

डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद

परिपत्रक क्रमांक/एस.यु./विज्ञान/अभ्यासक्रम/७४/२०१४

या परिपत्रकाद्वारे सर्व संबंधितांना सुचित करण्यात येते की, विज्ञान विद्याशाखेने शिफारस केल्यानुसार बी. एस्सी. / एम. एस्सी. प्रथम व द्वितीय वर्षाच्या सुधारित अभ्यासक्रमास आणि बी. एस्सी. प्रथम वर्षाच्या अभ्यासक्रमात किरकोळ बदल करण्यास विद्यापरिषदेच्या वतीने मा. कुलगुरु यांनी, त्यांना प्राप्त असलेल्या विशेष अधिकार महाराष्ट्र विद्यापीठ अधिनियम-१९९४ कलम १४(७) अन्वये मान्यता दिलेली आहे. त्या अनुषंगाने सुधारीत तयार केलेल्या अभ्यासक्रमाची प्रत या परिपत्रकासोबत आपल्या पुढील कार्यवाहीसाठी पाठविण्यात येत आहे.

[1]	B.Sc. Physics	Semester-III & IV,
[2]	B.Sc. Chemistry	Semester-III & IV,
[3]	B.Sc. Botany	Semester-III & IV,
[4]	B.Sc. Zoology with minor changes	Semester-I & II,
[5]	B.Sc. Zoology	Semester-III & IV,
[6]	B.Sc. Fisheries	Semester-III & IV,
[7]	B.Sc. Electronics (Opt.)	Semester-III & IV,
[8]	B.A./B.Sc. Mathematics	Semester-III & IV,
[9]	B.Sc. Computer Science	Semester-I & II,
[10]	B.Sc. Information Technology	Semester-I & II,
[11]	B.C.A.	Semester-I & II,
[12]	B.Sc. Computer Science(Opt.)	Semester-I & II,
[13]	B.Sc. Information Technology(Opt.)	Semester-I & II,
[14]	B.Sc. Computer Application(Opt.)	Semester-I & II,
[15]	B.Sc. Computer Maintenance(Opt.)	Semester-I & II,
[16]	B.Sc. Biotechnology (Progressively)	Semester-I to VI,
[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

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[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
औरंगाबाद-४३१ ००४.
संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
६५९९-७०२
दिनांक :- २७-०५-२०१४.

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संचालक,
महाविद्यालये व विद्यापीठ
विकास मंडळ.

या परिपत्रकाची एक प्रत :-

- १) मा. परिक्षा नियंत्रक, परिक्षा विभाग,
 - २) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,
 - ३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर उपलब्ध करुण देण्यात यावेत.
 - ४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,
 - ५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,
 - ६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,
 - ७) कक्ष अधिकारी, बी.ए. / बी.एस्सी./ बी.सी.एस./एम.एस्सी. विभाग, परीक्षा भवन,
 - ८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,
- डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

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DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.

Revised Syllabus of

B.Sc. Second Year
Dairy Science & Technology
Semester – III & IV
Three Year Degree Course

(Effective for 2014-2015)

Dairy Science & Technology

Semester Pattern

Course Structure

B.Sc. 1st Year

Semester	Course Code	Paper No.	Title of Papers	Period	Marks
I	DST-101	Paper-I	Dairy form Management	45	50
	DST-102	Paper-II	Market Milk Industry	45	50
	DST-103	Paper-III	Practical Based on Paper No. I & II	45	50
II	DST-201	Paper-IV	Lives Stock Health & Hygiene	45	50
	DST-202	P-V	Dairy Processing & Engineering	45	50
	DST-203	P-VI	Practical Based on Paper No. IV & Vth	45	50

B.Sc. 2nd Year

Semester	Course Code	Paper No.	Title of Papers.	Period	Marks
III	DST-301	P-VII	Animal Nutrition	45	50
	DST-302	P-VIII	Indian Dairy Products	45	50
	DST-303	P-IX	Practical Based on Paper VII	45	50
	DST-304	P-X	Practical Based on Paper VIII	45	50
IV	DST-401	P-XI	Fodder Production & Feed Processing	45	50
	DST-402	P-XII	Cheese & Fermented Milk Products	45	50
	DST-403	P-XIII	Practical Based on P-XI	45	50
	DST-404	P-XIV	Practical Based on P-XII	45	50

B.Sc. 3rd Year

Semester	Course Code	Paper No.	Title of Papers	Period	Marks
V	DST-501	P-XV	Animal Reproduction & Artificial Insemination	45	50
	DST-502	P-XVI	Icecream and Fat Rich Dairy Products	45	50
	DST-503	P-XVII	Practical Based on paper No. XV	45	50
	DST-504	P-XVIII	Practical Based on paper No. XVI	45	50
VI	DST-601	XIX	Genetics and Animal Breeding	45	50
	DST-602	XX	Condensed Dried Milk and by-Products.	45	50
	DST-603	XXI	Practical Based on paper XIX	45	50
	DST-604	XXII	Practical Based on Paper XX	45	50

B.Sc. II Year (Semester-III)
Dairy Science & Technology
Paper VII
Title : Animal Nutrition

Max. Marks – 50

Sr. No.	Topics	No. of Periods
1	Livestock Population & Availability of Feeds & fodder	04
2	<p>Study of nutrients & their nutritional importance-</p> <p>i) Water : Sources, requirements in animal body, water loss & functions of water in animal body.</p> <p>ii) Carbohydrates : Defination, classification, importance, digestion & metabolism in ruminants</p> <p>iii) Proteins : Defination, classification, importance, digestion in ruminants.</p> <p>iv) Lipids : Defination, classification, importance digestion in ruminants.</p> <p>v) Minerals ; Defination types & importance in animal nutrition.</p> <p>vi) Vitamins : Defination, classification & importance in animal nutrition.</p> <p>vii) Probiotics, antibiotic, hormones & other growth stimulating substances.</p>	26
3	<p>Classification of feeds & fodder -</p> <p>i) Defination.</p> <p>ii) Classification.</p> <p>iii) Nutritional charactetstics of Roughages.</p> <p>iv) Nutritional charactetstics of Concentrates.</p>	07
4	<p>Anatomy of digestive system in ruminants -</p> <p>i) Anatomy & Physiology of ruminant</p> <p>ii) Factors affecting digestion of feed and digestion coefficient.</p>	08
		45

Reference Books :

1. Animal Nutrition & Feeding practices in India - S.K. Ranjhan
2. A Text book of Animal Husbandry (8th Edn) - G. C. Banerjee
3. Handbook of Animal Husbandry - I.C.A.R., New Delhi
4. Feeds and feeding - G.B. Morrison
5. A Textbook of Animal Nutrition - G. C. Banerjee
6. Principles & Practices of Dairy Farm Management - Jagdish Prasad
7. Modern Dairy Cattle Management - Davis
8. A Textbook of animal Husbandry & Dairy Science - Jagdish Prasad
9. Dairy Cattle feeding & Management - Willtam N.Etgas
10. Live-Stock feeding & Management - Sing & Moor
11. Laboratory Manual for Nutrition Research - S.K.Ranjan & Gopal K.
12. Analytical Techniques in Animal nutrition research - N. N. Pathak
D.N.Kansra
R.C.Jakhmola
13. Analytical Techniques in Animal Nutrition - P.C.Gupta V.K.Sharma
A.B.Maudar
14. The feeding of farm animals in India - P.E. Lander
15. Applied Nutrition - D.V. Reddy
16. Nutritional Microbiology of farm animals - D.N. Karma
N. N. Pathak

B.Sc. II Year (Semester-III)
Dairy Science & Technology
Paper VIII
Title : Indian Dairy Products

Max. Marks – 50

Sr. No.	Topics	No. of Periods
1.	i) Introduction. ii) Indian Dairy Products. iii) Classification of Indian Dairy Products iv) Comparison with western dairy products.	03
2.	Desiccated Milk Products :- i) Khoa : Defination, Classification, types, methods of manufacture, packaging, preservation, factors affecting yield of khoa, physicochemical changes during manufacture and storage of khoa, defects in khoa, khoa sweets :- Defination composition & technology of manufacture. i) Pedra, Burfi, Gulabjamun & Milk Cake. ii) Rabri. iii) Basundi iv) Kheer v) Khurchan	13
3.	Heat and acid coagulated milk products : i) Channa : Definition, methods of manufacture, packaging, yield and defects. Channa based Sweets :- Channa Kheer, Rasogolla, Kalakand, Pantoa, Sandesh, Rasmalai, Rasanguri, Rajbhog & Channa Poda. ii) Panir :- Defination Method of manufacture, Packaging & storage. Physico chemical changes during storage.	13
4.	Fat rich Indian Dairy Products : i) Makkhan : Difination, Method of manufacture, fat losses during manufacture. ii) Ghee : History, Composition, methods of manufacture, grading, packaging and preservation of Ghee, marketing of Ghee. Market quality, Renovation of Ghee. Defects in Ghee AGMARK grading.	16
		45

Reference Books :

1. Outlines of Dairy technology by S. K. De.
2. Technology of Indian Milk Products by R. P. Aneja, B. N. Mathur, R.C. Chandan & A.K. Banjarjee
3. Milk Products in India by M.R. Shrinivasan & C.P. Anantkrishnan.
4. Indigenous Milk products by I.C.A.R. New Delhi
5. Dairy India (2007) by P. R. Gupta.

B.Sc. II Year (Semester-III)
Dairy Science & Technology
Paper IX (Practical)
Title : Animal Nutrition

Max. Marks – 50

Sr. No.	Topics	
1.	Collection & identification of feeds & fodder.	03
2.	Determination of Moisture / Dry matter.	01
3.	Determination of Crude fiber	01
4.	Determination of crude protein	02
5.	Determination of ether extract	01
6.	Determination of ash	01
7.	Study of digestive system of ruminants	02
8.	Computation of ration for milch cattles	02
09.	Visit to animal farms of agricultural college / veterinary college & established dairy farm.	02
		15

B.Sc. II Year (Semester-III)
Dairy Science & Technology
Paper X (Practical)
Title : Indian Dairy Products

Max. Marks – 50

Sr. No.	Topics	
1.	Preparation of Khoa	01
2.	Preparation of Khoa sweets a) Pedda b) Burfi c) Gulabjamun	03
3.	Preparation of Rabri	01
4.	Preparation of Basundi	01
5.	Preparation of Kheer	01
6.	Preparation of Chhana	01
7.	Preparation of Chhana Sweets a) Chhana Kheer b) Rosogolla c) Kalakand d) Sandesh e) Rasanguri f) Rasmalai	06
8.	Preparation of Paneer	01
9.	Preparation of Makkhan	01
10.	Preparation of Ghee	01
		17

B.Sc. II Year (Semester-IV)
Dairy Science & Technology
Paper - XI

Title : Fodder Production & Feed Processing

Max. Marks – 50

Sr. No.	Topics	No. of Periods
1.	Cultivation of important fodder crops- i) Legume : Lucerne, berseem, cowpea a& subabul. ii) Non legumes : Jawar, oat, maize iii) Grasses : Hybrid napier, paragrass, Rhodes grass, stylo, guinea grass. Yeshwant grass. iv) Intensive / relay fodder cropping programme.	15
2.	Conservation of green fodders as Silage and Hay	07
3.	Processing of inferior quality roughages	02
4.	Study of agro-industrial by products & unconventional feeds :- Sugar industry by products, mango\ seed kernel, neem cake, urea molasses liquid feed	06
5.	Feeding livestock during scarcity	02
6.	Measures of energy value and protein value of feeding stuff GE, DE, ME, NE, SE, DCP, TDN, Biological value, PER (Protein Efficiency Ratio), Protein replacement value, EAA (Essential Amino Acid)	03
7.	Feedings standards for farm animals	02
8.	Study of compounded feeds, concentrate mixtures, calf starters, milk replacer & mineral mixtures.	04
9.	Study of ration. Defination, types, characterstics of balanced ratio.	05
		46

Reference Books :

- | | | | |
|----|---|---|---------------------|
| 1. | Animal Nutrition & Feeding practices in India | - | S.K. Ranjhan |
| 2. | A Text book of Animal Husbandry (8 th Edn) | - | G. C. Banerjee |
| 3. | Handbook of Animal Husandry | - | I.C.A.R., New Delhi |
| 4. | Feeds and feeding | - | G.B. Morrison |
| 5. | A Textbook of Animal Nutrition | - | G. C. Banerjee |
| 6. | Principles & Practices of Dairy Farm Management | - | Jagdish Prasad |
| 7. | Dairy Cattle feeding & Management | - | Willtam N.Etgas |
| 8. | Live-Stock feeding & Management | - | Sing & Moor |
| 9. | The feeding of farm animals in India | - | P.E. Lander |

B.Sc. II Year (Semester-IV)
Dairy Science & Technology
Paper – XII

Title : Cheese & Fermented Milk Products

Max. Marks – 50

Sr. No.	Topics	No. of Periods
1.	Introduction to the Subject	01
2.	Study of starter culture : Definition, types, factors affecting quality of starters, defects.	07
3.	Cheese :- i) History, Definition & Classification. ii) Status & Scope in dairy industry iii) Technology of manufacture of cheese varieties. a) Cheddar b) Gouda c) Mozzarella d) Cottage e) Processed Cheese iv) Role of milk constituents in ripening. v) Role of starter culture in relation to cheese quality vi) Study of rennet and its action during cheese manufacture. vii) Packaging and storage. viii) Defects in cheese, causes & prevention.	25
4.	Fermented milk products :- Definition, Composition, nutritive value & Technology of manufacture. i) Dahi / Curd. ii) Chakka, Shrikhand iii) Yoghurt iv) Lassi v) Cultured butter milk. vi) Acidophilus milk Brief study of the following products. i) Kefir ii) Kummiss iii) Leben iv) Bulgarian Milk	12

	v) Misthi Dahi	
		45

Reference Books :

- 1) Fundamentals of Cheese Science P.F. Fox, T.P. Guinee, T.M. Cogan and P.L.H. Mcsweeney.
- 2) Microbiology and Biochemistry of Cheese and Fermented Milk, edited by B.A. Law.
- 3) Cheese and Fermented Milk Foods By Frank Kosikowski
- 4) Milk and Dairy Products Technology by Edgar Spreer.
- 5) Outlines of Dairy Technology by S.K. De.
- 6) Technology of Indian Milk Products by R. P. Aneja, B. N. Mathur, R.C. Chandan & A. K. Banarjee.
- 7) Dairy Microbiology by K. C. Mahrt.
- 8) Dairy Bacteriology by Hammer.
- 9) Handbook of Dairy Processing by M/s. Alfa Laval
- 10) Milk and Milk Products Technology - Md. Rajuddin & A. S. Hembade.
- 11) Dairy processing Technology by Germit Smit.

B.Sc. II Year (Semester-IV)
Dairy Science & Technology
Paper XIII (Practical)

Title : Fodder Production & Feed Processing

Max. Marks – 50

Sr. No.	Topics	
1.	Preparation of cropping scheme for fodder crop.	01
2.	Processing of feeds fodder – chaffing, cooking, grinding, soaking, palling, enriching & alkali treatment.	02
3.	Preparation of concentrate mixture.	01
4.	Preparation of Mineral mixtures	01
5.	Preparation of calf starters	01
6.	Preparation of milk replacers	01
7.	Preparation of Hay	01
8.	Preparation of Silage	02
9.	Preparation of urea molasses of liquid feed	02
10.	Preparation of complete feed blocks	02
11.	Visit to feed factory	01
		15

B.Sc. II Year (Semester-IV)
Dairy Science & Technology
Paper XIV (Practical)

Title : Cheese & Fermented Milk Products

Max. Marks – 50

Sr. No.	Topics	
1.	Study of cheese making equipment	01
2.	Manufacturing of cheeses : a) Cheddar cheese b) Mozrella cheese c) Prepration of Pizza	06
3.	Preparation of Dahi	02
4.	Preparation of Chakka & Shrikhand	01
5.	Preparation of Yoghurt	01
6.	Preparation of Lassi	01
7.	Preparation of Cultured butter milk	01
8.	Preparation of Acidophilus milk	01
9.	Visit to dairy plant	01
		15