबाबत ...

विद्यापीठ अधिकार मंडळाने घेतलेल्या निर्णयानुसार सर्व संबंधितांस या
परिपत्रकाद्वारे कळविण्यात येते की, विद्यापीठ अनुदान आयोग, नवी दिल्ली यांच्या
एन.एस.क्यु.एफ. (N.S.Q.F.) योजनेअंतर्गत शैक्षणिक वर्ष २०१८-१९ पासून सोबत
जोडलेल्या यादीतील महाविद्यालयांसमोरील बॅचलर ऑफ व्होकेशनल (B.Voc.)
पदवीच्या प्रथम वर्ष अभ्यासक्रमांस मान्यता देण्यात येत आहे.

मा. प्राचार्य, सर्व संलग्न महाविद्यालये, सावित्रीबाई फुले पुणे विद्यापीठ, यांना
विनंती की, सदर परिपत्रकाचा आशय सर्व संबंधितांच्या निदर्शनास आणून द्यावा.


PRINCIPAL

Arts, Commerce & Science College
Sonai, Tal. Newasa, Dist. A.Nagar


उपकुलसचिव
(शैक्षणिक विभाग)

Sl. N	College Name	Course Name
1.	Arts, Science and Commerce College, CIDCO, Uttamnagar, Nashik-422008	1. Food Processing Technology 2. Electrical Appliances – Maintenance and Repairing
	Annasaheb Awate Arts, Commerce Hutatma Babu Genu Science College, Manchar, Ambegaon Pune-410503	1. Food Processing and Quality Management 2. Accounting & Taxation
3.	Mula Education's Arts, Commerce and Science College, Sonai, Tal Nevasa, Ahmednagar-414105	1. Food Processing (Dairy Milk) 2. Hospitality and Tourism
4.	Karmaveer Ganpat Dada More Arts, Commerce and Science College, Niphad, Nashik-422384	1. Soil and Water Conservation 2. Tourism and Service Industry 3. Banking and Financial Services
5.	Sangamner Nagarpalika Arts, D J Malpani Commerce and B N Sarda Science College, Sangamner, Ahmednagar-422605	1. Dairy Products and Processing 2. Agriculture and Soil Science 3. Accounting & Taxation
	Maratha Vidya Prasarak Samaj's K. T. H. M. College, Gangapur Road, Shivaji Nagar, Nashik-422002	1. Interior Design 2. Mass Media 3. Direct Tax and Indirect Tax 4. Dramatics 5. Printing Technology
7.	New Arts, Commerce and Science College, Parner, Dist- Ahmednagar-414302	1. Renewable Energy Tech. and Management 2. Software Development
8.	Maharaja Sayajirao Gaikwad Arts, Science and Commerce College, Malegaon, Nashik-423105	1. Retail Management
9.	Dada Patil Mahavidyalaya, Arts, Commerce and Science, Karjat, Ahmednagar-414402	1. Medicinal Plants Grower
10.	Karmaveer Abasaheb Alias N M Sonawane Arts, Commerce and Science College, Satana, Tal- Baglan, Nashik-423301	1. Agriculture and Horticulture 2. Beauty and Wellness
11.	HPT Arts and RYK Science College, Nashik - 422005	1. Tourism and Hospitality Management
12.	Mahatma Gandhi Vidya Mandir's Arts, Science and Commerce College, Mahmad, Nashik-423104	1. Information Technology 2. Electronics
13.	New Arts Commerce and Science College, Lal Taki, Ahmednagar-414001	1. Printing Technology

CS

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महाराष्ट्र शासन
शिक्षण सहसंचालक (उच्च शिक्षण)

१७ डॉ आंबेडकर रोड, पुणे विभाग, पुणे-१

Web: www.jdhpune.info

E_mail ID- jdhpune@gmail.com

फोन नं. ०२०-२६१२७८३३/२६०५१६३२

फॅक्स नं. ०२०-२६०५१६३२

क्र.सस/उशि/पुवि/बी.व्होक/विषय-अभ्यासक्रम/साफुपुवि/२०२०/७०२५

दि. ३०/०९/२०२०

प्रति,
कुलसचिव,
सावित्रीबाई फुले पुणे विद्यापीठ,
गणेशखिंड,
पुणे ४११ ००७.

विषय - बी.व्होक अभ्यासक्रमांना मान्यता देणेबाबत...

संदर्भ - (१) शासन निर्णय, उच्च व तंत्रशिक्षण विभाग, क्र.एनजीसी २०१८/(३२२/१८)/मशि-४,
दि.०४/०३/२०२०.

(२) प्राचार्य, कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई यांचेकडील पत्र
क्र.एसीएससी/८२/२०२०-२१, दि. १७/०८/२०२०.

उपरोक्त विषयाचे संदर्भात केंद्र शासनाच्या मनुष्यबळ विकास मंत्रालयाने National Vocational Education Qualification Framework या नावाचा कौशल्य विकास कार्यक्रम सुरु केलेला आहे. त्यानुसार केंद्र शासनाच्या वित्त विभागाने National Skill Qualification Framework ही योजना लागू केलेली आहे. त्या अनुषंगाने विद्यापीठ अनुदान आयोगाने Guidelines for introduction of Bachelor of Vocation (B.VOC.) Programme in Univesities and Colleges under the National Skills Qualifications Framework (NSQF) निर्गमित केलेले आहेत. सदर मार्गदर्शक तत्वानुसार विद्यापीठ अनुदान आयोगाने B.Voc. अभ्यासक्रमांना मंजूरी दिलेली आहे. तथापि, महाराष्ट्र सार्वजनिक विद्यापीठ अधिनियम, २०१६ मधील कलम १०९ अन्वये या अभ्यासक्रमांना शासनाची मान्यता आवश्यक आहे. यातील तरतूदीनुसार शासनाने संदर्भ क्र.१ येथील शासन निर्णयान्वये खालीलप्रमाणे त्या-त्या शैक्षणिक वर्षापासून विद्यापीठाने शिफारशीत केलेले बी.व्होक अभ्यासक्रम विद्यापीठ अनुदान आयोगाच्या मान्यतेप्रमाणे आवश्यकतेनुसार पूर्वलक्षीप्रभावाने सुरु करण्यास कायम विनाअनुदान तत्वावर मान्यता प्रदान करण्यात आलेली आहे.

संदर्भ क्र.१ येथील शासन निर्णयातील अ.क्र.	संस्था/महाविद्यालयाचे नाव	बी. व्होक (B.Voc.) अभ्यासक्रम
१	२	३
०३	मुळा एज्युकेशन सोसायटीचे, कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई ता. नेवासा जि. अहमदनगर- ४१४ १०५	१) Food Processing

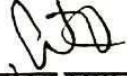
B.Voc. New Course Letter 20-21 CITY
To, D.E zine

कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई
ता. नेवासा, जि. अहमदनगर- ४१४ १०५
आवक क्र. ३३
दि. ११/१०/२०२०

उक्त संस्थेने शासन आदेशानुसार रु.१००/- च्या नॉन ज्युडिसिअल स्टॅम्प पेपरवर उक्त अभ्यासक्रमासाठी भविष्यात कोणत्याही परिस्थितीत अनुदानाची मागणी करणार नाहीत असे हमीपत्र संदर्भिय पत्रान्वये या कार्यालयाकडे सादर केलेले आहे. या हमीपत्राच्या आधारे खालीलप्रमाणे शिफारस करण्यात येत आहे.

महाराष्ट्र सार्वजनिक विद्यापीठ अधिनियम, २०१६ मधील तरतुदीनुसार तसेच अटी व शर्तीनुसार महाविद्यालयाने संबंधीत विद्यापीठाने विहित केलेल्या निकषांनुसार व विद्यापीठ अनुदान आयागाने विहित केलेल्या शैक्षणिक पात्रतेनुसार अध्यापक / कर्मचारी वर्ग नेमणे आवश्यक आहे. तसेच इतर सर्व आवश्यक पायाभूत सोयी सुविधा उपलब्धतेबाबत तसेच शासन मंजूरी आदेशातील मार्गदर्शक सूचनांचे काटेकोरपणे अनुपालन करावे. व्यवस्थापनाच्या उपरोल्लोखित अभ्यासक्रमासाठी संलग्नकरण करण्याची प्रक्रिया सुरु करण्यास हे कार्यालय शिफारस करीत आहे.

उक्तप्रमाणे शासनाच्या संदर्भिय निर्णयान्वये कार्यवाही करून केलेल्या कार्यवाहीचा अहवाल वेळोवेळी शासनास, मा.संचालनालयास तसेच या कार्यालयास सादर करण्यात यावा.



(डॉ.मोहन खताळ)

सह संचालक (उच्च शिक्षण)

पुणे विभाग, पुणे-१.

प्रत :-

- १) मा.सचिव, उच्च व तंत्र शिक्षण विभाग, मंत्रालय विस्तार भवन, मुंबई-४०० ०३२ यांना माहितीसाठी सविनय सादर.
- २) मा.शिक्षण संचालक (उच्च शिक्षण) महाराष्ट्र राज्य, पुणे-४११००१ यांना माहितीसाठी सविनय सादर.
- ३) प्राचार्य, मुळा एज्युकेशन सोसायटीचे, कला, वाणिज्य व विज्ञान महाविद्यालय, सोनई ता. नेवासा जि. अहमदनगर- ४१४ १०५

**SAVITRIBAI PHULE PUNE UNIVERSITY PUNE
REVISED SYLLABUS SINCE, JUNE 2018**

BACHELOR OF VOCATION (B. VOC)

SUBJECT-FOOD PROCESSING (DAIRY MILK)

**SCHEME FOR PROVIDING SKILL BASED EDUCATION UNDER NATIONAL
SKILL QUALIFICATION FRAMEWORK (NSQF)**

SPONCERED BY UGC, NEW DELHI

Collaboration with

**Mula Education Society's
ARTS, COMMERCE AND SCIENCE COLLEGE, SONAI**
A/P- Sonai, Tal- Newasa,
Dist- Ahmednagar-414105
Maharashtra, India.
Tel - +91 (02427) 231384
E-mail- mesacsccollege@gmail.com
Website- www.acssonaicollege.com

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(BOARD OF STUDY)

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2.Dr.Ashok R.Tuwar
Vice Principal,
Mula Education Society's
Arts, commerce and science college sonai,
Tal Newasa Dist A.nagar

3 Mr. Jadhav A. S.
Dept. of B.Voc
Mula Education Society's
Arts, Commerce and College Sonai

4 Miss. Phakatkar S. S.
Dept. of B.Voc
Mula Education Society's
Arts, Commerce and College Sonai

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Arts, commerce and science college
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Dist- Ahmednagar-

6.Dr.S.P Khedkar
Member
Arts, commerce and science college,
At- Sonai, Tal- Newasa
Dist- Ahmednagar-

7.Mr.Sopan A.Najan
Member
Arts, Commerce and Science college
At- Sonai, Tal- Newasa
Dist- Ahmednagar-414105,M.S India .

8. Dr. Zine D. E.
Member
Arts, Commerce and Science college
At- Sonai, Tal- Newasa
Dist- Ahmednagar-414105,M.S India .

9. Dr. Sharad Gadakh
Precedent Mula Agro product.
AP/ Bramhni Tal Rahuri Dist. A.nagar

B.VOC. SYLLABUS

OBJECTIVES

- **Objectives of Dairy Milk Processing:**

1. Increase production of milk to ensure the availability of recommended minimum dietary requirement.
2. Increase rural development opportunities through entrepreneurship.
3. Enable the sector to comply with Food Safety and Standard Act 2006.
4. Strengthening of organized Dairy Farm Sectors.
5. Value addition and improved marketing to provide better price to the farmers.
6. Innovation, research and development for the cost effective production.
7. Provide better service at farmer's door step.

- **Objectives of Food Processing Technology:**

1. To boost the shelf life of food articles.
2. To prevent contamination of food.
3. For transport and food storage.
4. To turn food products into the ones that appeal to customers.
5. To make availability of food even at distant or remote places.
6. To retain the nutritive value of food.
7. To ensures the availability of food throughout the year

SYALLABUS INDEX

Approved as per SPPU,Pune Ref.No.CBS/1159 Date-31/10/2018

F.Y. B. VOC, FOOD PROCESSING (DAIRY MILK)

SR. NO.	Se mes ter	Paper	COURSE CODE	COURSE TITLE	Credits
1	I	I	FPT01	INTRODUCTION TO CELL BIOLOGY (THEORY)	03
2	I	II	FPT 02	GENETICS (THEORY)	03
3	I	III	FPP 03	GENETICS AND CELL BIOLOGY (PRACTICAL)	06
4	I	IV	FPT 04	INTRODUCTION TO MICRO BIOLOGY (THEORY)	03
5	I	V	FPP 05	INTRODUCTION TO MICRO BIOLOGY (PRACTICAL)	06
6	I	VI	FPT 06	INTRODUCTION TO DAIRY TECHNOLOGY (THEORY)	03
7	I	VII	FPP 07	INTRODUCTION TO DAIRY TECHNOLOGY (PRACTICAL)	06
8	II	VIII	FPT 08	DAIRY FARM MANAGEENT (THEORY)	03
9	II	IX	FPP 09	DAIRY FARM MANAGEENT (PRACTICAL)	06
10	II	X	FPT 10	ENVIRONMENTAL SCIENCE (THEORY)	03
11	II	XI	FPP 11	ENVIRONMENTAL SCIENCE (PRACTICAL)	05
12	II	XII	FPT 12	BAKERY AND CONFECTIONARY (THEORY)	03
13	II	XIII	FPT 13	CONFECTIONARY (THEORY)	03
14	II	XIV	FPP 14	BAKERY AND CONFECTIONARY (PRACTICAL)	06

S.Y.VOC, FOOD PROCESSING (DAIRY MILK)

15	III	XV	FPT 15	BUSINESS ADMINISTRATION (THEORY)	03
16	III	XVI	FPP 16	BUSINESS ADMINISTRATION (PRACTICAL)	06
17	III	XVII	FPT 17	POST HARVEST TECHNOLOGY (THEORY) (THEORY)	03
18	III	XVIII	FPP 18	POST HARVEST TECHNOLOGY (THEORY) (PRACTICAL)	06
19	III	XIX	FPT 19	FOOD CHEMISTRY (THEORY)	03
20	III	XX	FPT 20	FOOD BIO- CHEMISTRY (THEORY)	03
21	III	XXI	FPP 21	FOOD BIO CHEMISTRY (PRACTICAL)	06
22	IV	XXII	FPT 22	FOOD ENGINEERING (THEORY)	03
23	IV	XXIII	FPP 23	FOOD ENGINEERING (PRACTICAL)	06
24	IV	XXIV	FPT 24	FOOD LAWS AND REGULATION (THEORY)	03
25	IV	XXV	FPP 25	FOOD LAWS AND REGULATION (PRACTICAL)	06
26	IV	XXVI	FPT 26	DAIRY TECHNOLOGY MANAGEMENT (THEORY)	03
27	IV	XXVII	FPT 27	FOOD PACKAGING (THEORY)	03
28	IV	XXVIII	FPP -28	FOOD PACKAGING (PRACTICAL)	06

T.Y. B. VOC, FOOD PROCESSING (DAIRY MILK)

29	V	XXIX	FPT 29	TRADITIONAL DAIRY PRODUCTS-I (THEORY)	03
30	V	XXX	FPP 30	TRADITIONAL DAIRY PRODUCTS-I (PRACTICAL)	06
31	V	XXXI	FPT 31	DAIRY TECHNOLOGY (THEORY)	03
32	V	XXXII	FPT 32	FOOD PROCESSING AND PRESERVATION TECHNOLOGY (THEORY)	03
33	V	XXXIII	FPP 33	FOOD PROCESSING AND PRESERVATION TECHNOLOGY (PRACTICAL)	06
34	V	XXXIV	FPT 34	FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (THEORY)	03
35	V	XXXV	FPP 35	FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (PRACTICAL)	06
36	VI	XXXVI	FPT 36	NEW PRODUCT DEVELOPMENT(THEORY)	03
37	VI	XXXVII	PPP 37	PROJECT (PRACTICAL)	06
38	VI	XXXVIII	FPT 38	FARM ANIMALS BREEDING (THEORY)	03
39	VI	XXXIX	FPT 39	FOOD TRENDS AND PROGRAMME (THEORY)	03
40	VI	XXXX	FPP 40	FOOD TRENDS AND PROGRAMME (PRACTICAL)	06
41	VI	XXXXI	FPT 41	ICE-CREAM & FAT RICH DAIRY PRODUCTS (THEORY)	03
42	VI	XXXXII	FPP 42	ICE-CREAM & FAT RICH DAIRY PRODUCTS (PRACTICAL)	06
43				TOTAL CREDITS	180

**F.Y B.Voc SYLLABUS
IMPLIMENTED
FROM
JUNE 2018-19**

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -I PAPER – I FPT 01
INTRODUCTION TO CELL BIOLOGY (THEORY)
Marks 50 Credits 03

Sr. No.	Topics	Lecture	Credit
1.	Introduction to cell biology: 1.1 Definition and scope. 1.2 Division of Cell Biology. 1.3 Stains: Principle and composition of Biological stains.	05	03
2.	Structure of Prokaryotic and Eukaryotic (Plant and Animal Cell) 2.1 Introduction 2.2 Structure of Cells 2.2.1.Prokaryotic Cells 2.2.1.Eukaryotic Cell. 2.3 Shape and Size of Cells	05	
3.	Structure and Function of Cell Member 3.1 Introduction: 3.2.Chemical composition of Plasma Member 3.2.1 Proteins 3.2.2Lipids 3.3.Member Model 3.3.1.Bilayer Model 3.2.2.Fluid Mosaic Model 3.2.3.Lipid Bilayer Model 3.4 Function of Cell Member 3.5Membrane Receptors 3.6 Modification of Plasma member 3.6.1.Microvilli 3.6.2.Desmosomes 3.6.3.Plasmadesmo 3.7 Transport System 3.7.1.Passive Transport 3.7.2. Active Transport 3.8Pinocytes 3.9.Phagocytosis	05	
4.	Study of Cell organelles with Respect to structure and Functions 4.1Endoplamic reticulum 4.1.1Morphology 4.1.2Types of Endoplasmic Reticulum 4.2.Golgi complex 4.2.1.Morphology 4.2.2.Structure of Golgi Complex 4.2.3.Function of Golgi complex	04	
5.	Lysosomes 5.1 Origin, occurrence and morphology 5.2 Ultra structure and functions	07	
6.	Mitochondria:		

	6.1 Origin, occurrence and morphology 6.2 Ultra structure and functions.	04	
7.	Nucleus: 7.1 Shape, Size, number and position 7.2 Ultra structure of nuclear membrane 7.3 Nucleolus: general organization, chemical composition and functions.	07	
8.	Cell division and their significance: 7.1 Cell cycle in brief. 7.2 Mitosis 7.3 Meiosis	08	
9.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -I PAPER – II FPT 02
GENETICS (THEORY)
Marks 50 Credits 03

Sr. No.	Topics	Lecture	Credit
1.	Introduction to genetics: 1.1 Genetical terminology. 1.2 Definition, Concept of heredity and variations, 1.3 Branches and Applications of Genetics.	8	3
2.	Mendelism: 2.1 Selection of experimental material, 2.2 Monohybrid cross, Dihybrid cross, 2.3 Law of dominance, Incomplete dominance, 2.4 Law of segregation/law of purity of gametes, 2.5 Law of independent assortment, 2.6 Back cross and Test cross.	8	
3.	Multiple Alleles: 3.1 Concept, characteristics and importance of multiples alleles, 3.2 ABO & Rh-blood group system and its medicolegal importance. 3.3 Concept of polygenic inheritance with reference to coat color in Rat.	8	
4.	Gene Mutation: 4.1 Definition 4.2 Types of mutations: spontaneous, induced, somatic, gametic, forward, reverse. 4.3 Types of point mutation- deletion, insertion, substitution, transversion, transition. 4.3 Mutagenic agents. a) UV radiation and ionising radiation. b) Base analogs, alkylating and intercalating agents.	8	
5.	Chromosomes: 5.1 Introduction to morphology and composition 5.2 Classification based on the centromeric position 5.3 Types of chromosome (autosomes and sex chromosome) 5.2 Chromosomal aberrations: structural changes.	7	
6.	Application of genetics: 6.1 Genetic counseling. 6.2 Concept of genetic Engineering	6	
7.	Total	45	

**COURSE:- FOOD PROCESSING (DAIRY MILK
SEMESTER -I PAPER – III FPP 03
GENETICS AND CELL BIOLOGY (PRACTICAL)
Marks 100 Credits 0 6**

Sr. No.	Title of Practical	Credit
1.	Introduction -Study of Microscopy: - Simple, Compound.	04
2.	Cytological techniques-preparation of Fixatives,	
3.	Preparation of stains (Acetocarmine and Aceto-orcein).	
4.	Study of Prokaryotic Cell.	
5.	Study of Eukaryotic Cell.	
6.	Study of cell organelles by using Models, Charts, Slides & electron photo micrographs.	
7.	Study of various stages of mitosis	
8.	Study of various stages of meiosis.	
9.	Study of Drosophila	
10.	Study of Mutant in Drosophila	
11.	Study of Monohybrid ratio by providing hypothetical data and deducing applicability of Mundelein laws.	
12.	Study of Dihybrid ratio by providing hypothetical data and deducing applicability of Mundelein laws.	
13.	Study of blood groups in human (ABO and Rh)	
14.	Study of Karyotypes in human.	
15.	Study of genetic traits in human beings (tongue rolling, widow's peak, ear lobes, color blindness and PTC tasters/ non tasters)	
16.	Industrial / Field visit	02
17.	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -I PAPER – IV FPT 04

INTRODUCTION TO MICRO BIOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Introduction -Basic aspects and scope of food microbiology. Intrinsic and extrinsic factors that affect microbial growth in foods.	10	03
2.	Microbial spoilage - fruits, fruit juices, vegetables, cereals, meat, poultry, sea foods, carbonated soft drinks, canned foods; control of spoilage.	05	
3.	Industrial Microbiology : Fermentation processes: the range, components and types (submerged, surface and solid state fermentation): criteria for selection of industrially important microorganisms; media for industrial and inoculums development; down-stream processing of fermented products.	10	
4.	Fomenters : types, functions, design and control	10	
5.	Importance of Microorganism - processes involved in the production of industrial alcohol, vinegar, soy based fermented products, organic acids (citric lactic), enzymes (protease, lipase and rennet), vitamin (B-12), antibiotic (nisin) and microbiology of effluent treatment in food industry.	10	
6.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER -I PAPER – V FPT 0 5****INTRODUCTION TO MICRO BIOLOGY (PRACTICAL.)****Marks 100 Credits 06**

Sr No	Name of Practical	Credits
1	General instruction for microbiological laboratory. Microscope- simple and compound; Microbiological equipments; autoclave, hot air oven, incubator, centrifuge, colorimeter, laminar airflow, membrane fi	04
2	. Simple staining- methylene blue; crystal violet; negative staining. Differential staining (Gram, spore, acid fast).	
3	Mortality of microorganisms; hanging drop technique. Measurement of microorganisms by micrometry	
4	Preparation of commonly used growth media liquid and solid: simple and differential media. Isolation technique for microorganisms- Streak & pour plate Enumeration of microorganisms in air and soil.	
5	. Enumeration of microorganisms in water: total viable count, coliform (MPN).	
6	. Serial dilution technique.	
7	Anti- microbial activity by disc and well diffusion techniques.	
8	. Microbiological examination of: fresh and canned fruits/ vegetables/ juices; flour and bread, eggs and meat	
9	Production of nisin and assaying the antimicrobial activity of the culture.	
10	Shelf life study of prepared fruit juices.	
11	Microbiological examination of: fresh and canned fruits/ vegetables/ juices/ milk, flour and bread, eggs and meat.	
12	Preparation of Vinegar and beverage	
13	Preparation of Idli.	
14	Preparation of Tofu.	
15	Preparation of Saurkraut.	
16	Educational tour to food processing/ fermentation industries.	
	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER – I PAPER – VI FPT 06

INTRODUCTION TO DAIRY TECHNOLOGY (THEORY)

Marks 50

Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Introduction Dairy Industry 1.1 Scope & Importance of Dairy Industry 1.2 Present status of Dairy Industry in Maharashtra	3	03
2.	Present status of Dairy Industry in India 2.1 Milk production in India 2.2 Sources Of Milk 2.3 Density Of Milk 2.4 Milk Capita Consumption 2.5 Indian Standard	3	
3.	Definition of milk, 3.1 composition of milk 3.2 different livestock species	8	
4.	Physico- chemical properties of milk A) Physico 4.1.1 test & odder 4.1.2 specific gravity 4.1.3 boiling & freezing point 4.1.4 refractive index & electrical conductivity viscosity surface tension B) chemical properties 4.2.1 Acidity 4.2.2 Buffering Action	5	
5.	Factors affecting composition of Milk 5.1.1 Milking interval 5.1.2 Gestation 5.2 other factors 5.2.1 Pregnancy 5.2.2 Environmental temp	7	
6.	Factors affecting yield of Milk 6.1.1 Breed 6.1.2 Species 6.1.3 hormones 6.1.4 season	10	
7.	Microbial quality of raw milk and standards for different market milk	5	
8.	Nutritional importance of milk and its constituents 8.1 Vitamins 8.2 Proteins 8.3 Minerals 8.4 Amino Acid	5	
	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER – I PAPER – VII FPP 07

INTRODUCTION TO DAIRY TECHNOLOGY (PRACTICAL)

Marks 100

Credits 06

Sr No	Name of practical	Credit
1	Study of platform tests	04
2	Sampling of milk and milk products	
3	Determination of Fat by Gerber's method.	
4	Determination of SNF of milk.	
5	Determination of TS of milk.	
6	Determination of Specific gravity of milk.	
7	Determination of acidity of milk.	
8	Determination of adulteration in milk and milk products	
9	Study of Standardization of milk by Pearson's method.	
10	Study of cream separator and separation of cream.	
11	Study of cleaning of dairy equipments.	
12	Study of sanitization of dairy equipments.	
13	Visit to milk processing plants.	02
	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –II PAPER –VIII FPT 08****DAIRY FARM MANAGEENT (THEORY)****Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	Live stock management ;-Terminology used in livestock management Organic livestock production- definition, importance, principle, standards, certifications, SWOT analysis, A1 and A2 milk, Integrated livestock farming	10	03
2.	Indian breed -Important Indian and exotic breed of cattle and buffalo	5	
3.	Feeding and management - of calf, heifer, dry and milking animals Feeding and management of dry, pregnant , draft animals and breeding bulls	10	
4.	Cattle disease -Diseases and it's preventive, curative measures in cattle and buffalo	5	
5.	Reproduction -Bovine male and female reproductive system	5	
6.	Ecology -Effect of climate change on livestock production	5	
7.	Cost of milk production, economical unit of cattle and buffalo	5	
	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –II PAPER –IX FPP 09

DAIRY FARM MANAGEENT (PRACTICALS)

Marks 100

Credits 06

Sr.No	Name of Practical	Credits
1	External body parts of cattle	04
2	External body parts of buffalo.	
3	External body parts of Sheep	
4	External body parts of Goat	
5	Routine management, practices followed on livestock farm.	
6	Method of handling and restraining of Animals	
7	Method of identification marks and dehorning of animals.	
8	Recording of pulse rate of animals	
8	Recording of Respiration rate of animals	
10	Recording of body temperature of animals	
11	Preparation of feeding scheduled and feeding different categories of cattle.	
12	Preparation of feeding scheduled and feeding different categories of buffalo	
13	Clean and hygienic milk production and milking methods	
14	Judging of animals for dairy and draft purpose.	
15	Utilization of dairy farm waste i.e. dung, urine, etc.	
16	Field visit to dairy farms.	
	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -II PAPER XI FPT 10 ENVIRONMENTAL SCIENCE (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1	Introduction of Environment. Definition of Environment and Environmental Science,Environmental Science - Scope and Importance, Biosphere: Definitions,	2	03
2	Evolution of the universe ,Evolution of the elements; origin of the earth, Solar system, Evolution of life, Atmosphere of the primitive earth.	2	
3	Ecology Definition; branches; scope; and its relation to other divisions of sciences,,Autecology and synecology.,Ecosystem- Concept and structure of ecosystem.,Functions of ecosystem,Biotic components of ecosystem (producer, consumer and decomposer).,Abiotic components of ecosystem.	06	
4	Soil -Soil formation.Types of Soil.,Soil profiles.,Physical and chemical characters of soil.,Biological characters of Soil,Topographic factors.	3	
5	Sources of Water : Natural Water Resources and their types,Precipitation: Types of precipitation, Rainfall measurement (Rain gauge),Recording type, Non Recording type. Surface sources: Rivers, Lakes, Streams, Ponds, Storage reservoir.	4	
6	Ecosystem ,Basic concepts, components of Ecosystem, Trophic levels, food chains and food webs,Ecological pyramids,Ecosystem functions,Energy flow in ecological systems, energy efficiencies.	05	
7	Ecosystem -Terrestrial ecosystem -Dessert ecosystem,Grassland ecosystem,Forest ecosystem (Evergreen and Deciduous),Mountain ecosystem.Marsh land. Aquatic Ecosystem:Freshwater ecosystem Lentic ecosystem- Ponds and Lakes;,Lotic ecosystem – Rivers and Streams.Marine ecosystem: Oceans , Seas, and Estuaries.	10	
8	Biogeochemical cycles Gaseous cycles,Oxygen cycle,Carbon cycle,Nitrogen cycle.Phosphorus cycle,Sulphur cycle.	4	
9	Succession ,Concepts of succession,Types of Succession.Trends in succession.Climax and stability.Co-evolution and group selection.	4	
10	Biodiversity conservation- International and national efforts to conserve biodiversity.Socio-cultural aspects of biodiversity.Biotechnological needs for biodiversity conservation.Traditional knowledge and biodiversity conservation.	5	
	Total	45	03

COURSE: - FOOD PROCESSING (DAIRY MILK)
SEMESTER -II PAPER – XI FPP 11

ENVIRONMENTAL SCIENCE (PRACTICAL)

Marks 100 Credits 06

Sr No	Name of Practical	Credits
1	Analysis of frequency distribution of plants in a piece of vegetation by quadrat method	04
2	To determine chlorophyll content of the given plant material.	
3	Quantitative analysis of soil pH and water holding capacity	
4	Comments on life cycle of some economically important insects	
5	Identification of museum specimens of some economically important fishes.	
6	To study the 'Laboratory Safety Rules' and First-Aid and emergency treatment in laboratory	
7	Identification of phytoplankton and zooplankton samples from different water Sample.	
8	To study the ecological adaptations of hydrophytes, xerophytes, mesophytic and halophytic plants / animals specimens	
9	Determination of leaf area index	
10	To study the laboratory equipments and instruments (Oven, , Autoclave, Electronic balance, pH meter, Colorimeter, etc).	
11	To study the laboratory equipments and instruments (Oven, Microscope, Incubator, Inoculation chamber	
12	Estimation of Alkalinity of provided water sample	
13	Estimation of total hardness from water sample by E. D. T. A. method	
14	Estimation of Acidity from provided water sample.	
15	Estimation of chlorides from water sample by Argentometric method	
16	Visit to water purification plant	02
	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -II PAPER – XII FPT 12

BAKERY AND CONFECTIONARY (THEORY)**Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit (4)
1.	History- Traditional confectionary goods, Types of confectionary, classification. Basic Technical considerations, TS, TSS, pH, acidity, ERH, Sugar, Invert Sugar, Glucose syrup, RH, Crystallization.	10	03
2.	Raw Materials: Sugar, Sugar qualities, Physical, Chemical, Optical properties. Sugar grinding, Dextrose, Fructose, Lactose, caramel, maltose, Honey, sorbitol, xylitol, Iso malt, soy maltose, Polydextrose, Lactitol, Maltitol. Whipping, Release agent, thickeners, Acidulents, Flavours, for confectionery, emulsifiers and other additives, starch derivatives, colours used in confectionary. Production of glucose syrup, Acid hydrolysis, enzyme hydrolysis	10	
3.	Cocoa Processing: Cocoa bean, processing, roasting, Fermentation, Production of Cocoa butter Cocoa powder, its quality. Chocolate Processing: Ingredients, Mixing, Refining, Conching, Tempering, Molding, Cooling, Coating, Fat bloom.	10	
4.	High Boiled Sweets: Introduction, Composition, Properties of high boiled sweets, preparation of high boiled sweets, Traditional, batch and continuous Method of preparation. Different types of higher boiled sweets, Recipes. Caramel: Definition, Composition, Factors affecting quality of caramel, caramel Manufacture process, batch type, continuous types, checking of faults in caramel. Toffee: Definition, Composition, types of toffee Ingredient and their role. Batch and Continuous method of toffee. Fondant: Fudge/Creamy: ingredients, Methods, Productivity. Lozenges: Definition recipe, Method of Manufacture, Compositions, factors affecting quality,.	15	
	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -II PAPER – XIII FPT 13 CONFECTIONARY (THEORY)

Marks 50 Credits 03

Sr No	Topics	Periods	Credits
1	Marshmallow and. Nougat: Definition, composition, recipe, and method of manufacture. Nougat. Panning: Process, types of Panning, soft and hard panning.	9	03
2	Quality of confectionery , Standards and regulations, Packaging requirements of confectionary, economics and marketing of confectionary goods.	9	
3	Bakery Products- Role of Bakery ingredients (major and minor), From Hard Wheat: Bread: Processes of bread making mainly straight and sponge, role of each ingredient, quality control.	9	
4	Macaroni Products: Including spaghetti, Noodles, Vermicelli Process	9	
5	Nutritional improvement of bakery Products. Setting of bakery Unit, Bakery norms. Specifications for raw materials. Packaging. Marketing of Products. Project report on bakery. Visit to wheat milling Industry. Visit to Bakery.	9	
	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -II PAPER –XIV FPP 14 BAKERY AND CONFECTIONARY (PRACTICAL)

Marks 100 Credits 04

Sr No	Name of practical course	Credits
1	Classification of wheat based on physicochemical properties.	04
2	Study of Physico chemical analysis of Flour.	
3	Quality Testing of flour: Falling number and α amylase activity,	
4	Quality Testing of flour Sedimentation value	
5	Quality testing Pelshenke value, Farinograph,	
6	Quality testing Mixograph, Extensiograph, Alveograph	
7	Manufacture of Bread Types,	
8	Manufacture of Bread, Faults, remedies, shelf life bread:	
9	Determination of Reducing Sugar cuits	
10	,Manufacture of cookies, crackers, buns	
11	Types and quality. Other baked products Pastry, pizza.	
12	Extruded Products from wheat: Vermicelli, noodles etc.	
13	Determination of Physical properties of sugar.	
14	Production of invert sugar.	
15	Determination of Moisture in Sugar.	
16	Field visit/Industrial visits	02
1	Total	06

S.Y B.Voc
SYLLABUS
IMPLIMENTED
FROM
JUNE 2019-20

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –III PAPER – XV FPT 15

BUSINESS ADMINISTRATION

Marks 50 Credits 03

Sr No	Topic	Lectures	Credits
1	<p>INTRODUCTION AND FUNCTIONS OF MARKETING 1.1 Marketing – Definitions, Concept, importance and functions of marketing, 1.2 Service Marketing: 7P’s of services marketing, 1.3 E-Marketing 1.4 Digital marketing: meaning, importance of digital marketing</p> <p>MARKETING MIX 2.1 Product mix and Price mix Product mix: concept of a product, PLC, Product simplification, product diversification, new product development 2.2 Price mix : meaning, importance of price mix , factors influencing pricing , pricing methods and recent trends 2.3 : Place mix and Promotion mix c. Place mix: meaning and concepts of channel of distribution, types of channel of distribution or intermediaries, Factors influencing selection of channels, d. Promotion mix: meaning, elements of promotion mix, types of media: outdoor, indoor, print, press,</p>	10	03
2	<p>INTRODUCTION OF FINANCE – Definition - Nature and scope of finance function</p> <p>Sources of Finance 2.1 External: - Shares, Debentures, Public Deposits, Borrowing from banks: - meaning, types, advantages and limitations of these sources. 2.2 Internal: - Reserves and surplus, Bonus shares, Retained earnings, 5 Dividend policy; Meaning, advantages and limitations of these sources Capital Structure Meaning - criteria for determining capital structure.</p>	10	
3	<p>INTRODUCTION TO COMMUNICATION Meaning, Definition, objective, Process, importance. Principles of good Communication, Types of communication Written Communication, Verbal & Non-verbal Communication Techniques of Effective Speech,</p>	10	

	<p>The Art of Listening, Principles of Good Listening, Phone Etiquette, Grapevine</p> <p>Business Correspondence Component and layout of Business letter, Drafting of letters: Enquiry letter, Placing order, Complaints and follow up letters, Sales letter, Application for employment and Resume, Notices, , Email etiquette</p> <p>Media of Communication Introduction, Advantages and Disadvantages of Media of Communication</p>		
4	<p>INSTITUTIONAL SUPPORT TO NEW VENTURE (Students are expected to study the assistance scheme of following institutions)</p> <p>4.1 District Industries Center(DIC) 4.2 Maharashtra Industrial Development Corporation(MIDC) 4.3 Small Industries Service Sector(SISI) 4.4 Micro, Small & Medium Enterprise(MSME)</p> <p>Financial Assistance for Small Enterprise: Institutional: a)Bank Loan b) Angel Funding c) Venture Funding d) Self Employment Schemes of Government of Maharashtra e) Government Financial Institutions: Khadi and Village Industries Board(KVIB),Rajiv Gandhi Udyami Mitra Yojana (RUGMY) f) Prime Minister Employment Generation Programme (PMEGP)</p>	5	
5	<p>INTRODUCTION TO HUMAN RESOURCE MANAGEMENT:</p> <p>5.1 5.1.1 Definition and concept of human resource, 5.1.2 Importance of human resource management, 5.1.3 Functions of human resource management,</p> <p>5.2 Human Resources Planning: 5.2.1Definition and objectives of Human Resource planning. 5.2.2 Sources of Recruitment- Methods of Recruitment,</p> <p>5.3 Training and Development: 5.3.1 Meaning and Definition, Needs, Importance of 5.3.2 Training- 5.3.3 Training Methods</p> <p>5.4 Performance Appraisal & Wage and Salary Administration: 5.4.1 Part A : Performance Appraisal Concept and objectives of performance Appraisal. Performance Appraisal Methods. 5.4.2 Part B : Wage and Salary Administration Methods of Wage Payments. Determining the level of remuneration. Profit sharing, Fringe Benefits</p>	10	
	Total	45	03

Reference

1. P. C. Pardeshi - Human Resource Management, C. B. Mamoria - Personnel Management
2. K. Ashwathappa – Organisational Behaviour, V.S. P. Rao- Human Resource Management. Texts and cases, Business Communication (Principles, Methods and Techniques) - Nirmal Singh- Deep & Deep Publications Pvt. Ltd, New Delhi., Essentials of Business Communication – Rajendra Pal & J. S. Korlhalli- Sultan Chand & Sons, New Delhi.
3. Media and Communication Management – C.S. Raydu - Himalaya Publishing House, Mumbai.
4. Professional Communication- Aruna Koneru- Tata McGraw-Hill Publishing Co. Ltd, New Delhi.
5. Creating a Successful CV - Siman Howard - Dorling Kindersley.

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -III PAPER –XVI FPP 16

BUSINESS ADMINISTRATION

(PRACTICAL)

Marks 150

Credits 06

Sr No	Name of Practical	Credits
1	Study of Advertisement of Particulars product and present	04
2	Study of packaging strategies of products	
3	Observation of Customers and salesman and role play	
4	Study of recruitment and selection process followed by company	
5	Mock interview	
6	Study of business correspondence with other agencies	
7	Study the various techniques of communication and presentation	
8	Study the financial resources available in the market	
9	Study the Government Scheme available for business	
10	Project work.	
11	Industrial Visit / Market Survey	02
12	Presentation on results of market survey	
	Total	06

References

1. Industrial Law - P.L. Malik
2. Business and Commercial Laws-Sen and Mitra.
3. An Introduction to Mercantile Laws-N. D. Kapoor

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -III PAPER – XVII FPT 17 COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER -III PAPER – XVII FPT 17

POST HARVEST TECHNOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Introduction of post harvest technology 1.1 Cereals; 1.2 Pulses ; 1.3 Oil seeds,; 1.4 Spices; 1.5 Tea, coffee and cocoa; 1.6 Production of spices in India	6	03
2.	Importance of post harvest technology 2.1 Management of plantation crops 2.2 Adulteration study.	6	
3.	Post harvest technology of major and minor spices : 3.1 Black pepper, oleoresin and volatile. Cardamom, ginger, chilies, turmeric powder, and Ajwan, coriander, cumin, cinnamon, fenugreek, garlic, mustard, mace and nutmeg, 3.2 Onion, saffron, tamarind, cloves, mint, vanilla, asafetida 3.3 Preservation and storage study	05	
4.	Post harvest technology of fruits 4.1 Vegetables 4.2 Oil seed processing.	10	
5.	Post harvest technology of tea 5.1 Post harvest technology of coffee 5.2 Cocoa processing technology.	8	
6.	Rice and wheat milling introduction 6.1 Composition nutritional value 6.2 Milling process and cleaning	5	
7.	E- learning, seminar ,workshop, group discussion	5	
8.	Total	45	

References:

1. Haard, N.F. and Salunkhe, D.K. 1975.
2. Postharvest Biology and Handling of Fruits and Vegetables. AVI, Westport. Kader, A. A. 1992.
3. Postharvest Technology of Horticultural Crops, 2nd Ed. University of California, Division of Agriculture and National Resources, California. Salunkhe, D.K. and Kadam, S.S. Ed. 1998.

COURSE:- FOOD PROCESSING (DAIRY MILK)

**SEMESTER –III PAPER – XVIII FPP 18
POST HARVEST TECHNOLOGY (PRACTICAL)**

Marks 100 Credits 06

Sr.No	Name of Practical	Credits
1	Preservation of fruits and vegetables by different method	04
2	Preservation of fruits and vegetables by traditional methods	
3	Preservation of fruits and vegetables by dehydration method	
4	Preservation of fruits and vegetables by freezing	
5	Preservation of fruits and vegetables by pickling	
6	Chemical analysis of tea	
7	Chemical analysis of coffee	
8	To study adulteration test of turmeric	
9	To study adulteration test of red chilies	
10	Adulteration test of black pepper	
11	To study adulteration test of tea and coffee	
12	Estimation of protein from fruits	
13	To study Glycemic index of fruits	
14	Study of Storage and packaging of spices and vegetables	
15	Visit to spice industry or fruit and vegetables processing plant	
16	Minor project Adulteration study of khoa and ghee	02
17	Total	06

References :

1. Tea, Coffee, and Cocoa: A Practical Treatise on the Analysis of Tea, Coffee, Cocoa, Chocolate, Mate (Paraguay Tea), Etc - Primary Source Edition Paperback – Import, 19 Feb 2014
2. Altekruise, S. F., Street, D. A., Fein, S. B., Levy, A. S. (1996). Consumer knowledge of foodborne microbial hazards and food-handling practices. J Food Protect.; 59:287-294. Altekruise, S. F., Street, D. A., Fein, S. B., Levy, A. S. (1996).
3. Consumer knowledge of food-borne microbial hazards and food handling practices. Journal of Food Protections. 59, 287–294
4. Cereal Processing Technology: G. Owens.
5. Fruits And Vegetable Processing: M.E. Dauthy.
6. Packaging Technology: G. A. Giles.

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –III PAPER – XIX FPT 19****FOOD CHEMISTRY (THEORY)****Marks 50****Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	Water: 1.1 Water binding and chemical reactions mediated by water.	03	03
2.	Food Proteins: 2.1 Classification, 2.2 physico-chemical properties, 2.3 Reaction involved in processing, Reactions with alkali,	07	
3.	Enzyme 3.1 catalysed reactions involving hydrolysis and proteolysis, 3.2 Theories of formation of texturised proteins.	07	
4.	Lipid : 4.1 Reactions involved during deep frying of food viz., 4.2 autoxidation of saturated acyl lipids and polymerization.	10	
5.	Lipoprotein and membrane; 5.1 definition, 5.2 classification and involvement in the formation of biological membranes.	13	
6.	Unsaponifiable matter contents in various fats and oils. 6.1 Edible fats and oils, 6.2 classification and 6.3 chemical composition.	03	
7.	Seminars, Workshop, Group discussion	02	
8.	Total	45	

References

1. Food Bio- Chemistry And Processing: B. J. Simpson.
2. Biology and Handling of Fruits and Vegetables. AVI, Westport. Kader, A. A. 1992.
3. Postharvest Technology of Horticultural Crops, 2nd Ed. University of California, Division of Agriculture and National Resources, California. Salunkhe, D.K. and Kadam, S.S. Ed. 1998.
4. Food Bio- Chemistry And Processing: B. J. Simpson.
5. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.
6. Agricultural And Food Marketing Management: I. M. Crowford.

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –III PAPER – XX FPT 20

FOOD BIO CHEMISTRY (THEORY)**Marks 50****Credits 03**

Sr.No	Topics	Periods	Credits
1	CARBOHYDRATES: 1.1 Legumes, jellies polysaccharide viz. linear, branched and modified. 1.2 Properties and utilization of common polysaccharides, viz. cellulose, glycogen, hemicellulose and pectin.	6	03
2	ENZYMATIC DEGRADATION OF POLYSACCHARIDES, VIZ. 2.1 Agar, alginate. 2.2 Carrangeenan, gums and starch. 2.3 Production of dextrans and malto dextran.	6	
3	FOOD ENZYMES: 3.1 Hydrolases and lipases, utilization in food industry, effect of inhibitors, 3.2 pH and temperature. Minerals in foods: Main Elements, trace elements in eggs, cereal and cereal products, vegetables and fruits.	6	
4	PROTEINS, 4.1 vitamins and 4.2 minerals	6	
5	FOOD ADDITIVES: 5.1 amino acids, minerals. 5.2 Aroma substance flavour enhancers-monosodium glutamate, nucleotides. 1Sugar substitutes, 5.3 sorbitol. Sweeteners-saccharin 5.4 cyclamate, Food colors.	12	
6	ANTI-NUTRITIONAL FACTORS 7.1 Food contaminant, 7.2 Toxic-trace elements, radio nuclides.	6	
7	7.1 Seminars, 7.2 Group discussion. 7.3 Workshop	03	
8	Total	45	

References

1. Food Bio- Chemistry And Processing: B. J. Simpson

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –III PAPER – XXI FPP 21

FOOD BIO CHEMISTRY (PRACTICAL)**Marks100****Credits 06**

	Name of Practical	Credits
1	To study different methods of Biochemical Analysis	04
2	Analysis of Moisture content from given food sample.	
3	Analysis of Protein from given food sample.	
4	Analysis of Fat from given food sample.	
5	Analysis of Ash from given food sample.	
6	Analysis of Crude fiber from given food sample.	
7	Analysis of Carbohydrate from given food sample.	
8	Analysis of Energy Value from given food sample.	
9	Analysis of Sugar from given food sample.	
10	Analysis of Pectin from given food sample.	
11	Analysis of pH from given food sample.	
12	Analysis of Acidity of Extracted fat from given food sample.	
13	Analysis of Glycogen from given food sample.	
14	Analysis of Acid soluble compound from given food sample.	
15	Analysis of Acid insoluble compound from given food sample.	
16	Industrial visit	02
17	Total	06

References

1. Industrial Microbiology: M, J. Waites, N. L. Morgan, J. S. Rockey, G Higton.
2. Food Bio- Chemistry And Processing: B. J. Simpson.

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –IV PAPER – XXII FPT 22****FOOD ENGINEERING (THEORY)****Marks 50****Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	RHEOLOGY OF PROCESSED FOOD, 1.1 properties of fluid foods, 1.1.1 Rheological method, 1.2 Measurement of rheological parameters, 1.2.1 properties of granular food and powders, 1.3 Properties of solids foods, 1.3.1 Visco-clastic models. 1.3.2 Measurement of food texture.	7	03
2.	FOOD FREEZING: 2.1 Thermal properties of frozen foods. 2.2 Prediction of freezing rates. Plank's equation, 2.3 Neumanna problem and Tao solution. 2.4 Design of food freezing equipment, 2.5 Air blast freezers, 2.6 Plate freezers and immersion freezers, storage of frozen foods.	7	
3.	FOOD DEHYDRATION: 3.1 Estimation of drying time for food products, constant rate period and falling rate period dehydration. 3.2 Diffusion controlled falling rate period. 3.3 Use of heat and mass balanced in analysis of continuous dryers,	7	
4.	FIXED TRAY DEHYDRATION, 4.1 cabinet drying, 4.2 tunnel drying. 4.3 Freeze Dehydration: Heat and mass transfer, Calculation of drying times, Industrial freeze drying.	3	
5.	STUDY OF FOOD EQUIPMENT 5.1 pulping, Fruit juice extraction, 5.2 Blanching, Dehulling, 5.3 Size reduction and distillation. 5.4 Equipment used for food processing such as mixing, evaporator, heat exchanger, centrifugation and pumping.	14	
6.	Process time calculation using D, Z and F value.	7	
7.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –IV PAPER – XXIII FPP 23

FOOD ENGINEERING (PRACTICAL)

Marks 100 Credits 06

Sr. No	Name of Practical	Credits
1	Study of mechanism of different parts of freezers	04
2	Study of freezers and freeze dryers	
3	Design problems on batch freezers	
4	Design problems for continuous freezers	
5	Design problems on dryer	
6	Study of importance of freezer and dryer	
7	Study of rheological properties of foods.	
8	Sieving and size reduction Operation	
9	Study of mechanism of milk tester	
10	Study of Principle and mechanism of centrifuge machine	
11	Centrifugation of different food product	
12	Study centrifugation of Milk.	
13	Study of Food plant design	
14	Study of Food plant Layout.	
15	Engineering drawing.	
16	Visit to dairy industry.	02
17	Total	06

References

1. Agricultural And Food Marketing Management: I. M. Crowford.
2. Cereal Processing Technology: G. Owens.
3. Fruits And Vegetable Processing: M.E.Dauthy.
4. Packaging Technology:G. A. Giles.

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER – IV PAPER – XXIV FPT 24****FOOD AND INDUSTRIAL LAWS (THEORY)****Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit
1	INTRODUCTION 1.1 To subject, Need of enforcing the laws and various types of laws.	04	03
2	MANDATORY FOOD LAWS; 2.1The food safety and standards bill 2005, 2.2Establishment of the authority, composition of authoring functions of chief executive officer, scientific part,	10	
3	GENERAL PRINCIPLES 3.1to be followed in administration of act, 3.2 General provisions as to articles of food, special responsibility as to safety of food, analysis of food offences of penalties.	4	
4	MANDATORY ACTS OF FOOD PROCESSING 4.1Standard weight of measure act, essential commodity act, consumer protection act, 4.2Environmental protection act insecticide act. 4.3Export (quality control & inspection) act.	5	
5	THE COMPANIES ACT, 1956 5.1Company-Definition, Meaning, Features and Types of Companies, 5.2Incorporation of a Company-Mode of forming ,Documents to be filed with registrar, Certificate of Incorporation, Effects of Registration, Memorandum of Association-Its contents and alteration, Doctrine of Ultra Vires 5.3Article Of Association- Its contents and alteration- Comparison between Articles and Memorandum, Prospectus- Registration and contents Statement in lieu of Prospectus	8	
6	THE INDUSTRIAL DISPUTES ACT,1946 & THE FACTORIES ACT 1948: 6.1 The Industrial Disputes Act,1946 - 6.2 Definitions, Authorities under the Act, 6.3 Power & Duties of Authorities, Strike & lockout, 6.4 Lay-off ,retrenchment, closure and dismissal, 6.5 Grievance Redressal Machinery, Penalties 6.6 The Factories Act, 1948 - Definitions, Authorities, Provisions regarding Safety, Provisions regarding Health, Provisions regarding Welfare, Provisions regarding Leave with Wages, 6.7 Provisions regarding Working hours of adults, Penalties.	10	
7	OPTIONAL FOOD STANDARDS; 7.1Scope, Need and Procedure to obtain- HACCP, ISO, 7.2Agmark	3	
8	SEMINARS, WORKSHOP, GROUP DISCUSSION	1	
9	Total	45	

References

1. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.
2. Agricultural And Food Marketing Management: I. M. Crowford.

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER – IV PAPER – XXV FPT 25**

DAIRY TECHNOLOGY MANAGEMENT (THEORY)

Marks 50

Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Introduction of Dairy Technology 1.1 Milk composition 1.2 Nutritional importance of milk 1.3 Reception of milk and platform tests	6	03
2.	Introduction of Standardization 2.1 Define Standardization 2.3 sterilization of milk	6	
3.	Introduction of Pasteurization 3.1 Pasteurization of milk 3.2 Pasteurization methods	5	
4.	Introduction Homogenization of milk 4.1 Define Homogenization of milk	5	
5.	Post mulching techniques 5.1 Chilling 5.2 storage 5.3 marketing of milk	5	
6.	Indigenous milk products 6.1 Classification Indigenous milk products 6.2 Composition Indigenous milk products	5	
7.	Quality management standard and system 7.1 BIS/ISI standards 7.2 PFA rules,	5	
8.	Quality management standard and system, 8.1 AGMARK, 8.2 HACCP, 8.3 FSSAI .	8	
9.	Total	45	03

References

1. Milk and milk products----- Eckles, Comb and Mary
2. Milk and milk products ---- Harbonsing and Moore
3. Modern Dairy Products----- by Lampert
4. Dairy India Year Book – 2007 by - P.R. Gupta
1. Microbiology: M.J. Pelczar.
2. Food Microbiology: M. R. Adam, M. R. Moss.
3. Industrial Microbiology: M, J. Waites, N. L. Morgan, J. S. Rockey, G Higton.

DAIRY TECHNOLOGY MANAGEMENT (PRACTICAL)**Marks 100 Credits 06**

Sr No	Name of practical	Credits
1	Quality Evaluation Of Milk Platform Tests	04
2	Preparation Of Ice-Cream	
3	Preparation Of Rosogulla	
4	Preparation Of Shreekhand	
5	Preparation Of Khoya	
6	Preparation Of Kulfi	
7	Preparation Of Curd	
8	Examination & Adulteration Test Ghee	
9	Determination Of Fat And SNF Of Milk	
10	Detection Of Adulteration In Food Products	
11	Determination Of Specific Gravity Of Milk	
12	Standardization Of Milk & Milk Products	
13	Examination Of Casein From Milk	
14	Texture Analysis Of Food	
15	Determination Of Viscosity By Viscometer	
16	Visit To Quality Control Laboratory Milk Processing Industry	02
17	Total	06

References

- 1.Milk products in India----- M.R. Shrinivasan & C.P.Anantkrishnan.
- 2.Dairy Technology and Engineering by H.G. Kessler
- 3.Ice-Cream----- by W. S. Arbuckle
- 4.Dairy Processing by Earl.
- 5.Technology of Indian milk products—by R.P.Aneja, B.N.Mathur,

FOOD PACKAGING (THEORY)**Marks 50****Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	INTRODUCTION, 1.1 Importance of Packaging, 1.2 History of Package Development, 1.3 Packaging materials, a) Characteristics of basic packaging materials: Paper (paper board, corrugated paper, fibre board), Glass, Metal, Plastics, Foils and laminates, retort pouches, Package forms,	6	03
2.	PACKAGING TECHNIQUE OF MILK AND DAIRY PRODUCTS 2.1 pasteurized milk, 2.2 UHT-sterilized milk, 2.3 aseptic packaging,	6	
3.	STUDY OF FAT RICH PRODUCTS 3.1 ghee and butter, 3.2 coagulated and desiccated indigenous dairy products and their sweet makes, 3.3 concentrated and dried milks including baby foods.	6	
4.	MODERN PACKAGING TECHNIQUES; 4.1 Vacuum Packaging, 4.2 Modified atmosphere packaging (MAP), 4.3 Eco- friendly packaging, 4.4 Principles and methods of package sterilization, edible packaging.	10	
5.	CODING AND LABELLING OF FOOD PACKAGES, 5.1 Aseptic Packaging (AP), 5.2 Scope of AP and pre-requisite conditions for AP, 5.3 Description of equipments (including aseptic tank) and machines-	6	
6.	STUDY OF MICRO-PROCESSOR CONTROLLED SYSTEMS 6.1 Importance for AP, 6.2 Package conditions and quality assurance aspects of AP, 6.3 Microbiological aspects of packaging materials. 6.4 Disposal of waste package materials, 6.5 Packaging Systems	8	
7.	.Seminars, Workshops, Group discussion	3	
8	Total	45	

References

1. Packaging Technology: G. A. Giles
2. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.

FOOD PACKAGING (PRACTICAL)

Marks 100 Credits 06

Sr No	Name of practical	Credits	
3	Measurement of thickness of paper, paper boards.	04	
4	Measurement of basis weight of paper and paperboards.		
5	Measurement of grammage and water absorption of paper, paper boards.		
6	Measurement of bursting strength of paper of paper boards. Measurement Tear resistance of papers.		
7	Measurement of puncture resistance of paper and paperboard.		
8	Measurement of tensile strength of paper of paper boards.		
9	Measurement of grease resistance of papers		
10	Determination of gas transmission rate of package films. Determination of WVTR and QTR of films.		
11	Determination of coating on package materials. Identification of plastic films.		
12	Finding chemical resistance of films.		
13	Re- packaging practices followed for packing fruits, vegetables.		
14	Packaging of different dairy products by using Pre pack and Vacuum packaging machines.		
15	Preparation of Packaging Album.		
16	Industrial Visits		02
17	Total		06

References

1. Industrial Law - P.L. Malik
2. Business and Commercial Laws-Sen and Mitra.
3. An Introduction to Mercantile Laws-N. D. Kapoor

List of Reference Books:

1. A Text book of Animal Husbandry by - G.C. Banarjee
2. Milk and milk products----- Eckles, Comb and Mary
3. Milk and milk products ---
- Harbonsing and Moore
4. Modern Dairy Products----- by Lampert
5. Dairy India Year Book – 2007 by - P.R. Gupta
6. Dairy Plant Engineering and Management by Tufail Ahmed.
7. Handbook of Dairy science ----by K. C. Mahanta
8. Outlines of Dairy Technology by Sukumar De.
9. Milk products in India----- M.R. Shrinivasan & C.P. Anantkrishnan.
10. Dairy Technology and Engineering by H.G. Kessler
11. Ice-Cream-----
- by W. S. Arbuckle
12. Dairy Processing by Earl.
13. Technology of Indian milk products—by R.P. Aneja, B.N. Mathur,
14. R.C. Chandan &
A.K. Banerjee.
15. Introduction to food safety-----
- IGNOU, New Delhi.
16. Food Safety & Quality Assurance—IGNOU, New Delhi.
17. Hazards to food Safety-----
---- IGNOU, New Delhi.
18. Hand Book of Indian
Dairy Farmers- Patrick John.
19. A Textbook of Genetics----
- Dalela R. C. & S. R. Verma.
20. Genes and Evolution---
- JHA
21. Genetics of Live stock improvement----
- John F. Lesley
22. An Introduction to Genetics----
- B. K. Jain.

T.Y B.Voc
SYLLABUS WILL BE
IMPLIMENTED
FROM
JUNE 2020-21

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -V PAPER – XXIX FPT 29

Traditional Dairy Products-I (THEORY)

Marks 50

Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Dairy products 1.1 Introduction t Dairy products	5	03
2.	Definition dairy products 2.1 Classification Indian dairy products	5	
3.	Preparation of heat desiccated milk products: 3.1 Basundi 3.2 khoa	10	
4.	Preparation Technique 4.1 Khoa (Pedha)	4	
5.	Preparation of heat desiccated milk product 5.1 Kheer 5.2 Basundi	3	
6.	Heat and acid co- agulated milk products: 6.1 Channa, 6.2 Rasgolla	4	
7.	Heat and acid co- agulated milk products: 7.1 Kalakand, 7.2 Pantoa, 7.3 Paneer.	14	
8.	Total	45	03

SEMESTER -V PAPER – XXX FPP 30 Traditional Dairy Products-I (PRACTICAL)

Credits 6 Marks 100

Sr No	Name of Practical	Credits
1	Preparation of Khoa based sweet: barfi, gulabjamun.	04
2	Preparation of Khoa based sweet: peda	
3	Preparation of rabri.	
4	. Preparation of kheer	
5	. Preparation of basundi	
6	Preparation of chhana based sweet: rasgolla, sandesh	
7	Preparation of chhana based sweet: kalakand,	
8	. Preparation of chhana based sweet: Paneer	
9	Preparation of makkhan and ghee.	
10	Preparation of flavoured milk.	
11	Preparation of Kulfi	
12	Preparation of whey beverages.	
13	. Preparation of condensed milk.	
14	Preparation of skim milk	
15	Preparation of whole milk powder.	
16	Visit to Dairy	02
17	Total	06

SEMESTER -V PAPER – XXXI FPT 31 DAIRY TECHNOLOGY (THEORY)

Marks 50

Credits 03

Sr. No.	Topics	Lectures	Credit
1.	International requirements for export of milk and milk products	7	03
2.	Preservation of milk and milk products by physical preservatives	8	
3.	Preservation of milk and milk products by chemical preservatives	7	
4.	Preservation of milk and milk products by biological and herbal preservatives	7	
5.	Utilization of dairy by-products like whey and high acid milk	8	
6.	Packaging of milk and milk products with modern techniques	8	
7.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –V PAPER – XXXII FTP 32****FOOD PROCESSING AND PRESERVATION TECHNOLOGY (THEORY)****Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	Sources of food, scope and benefit of industrial food preservation, perishable, non perishable food, causes of food spoilage.	05	03
2.	Preservation by salt & sugar – Principle, Method, Equipment and effect on food quality.	05	
3.	Thermal processing methods of preservation – Principle and equipments: Canning, blanching, pasteurization, sterilization, evaporation.	05	
4.	Use of low temperature – Principal, equipment and effect on quality. Chilling, cold storage, freezing. Preservation by drying dehydration and concentration – Principle, Methods, Equipment and effect on quality :Difference, importance of drying & dehydration over other methods of drying and dehydration, equipments and machineries, physical and chemical changes in food during drying and dehydration.	8	
5.	Need and Principle of concentration, methods of concentration – Thermal concentration, Freeze concentration, membrane concentration, changes in food quality by concentration.	8	
6.	Preservation by radiation, chemicals & preservatives. Definition, Methods of Irradiation, Direct & Indirect effect, measurement of radiation dose, dose distribution, effect on microorganisms. Deterioration of Irradiated foods- physical, chemical and biological; effects on quality of foods.	9	
7.	Preservation of foods by chemicals, antioxidants, mould inhibitors, antibodies, acidulates etc. Preservation by fermentation- Definition, Advantages, disadvantages, types, equipments.	5	
8.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXIII FPP 33

FOOD PROCESSING AND PRESERVATION TECHNOLOGY (PRACTICAL)

Credits 6

Marks 100

Sr No	Name of Practical	Credits
1	Demonstration of various machineries used in processing.	
2	Demonstration of effect of blanching on quality of foods. and Preservation of food by high concentration of sugar	04
3	preparation of jam.ning of fruits and vegetables.	
4	Preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid.	
5	Preservation of food by using chemicals.	
6	Preservation of Bread,. using mold inhibitors	
7	Preservation Cake using mold inhibitors	
8	Preservation of coconut shreds using humectants.	
9	Drying of pineapple slices, apple slices in cabinet drier.	
10	Demonstration on drying of green leafy vegetables.	
11	Drying of Mango/other pulp by foam mat drying	
12	Drying of different pulp by foam mat drying	
13	Drying of semisolid foods using roller dryers. Drying of foods using freeze-drying process	
14	Demonstration of preserving foods under cold v/s freezing process.	
15	Processing foods using fermentation technique i.e. preparation of sauerkraut.	
16	Industrial Visit	02
17	Total	06

**COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXIV FPT 34**

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Production and processing scenario of fruits and vegetable: India and World. Scope of Fruit and Vegetable Preservation Industry in India.	5	03
2.	Present status, constraints and prospectus. Overview of principles and preservation methods of fruits and Vegetables.	5	
3.	Commercial processing Technology of Following fruits and vegetables.	5	
4.	Mango: Pulp, RTS, Squash canned Mango pulp. Toffee amchur, pickle Mango Powder, bar. Banana: Wafers, puree, dried banana powder.	5	
5.	Papaya: Jam, Candy RTS, Nectar, Squash, and Papain. Pomegranate: Juice, Squash, syrup, Anardana, Dalimbmanuka, Anargoli.	5	
6.	Guava; Jelly, Cheese, Juice, Canned guava, Squash, Toffee. Grape: Raisin, Juice, Wine. Fig: Pulp, dried fig, Toffee Powder, bar fig.	5	
7.	Citrus Fruits: Jelly, Marmalade RTS Squash, candy. Aonla; Preserve, Jam, Candy, Juice, Squash, powder, Dried	5	
8.	shreds, chivenprash, pickle, chutney sauce, sweets. Tamarind: Pulp, Powder, Toffee, Bar, RTS, Slab. Jamun: Jelly, RTS, Syrup, wine.	5	
9.	Wood apple: Jelly, Marmalade, Tomato: Ketchup, sauce, puree, soup, chutney, pickle.	5	
10.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXV FPP 35

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (PRACTICAL)

Marks 100 Credits 06

Sr.No	Name of Practical	Credits
1	Canning of Mango/Guava/Papaya.	04
2	Preparation of Fruit ,Apple/Mango/Guava,/Papaya/Aonla/Strawberry.	
3	Preparation of fruit Jelly: Wood apple, Sweet orange/mandarin/Guava,/Tamarind.	
4	Preparation of fruit marmalade: Ginner Marmalade.	
5	Preparation of fruit preserve and candy	
6	Preparation of grape raisin, dried fig and dried banana.	
7	Preparation of Anardana and dalmab manuka.	
8	Preparation of papain /guava cheese.	
9	Preparation of pickle, mixed pickle.	
10	Preparation of Amchur.	
11	Preparation of dried onion and garlic, Preparation of Banana and Potato wafers.	
12	Preparation of dehydrated leafy vegetable.	
13	Preparation of fruit RTS and candy.	
14	Preparation of fruit squash.	
15	Preparation of fruit syrup and dried ginger	
16	Industrials visit	02
17	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –VI PAPER – XXXVI FPT 36****NEW PRODUCT DEVELOPMENT (THEORY)****Marks 50****Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	New product development 1.1 Need, importance 1.2 Formulation for new product development.	4	03
2.	To study the objectives 2.1 Formulation for new product development	4	
3.	Ideas, business philosophy 3.1 Strategy of new product.	6	
4.	Formulation based on sources availability 4.1 Cost competitiveness for concept developments of new products.	5	
5.	Standardization 5.1 Various formulation and product design.	5	
6.	Adaptable technology 6.1 Sustainable technology for standardized formulation for process development.	4	
7.	Process control parameters 7.1 scale-up of new products.	6	
8.	Production trials for new product development 8.1 Lab and pilot scale Quality assessment of new developed products	6	
9.	Market testing and marketing plan. Costing and economic evaluation. Commercialization / product launch	5	
10.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXVII PPP 37

Sr No	Name of Practical	Credits
1	Research Project	6

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –VI PAPER – XXXVIII FPT 38

Farm Animals Breeding (THEORY)

Marks 50

Credits 03

Lecture	Topic	Lectures	Credits
1	History and concept of animal breeding	4	03
2	Cell and cell division, spermatogenesis and oogenesis	5	
3	Gene: Functions and role in animal genetics gene actions, gene and genotypic frequencies	6	
4	Gene expression and mutation and laws of probabilities	6	
5	Mendelian principles and Hardy Weinberg law	7	
6	Chromosomes and its abnormalities	7	
7	Variations in quantitative and qualitative traits of farm animals	5	
8	Systems of breeding	5	
	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)**SEMESTER –VI PAPER – XXXIX FPT 39****FOOD TRENDS AND PROGRAMME (THEORY)****Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credits
1.	Food demand and supply – Qualitative and quantitative requirements. Expected Technological advances to meet the needs.	5	03
2.	Future priorities in Food Production needs –Status of Food Industry in India and Abroad.	5	
3.	Food availability, production Trends – Factors of Production – Types of Foods like processed semi processed, Ready to eat Foods,	5	
4.	Fast Foods. Food Characteristics Nutritional significance of major food groups. Present trends of consumption, Further requirements. Consumers change of aptitude in Food Products consumption.	7	
5.	New food products developed Programmes aimed for making more food availability to increasing population and their prospects. Merits and drawbacks, prospects for future growth in India.	7	
6.	National and International Trends and Programmes in Food handling, processing and marketing Potentials and Prospects of developing Food Industry in India.	6	
7.	Food Losses –Factors affecting – Programmes and strategies to eliminate the losses and meet the required demand .Global demand for food	5	
8.	World Food Day- Important and action plans.	5	
9.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –VI PAPER – XXXX FPP 40

FOOD TRENDS AND PROGRAMME (PRACTICAL)

Credits 06

Marks 100

Sr No	Name of Practical	Credits
1	Analysis of Moisture content from given food sample.	04
2	Analysis of Protein from given food sample.	
3	Analysis of Fat from given food sample.	
4	Analysis of Ash from given food sample.	
5	Analysis of Crude fiber from given food sample.	
6	Analysis of Energy Value from given food sample.	
7	Analysis of Carbohydrate from given food sample.	
8	Analysis of Sugar from given food sample.	
9	Analysis of Pectin from given food sample.	
10	Analysis of pH from given food sample.	
11	Analysis of Acidity of Extracted fat from given food sample	
12	Analysis of Acid soluble compounds from given food sample	
11	Analysis of Hardness of given food sample	
12	Analysis of Alkalify of Extracted fat from given food sample	
14	Analysis of Acid insoluble compound from given food sample.	
15	Analysis of Taste of given food sample	
16	Industrial visit	02
17	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)
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ICE-CREAM & FAT RICH DAIRY PRODUCTS (THEORY)

Marks 50

Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Ice-cream: 1.1 Introduction 1.2 Definition 1.3 History of development and status of ice-cream industry.	05	03
2.	composition of ice-cream 2.1 Nutritive value of ice-cream 2.2 Different forms of ice-cream eg. (kulfi)	05	
3.	Classification of ice-cream 3.1 Standardization of ice-cream. 3.2 Standardization of frozen product.	05	
4.	Role of milk Constituents 4.1 Manufacturing of ice- cream 4.2 Manufacturing of kulfi	05	
5.	Study and role of dairy and non dairy ingredients in ice- cream 5.1 Condensed milk 5.2 Cream 5.3 Butter	05	
6.	Study of stabilizers and emulsifiers, 6.1 Their Classification, 6.2 Properties and role in quality of ice-cream.	05	
7.	Types of freezers. 7.1 Blast freezers 7.2 Normal freezers	02	
8.	manufacturing of ice-cream	03	

9.	physico-chemical properties of ice-cream 9.1 Mix and effect of processing 9.2 Physico- chemical properties of ice- cream mixes and ice- cream.	07	
10.	Over run in ice-cream 10.1 Their control	03	
11.	Packaging, 11.1 Hardening, storage 11.2 Transportation of ice-cream.	05	
12.	Defect in ice-cream, 12.1 Causes and prevention.	05	
13.	Manufacturing of indigenous frozen dessert. 13.1 Kulfi 13.2 Malai burfi, 13.3 milk ices and lollies. 13.3 Milk shake.	05	
14.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXXII FPP 42

ICE-CREAM & FAT RICH DAIRY PRODUCTS (Practical)

Marks 100 Credits 06

Sr No	Name of practical	Credits
1	Study of ice-cream freezer	04
2	Calculation & standard of ice-cream mix	
3	Manufacturing of soft serve plain & fruit flavored ice-cream	
4	Preparation of kulfi	
5	Preparation of milk shake	
6	Study of cream separator	
7	Separation of cream	
8	Study of butter churner & butter making equipment	
9	Role of Ingredients and defects in ice- cream manufacturing	
10	Microbial Examination of Ice- Cream	
11	Manufacturing of Flavour Milk	
12	Manufacturing of Ghee	
13	Manufacturing of Lollies	
14	Manufacturing of table butter & white butter	
15	Manufacturing of butter oil	
16	Visit to Ice cream Industry	02
17	Total	06

Total Credit	Total Semesters 06	180 Credit
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List of Reference Books:

1. Microbiology: M.J. Pelczar.
2. Food Microbiology: M. R. Adam, M. R. Moss.
3. Industrial Microbiology: M, J. Waites, N. L. Morgan, J. S. Rockey, G Higton.
4. Food Bio- Chemistry And Processing: B. J. Simpson.
5. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.
6. Agricultural And Food Marketing Management: I. M. Crowford.
7. Bakery Products: Science And Technology: Y. H. Hui.
8. Cereal Processing Technology: G. Owens.
9. Fruits And Vegetable Processing: M.E.Dauthy.
10. Packaging Technology:G. A. Giles.

Reference Books

- 1] A Text book of Animal Husbandry by - G.C. Banarjee
- 2] Milk and milk products----- Eckles, Comb and Mary
- 3] Milk and milk products ---- Harbonsing and Moore
- 4] Modern Dairy Products----- by Lampert
- 5] Dairy India Year Book – 2007 by - P.R. Gupta
- 6] Dairy Plant Engineering and Management by Tufail Ahmed.
- 7] Handbook of Dairy science ----by K. C. Mahanta
- 8] Outlines of Dairy Technology by Sukumar De.
- 9] Milk products in India----- M.R. Shrinivasan & C.P.Anantkrishnan.
- 10] Dairy Technology and Engineering by H.G. Kessler
- 11] Ice-Cream-----by W. S. Arbuckle
- 12] Dairy Processing by Earl.

- 13] Technology of Indian milk products—by R.P.Aneja, B.N.Mathur, R.C. Chandan & A.K. Banerjee.
- 14] Introduction to food safety----- IGNOU, New Delhi.
- 15] Food Safety & Quality Assurance—IGNOU, New Delhi.
- 16) Hazards to food Safety----- IGNOU, New Delhi.
- 17) Reproduction in farm animals---- C. N. Sane & others.
- 18) Hand Book of Indian Dairy Farmers--- Patrick John.
- 19) A Textbook of Genetics----- Dalela R. C. & S. R. Verma.
- 20) Genetics and Breeding in farm animals--- Banerjee & Mukharjee.
- 21) Reproduction in farm animals----- Hafeez.
- 22) Hand book & Physiology of farm animals---- R. D. Frandson.
- 23) Anatomy & Physiology of farm animals--- R. D. Frandson.
- 24) Principles of Dairy Science G. H.Schmidt, L. D. Vivek & N. N. Pathak.
- 25) Genes and Evolution-----JHA
- 26) Cattle embryo transfer procedure -----Curtis.
- 27) Genetics of Live stock improvement----- John F. Lesley
- 28) An Introduction to Genetics----- B. K. Jain.
- 29) Population Genetics in animal breeding---- Franz pitcher.
- 30) Industrial &Labour Laws -S.P.Jain
- 31) Industrial Law - P.L. Malik
- 32) Business and Commercial Laws-Sen and Mitra.
- 33) An Introduction to Mercantile Laws-N. D. Kapoor