

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO.SU/Sci.& Tech./B.Voc./33/2018**

It is hereby inform to all concerned that, on the recommendation of the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following curriculum under B.Voc. programme viz: Certificate, Diploma, Advanced Diploma and B.Voc. Degree** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith:

1.	B.Voc. Industrial Automation,
2.	B.Voc. Automobile Technology,
3.	B.Voc. Farm Equipment and Machinery,
4.	B.Voc. I.T.Skills and Software Development,
5.	B.Voc. Architectural Planning and Interior Design,
6.	B.Voc. Dairy Products,
7.	B.Voc. Drill Technology,
8.	B.Voc. Plant Tissue Culture and Green House Technology,
9.	B.Voc. Renewable Energy Source,
10.	B.Voc. Computer Hardware & Networking Maintenance.
11.	B.Voc.Food Processing and Preservation.
12.	B.Voc. Sustainable Agriculture.
13.	B.Voc. Bioproducts technician

This is effective from the Academic Year 2018-2019 and onwards.

This curriculum are also available on the university website

www.bamu.ac.in

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
Ref.No.
SU/B.Voc/2018/21709-22148
Date:- 12-12-2018

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Deputy Registrar,
Syllabus Section.

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- 1] **The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, University Network & Information Centre, UNIC,
with a request to upload this Circular on University Website.**

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- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad
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Pariksha Bhavan, Dr. Babasaheb Ambekar Marathwada University.
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**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Curriculum of

B.Voc. Dairy Products

UNDER THE FACULTY OF SCIENCE & TECHNOLOGY.

[Effective from 2018-19 & onwards]

Scheme for Skill Component

B. Voc. (Dairy Products)

	Title of the Paper	Total Hours	Credits
Semester – I Level- 5	Milk Products-I	136	9
	Milk Products Practical-I	114	9
	Total	250	18
Semester – II Level -5	Milk Products-II	136	9
	Milk Products Practical-II	114	9
	Total	250	18
Semester – III Level -6	Dairy Farming In India-III	90	6
	Dairy Farming In India Practical-III	180	12
	Total	270	18
Semester – IV Level -6	Ice-Cream and fat rich dairy Products-IV	90	6
	Ice-Cream and fat rich dairy Products Practical-IV	180	12
	Total	270	18
Semester – V Level -7	Condensed, Dried Milk Products-V	90	4
	Condensed, Dried Milk Products Practical-V	180	6
	Field work-I	25	3
	Project work-I	75	5
	Total	370	18
Semester – VI Level -7	Market Milk Processing and Marketing-VI	90	4
	Market Milk Processing and Marketing Practical-VI	180	6
	Field work-II	25	3
	Project work-II	75	5
	Total	370	18
Grand Total		1780	108

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Principal
M.S.S. Arts College Tirthpuri
Tq. Ghansawangi, Dist. Jalna

B. VOC. (Dairy Products)

Semester I

Theory Paper I: Milk Products I (9 Credit)

Unit I Milk: Definition, composition and study of milk constituents. Physico-Chemical properties of milk. Nutritive value of milk. Factors affecting quality and quantity of milk

Unit: II Study of Bacteria, classification, properties, Reproduction and growth. Sources of Microorganisation in milk and their prevention. Steps in clean milk production. Milk fermentation, products of Microbial growth

UnitIII Introduction to milk products Technology, Dairy Products and entrepreneurial opportunities, classification of milk products, marketing of milk products: scope and limitation

Unit IV Study of starter culture, study of fermented milk products: curd, yoghurt, chakka, shrikhand, kefir, kumiss. Khoa: Definition, composition, manufacturing and channa, based sweet meats

Unit VII Cream: method of separation, types of cream, defects and efficiency of cream separator. Butter: definition and composition of desi butter and creamery butter, history, manufacturing, packaging, storage and defects in butter. Ghee: history, definition and composition, method of preparation, grading, packaging storage and defects in ghee

B. VOC. (Dairy Products)

Semester I

Practical Paper I: Milk Products I (9 Credit)

- 1) Spotting – Appliances, milk products (08 spot)
- 2) Preparation of Dairy Products (any one) Basundi/Rabri/Khoa/ Chocolate milk/ Milkshake
- 3) Preparation of Dairy Products (any one) Channa/Kalakand/ Paneer/ Rasogola
- 4) Preparation of Dairy products (any one) Khoa/pedha/barfi/gulajam
- 5) Preparation of Dairy products (any one) Curd/chakka/ shrikhand/butter/ghee/Ice-cream
- 6) Record Book , Excursion Report & Viva-voice

B. VOC. (Dairy Products)

Semester II

Theory Paper I: Milk Products II (9 Credit)

Unit I Recent Trends in Dairy Technology: Membrane technology, food preservation, water activity, hurdle technology, Enzyme Encapsulation

Unit II Ice-cream: history, definition, composition, manufacturing, storage and defect, kulfi. Milk by Products: casein, lactose, whey, ghee residue

Unit III Cheese: history, definition, composition, classification, manufacturing. Defects in manufacturing and storage. Condensed milk: history definition, composition, manufacturing and defects

Unit IV Study of indigenous milk products: basundi, rabri etc.
Channa: definition, composition manufacturing and channa based sweet meats i.e Rosogolla, Sandesh, Kalakand etc. Panir: manufacturing, packing and storage

Unit V Milk powder: definition, composition, types, methods of manufacturing, packing, storage and defects. Study of special milk: toned and double toned milk, fortified milk, synthetic milk, reconstituted milk

B. VOC. (Dairy Products)

Semester II

Practical Paper I: Milk Products II (9 Credit)

- 1 Preparation of curd, lassi and acidophilus milk
- 2 Preparation of Chakka and shrikhand
- 3 preparation of Ice-cream and kulfi
- 4 Cream Separation
- 5 Preparation of Butter
- 7 Preparation of Ghee
- 8 preparation of khoa
- 9 preparation of khoa based sweets like pedha, burfi and gulab Jamun
- 10 preparation of channa and channa based sweet like kalakand, Rosogola and basundi
- 11 preparation of basundi, rabri and kheer
- 12 preparation of chocolate milk, milk shake and reconstituted milk
- 13 Adulteration in milk products and cheese making units of the processing plant

B. VOC. (Dairy Products)

Semester III

Theory Paper I: Dairy farming in India (9 Credit)

Unit I Introduction to Dairy farming in India

History of Domestication of Dairy Animals

Taxonomic classification of dairy animals

Animal Husbandry in India- Present and future

Common terminologies used in animal husbandry

Unit-I Animal husbandry region in India

Animal Adaptation and behavioral patterns

Cattle and Buffalo-their production potential, role in National economy

Study of dairy farming system in India, Cattle development through five year plans

Unit- III Establishment of dairy farm Selection of site Different structure and their

location and space requirement and housing materials

Capital- Types, Ways of rising

Unit- IV Types of Housing for dairy animals

Water supply, light and Ventilation, Drainage system

Recycling of waste

Maintenance of sanitary and Hygienic condition on farm

B. VOC. (Dairy Products)**Semester III****Practical Paper II: Dairy farming in India (9 Credit)**

- 1) Morphology of cattle and Buffalo
- 2) Linear body measurements-Body wedges and estimation of body weight
- 3) Study of cattle breeds
 - Milk purpose – sahiwal, redsindhis , gir,
 - Dual purpose- Deoni, kankrej, Ongole, Hariyana
 - Drought Purpose- Khillar, Red khandhari, Amritmahal, Cross breeds
 - Exotic Breeds- HF, Jersey, Brownswiss
- 4) Study of Buffalo Breeds- Murrha, Surti, Jafrabadi, Mehsana, Mrathwadi,
- 5) Common Appliance Used in controlling the farm animals
- 6) Casting, restraining and handling of farm animals
- 7) Preparation of drugs Like ointment, liniment, bolus,
- 8) Drenching, injections and vaccinations
- 9) Pathological test – Blood test, Urine test, Test for mastitis.
- 10) Farm Layout
- 11) Dentition in Cattle and age Determination
- 12) Study of udder
- 13) Physico- Chemical evaluation of milk
 - A) Sampling , organoleptic test
 - B) Specific Gravity, Acidity and pH
 - C) Viscosity , Electrical Conductivity and Refractive index
 - D) Fat, SNF, TS
- 14) Detection of adulterants from milk
- 15) Detection of Preservatives From Milk
- 16) Record keeping
- 17) Visit to – Dairy Farm. Dairy Plant, Agricultural Veterinary collage, Veterinary Hospital.

B. VOC. (Dairy Products)**Semester IV****Theory Paper I: Ice-Cream and Fat rich dairy Products (9 Credit)****Unit I**

Introduction to milk products technology, Dairy products and entrepreneurial opportunities, Classification of milk products, Marketing of milk products: scope and limitation

UNIT II

Study of starter culture Study of fermented milk products: curd, yoghurt, chakka Shrikhand, kefir, kumis Khao: definition, composition, types, manufacturing

Unit III**Ice-Cream:**

- i) History Development and status of ice-cream industry.
- ii) Definition, composition and nutritive value of ice-cream.
- iii) Classification and standard of ice-cream
- iv) Role of milk constituents in manufacturing of ice-cream
- v) Study and role of dairy and non dairy ingredients in ice-cream
- vi) Study of stabilizers and emulsifiers, their classification, properties and role in quality of ice-cream
- vii) Types of freezers
- viii) Manufacturing of ice-cream
- ix) Physico-chemical properties of ice-cream mix and effects of processing on physico-chemical properties of ice-cream mixes and ice-cream
- x) Over run in ice-cream and their control
- xi) Packing, hardening, storage and transportation of ice-cream
- xii) Defect in ice-cream, their causes and prevention

- xiii) Manufacturing of indigenous frozen desert
a) kulfi b) malai ka burf c) milk ice and lollies d) milk shake

Unit IV **Fat rich dairy products**

A) CREAM

- I) Methods of cream separation
- II) Types of cream
- III) Factors affecting efficiency of cream
- IV) Defects of cream

B) Butter

- I) History
- II) Definition, composition & types of butter
- III) Butter churn
- IV) Methods of manufacturing
- V) Factor affecting fat losses in butter milk
- VI) Theories of churning
- VII) Defects, their causes & prevention
- VIII) Continuous butter making machine
- IX) Comparison of desi and table butter

C) Butter oil- composition, methods of manufacturing, distribution & uses

B. VOC. (Dairy Products)

Semester IV

Practical Paper II: Ice-Cream and Fat rich dairy Products (9 credit)

- 1 study of ice-cream freezer
- 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 milk separator
- 7 Separation of cream
- 8 Study of butter churn & butter making equipment
- 9 Manufacturing of table butter & white butter
- 10 Manufacturing of butter oil
- 11 Project work
- 12 Visit to ice-cream plant

B. VOC. (Dairy Products)

Semester V

Theory Paper I: Condensed, dried milk and by-products(4 credit)

Unit I condensed and evaporated milk

- a) History, status and scope
- b) Physico-chemical changes taking place during manufacturing of condensed milk
- c) Health stability of milk & condensed milk
- d) Condensed milk, sweetened condensed milk & evaporated milk
- e) Seeding crystallization & stability of evaporated milk
- f) Defects in condensed milk, their causes and prevention

Unit II Dried Milk

- a)History & status in India
- b)Types , composition, PFA/BIS and international standards
- c) Manufacturing of skim milk powder, whole milk powder and heat classified powder
- d)Physical properties of dried milk
- e) Defect during manufacturing & storage, their causes and prevention
- d) Study of infant milk food, malted milk food and dairy

Unit III By – Products

- a) Status, scope and utilization of dairy by-products in india
- b) Physico chemical characteristic of whey, butter milk
- c) Whey processing, beverage of whey and dried milk
- d) Butter milk processing, condensed butter milk & dried butter milk
- e) Casein, industrial and food grade

Unit IV Introduction to food safety, quality assurance

- a) International organization for standard (ISO)
- b) Total quality management (TQM)
- c) Hazard analysis critical control point (HACCP)

B. VOC. (Dairy Products)

Semester V

Practical Paper II : Condensed, dried milk and by-products (6 credit)

Sr No	Topics
1	Study of vacuum pan
2	Determination of heat stability of milk
3	Manufacturing of condensed & evaporated milk
4	Study of drum dryer
5	Study of spray drying plant
6	Manufacturing of skim milk & whole milk powder
7	Determination of partial & bulk density of dried milk
8	Preparation of whey beverages
9	Preparation of casein
10	Preparation of lactose
11	Project work

➤ Field Work I : 3 CREDIT

➤ Project work I : 5 CREDIT

B. VOC. (Dairy Products)

Semester VI

Theory Paper I Market Milk processing and marketing (4 Credit)

Unit I

Collection, Transportation, receiving, grading, Weighing and cooling of milk,

Milk processing: straining, filtration, classification, homogenization

Pasteurization- LTLT, HTST, Vaccination, UHT, Uprization, stassanization, Sterilization

Unit II

Standardization of milk, Legal Standards, pricing policy of milk

Milk packing : pouch, Tetra pack, Glass bottle, storage and distribution of milk

Unit III Lay-out of milk processing plant, Hygienic requirement of plant, processing equipment and personnel, plant and machinery, storage tank, Ventilation, drainage system, flooring, doors and windows, rodent control beat station, hand washing station

Unit IV Metals used in dairy industry and their effect on quality of milk steam generation and refrigeration, dairy waste disposal

Unit V Introduction to market milk industry in India. History of development of Indian Dairy Industry with reference to NDBB, OF and Dairy Co-operatives. Production and utilization patterns of milk in India. Economics of milk production

Unit VI: Study of Udder : a) Morphology and Anatomy b) Physiology and Endocrinology c) Theories of milk secretion

B. VOC. (Dairy Products)

Semester VI

Practical Paper II Market Milk processing and marketing (6 Credit)

- 1) Spotting – lab. Equipment
- 2) Udder on model/specimen/milking Utensils/milk machine
- 3) Milk analysis: fat/Ts, % Titrable acidity/specific gravity/SNFH, Viscosity/Electrical conductivity/freezing point
- 4) Detection of milk adulterant/ preservatives/phosphatase enzyme.
- 5) Sensory evaluation of milk/ preparation of standard milk
- 6) Identification of Bacteria/ MBRT/SPC/RRT
- 7) Study of preparation of animals for milking, Equipment used for milking
- 8) Milk methods
- 9) Physico-chemical evaluation of milk
- 10) Study of detergent
- 11) Study of milk record
- 12) Cleaning and sterilization of milk utensils
- 13) Milk packaging material
- 14) Preparation of standardized milk
 - Field Work II (3 CREDIT)
 - Project work II (3 CREDIT)



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