॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

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

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विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०–२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसचे (बी.व्होक पदवी, ॲडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट) अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करणे बाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०–२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसच्या (बी. व्होक पदवी, ॲडव्हान्स डिप्लोमा, डिप्लोमा व सर्टिफिकेटस) अभ्यासक्रमांना **मा. विद्यापरिषदेच्या दिनांक २१ सप्टेंबर २०२१ रोजीच्या बैठकीतील विषय क्रमांक ५/५२–२०२१ च्या** ठरावानुसार **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचा खालील अभ्यासक्रमांस मान्यता देण्यात आली आहे.

1. B. Voc. Chemical & Petrochemicals Applied Analytical Chemistry. I year
2. B. Voc. Degree in Dairy Technology I year
3. B. Voc. Degree in Dairy Farming I year
4. Certificate Course in Dairy Processing Equipement operator.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी. ही विनंती.

स्वाक्षरित

सहा.कुलसचिव

शैक्षणिक (१–अभ्यासमंडळ) विभाग

जा.क्र.:शैक्षणिक–१/परिपत्रक/व्होकेशनल अभ्यासक्रम/N-२०२०–२१/**१५१**

दिनांक : ०४.१०.२०२१

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. मा अधिष्ठाता, विज्ञानव तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

UGC Sanctioned Vocational Course

Syllabus for,

B. Voc. Degree in Dairy Technology (CBCS Pattern)

First Year Semester I & II

Faculty: Science and Technology

(w.e.f. 2020-21)

Table: Indicating Eligibility, Duration, Total Credits.

Exit Points /Awards	Eligibility	Normal Duration	Skill Component Credits	General Education Credits	Total Credits for Award	NSQF Level	Medium of instruction
B. Voc Degree	**12th** pass or **Diploma** in relevant field after 12th	Six semester	108	72	180	7	English

About the Course:

Government of India, taking note of the requirement for skill development among students launched National Vocational Education Qualification Framework (NVEQF) which was later on assimilated into National Skills Qualifications Framework (NSQF). Various Sector Skill Councils (SSCs) are developing Qualification Packs (QPs), National Occupational Standards (NOSs) and assessment mechanisms in their respective domains, in alignment with the needs of the industry.

In view of this, the UGC implemented the scheme of Community Colleges from 2013-14 in pilot mode on the initiative of the MHRD. Thereafter, realizing the importance and the necessity for developing skills among students, and creating work ready manpower on large scale, the Commission decided to implement the scheme of Community Colleges as one of its independent schemes from the year 2014-15. The Commission also launched another scheme of B.Voc. Degree programme to expand the scope of vocational education and also to provide vertical mobility to the students admitted into Community Colleges for Diploma programmes to a degree programme in the Universities and Colleges. While these two schemes were being implemented, it was also realized that there is a need to give further push to vocational education on a even larger scale. Accordingly, 'Deen Dayal Upadhyay Centres for Knowledge Acquisition and Up gradation of Skilled Human Abilities and Livelihood (KAUSHAL)' was also incorporated. Since all these three provisions serve a common purpose, all these schemes are merged into a single scheme for providing skill based education under National Qualification Framework.

Type of Courses and Awards: There will be full time credit-based modular programmes, wherein banking of credits for skill and general education components shall be permitted so as to enable multiple exit and entry. The multiple entry and exit enables the learner to seek employment after any level of Award and join back as and when feasible to upgrade qualifications / skill competencies either to move higher in the job profile or in the higher educational system. This will also provide the learner an opportunity for vertical mobility to second year of B.Voc degree programme after one year diploma and to third year of B.Voc degree programme after a two year advanced diploma. The students may further move to Masters and Research degree programmes mapped at NSQF Level 8 – 10.

Type of Courses and Awards:

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Aims and Objectives:

The aims and objectives of the scheme of Vocational programme under NSQF are;

(i) To provide judicious mix of skills relating to a profession and appropriate content of general education.

(ii) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.

(iii) To provide flexibility to students by means of pre-defined entry and multiple exit points.

(iv) To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements.

(v) Such diploma graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

(vi) To provide vertical mobility to students coming out of 10+2 with vocational subjects and Community Colleges.

The Objectives of the B.Voc. in Dairy Technology:

(i) To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.

(ii) To develop a scientific attitude to make students open minded, critical and curious.

(iii) To develop an ability to work on their own and to make them fit for the society.

(iv) To develop skill in field work, experiments, equipment and laboratory use along with collection and interpretation of materials and data.

(v) To make aware of natural resources and environment and the importance of conserving the same.

(vi) To develop ability for the application of the acquired knowledge in the relevant fields so as to make our country self-reliant and self-sufficient.

Outcome of the course:

(i) This program will train and orient the students in the field of Dairy Technology under the field of Agriculture (Food processing).

(ii) This program will help the students for their career development.

(iii) This program shall train and orient the students for industrial Dairy Technology skills and serve as human resource for the industries and other organizations.

(iv) The programme also has a strong interdisciplinary component. Emphasis is given on the experimental learning through hands-on laboratory exercises, field trips and assignments.

(v) This skill oriented course will provide job opportunities and additional specific skills to the students for self-employability through the development of their own enterprises.

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credit	Marks		Total
							ESA	CIA	
Sem.I		**General Education Component**							
	Paper-I	BAAGE -111	Communication Skills	4	GE	4	75	25	100
	Paper-II	BAAGE -112	Basics of Computer	4	GE	4	75	25	100
	Paper-III	BAAGE -113	*Activity based on Paper-I & II	1	GE	1	-	25	25
		Skill Courses							
	Paper-IV	DTTH-111	Principles of Food Processing	4	CC	4	75	25	100
	Paper-V	DTTH-112	Food Chemistry	4	CC	4	75	25	100
	Paper-VI	DTTH-113	Fundamentals of Microbiology	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-VII	Practical Based on DTPR-111			PR	3	50	25	75
	Paper-VIII	Practical Based on DTPR-112			PR	3	50	25	75
	Paper-IX	Practical Based on DTPR-113			PR	3	50	25	75

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem.II		**General Education Component**							
	Paper-X	BAAGE -124	Personality Development	4	GE	4	75	25	100
	Paper-XI	BAAGE -125	Environmental Study	4	GE	4	75	25	100
	Paper-XII	BAAGE -126	*Activity based on Paper-X & XI	1	GE	1	-	25	25
		Skill Courses							
	Paper-XIII	DTTH-124	Cereal Processing	4	CC	4	75	25	100
	Paper-XIV	DTTH-125	Confectionary Technology	4	CC	4	75	25	100
	Paper-XV	DTTH-126	Introduction to Food Microbiology	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-XVI	Practical Based on DTPR-124		3	PR	3	50	25	75
	Paper-XVII	Practical Based on DTPR-125		3	PR	3	50	25	75
	Paper-XVIII	Practical Based on DTPR-126		3	PR	3	50	25	75
Summer	**Compulsory Activity: 2 Months Industrial Training during Summer Vacation**								

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credit	Marks		Total
							ESA	CIA	
Sem. III		**General Education Component**							
	Paper-XIX	BAAGE -237	ICT-Skill	4	GE	4	75	25	100
	Paper-XX	BAAGE -238	Entrepreneurship Development	4	GE	4	75	25	100
	Paper-XXI	BAAGE -239	*Activity based on Paper-XIX & XX	1	GE	1	-	25	25
		Skill Courses							
	Paper-XXII	DTTH-237	Introduction To Dairy Technology	4	CC	4	75	25	100
	Paper-XXIII	DTTH-238	Traditional Dairy Products	4	CC	4	75	25	100
	Paper-XXIV	DTTH-239	Dairy Chemistry	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-XXV	Practical Based on DTPR-237		2	PR	2	50	-	50
	Paper-XXVI	Practical Based on DTPR-238		2	PR	2	50	-	50
	Paper-XXVII	Practical Based on DTPR-239		2	PR	2	50	-	50
	Paper-XXVIII	Report on Summer Activity		-	PR	3	75	-	75

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. IV		**General Education Component**							
	Paper-XXIX	BAAGE -2410	Agriculture Extension	4	GE	4	75	25	100
	Paper-XXX	BAAGE -2411	Agriculture Business Management	4	GE	4	75	25	100
	Paper-XXXI	BAAGE -2412	*Activity based on Paper-XXIX &XXX	1	GE	1	-	25	25
		Skill Courses							
	Paper-XXXII	DTTH-2410	Ice-Cream and Fat Rich Dairy Products	4	CC	4	75	25	100
	Paper-XXXIII	DTTH-2411	Fermented Dairy Products	4	CC	4	75	25	100
	Paper-XXXIV	DTTH-2412	Dairy Microbiology	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-XXXV	Practical Based on DTPR-2410		3	PR	3	50	25	75
	Paper-XXXVI	Practical Based on DTPR-2411		3	PR	3	50	25	75
	Paper-XXXVII	Practical Based on DTPR-2412		3	PR	3	50	25	75
Summer	**Compulsory Activity: 2 Months Industrial Training during Summer Vacation**								

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credit	Marks		Total
							ESA	CIA	
Sem. V		**General Education Component**							
	Paper-XXXVIII	BAAGE -3513	Marketing Skill management.	4	GE	4	75	25	100
	Paper-XXXIX	BAAGE -3514	Climate Change and Agriculture	4	GE	4	75	25	100
	Paper-XXXX	BAAGE -3515	*Activity based on Paper-XXXVIII & XXXIX	1	GE	1	-	25	25
		Skill Courses							
	Paper-XXXXI	DTTH-3513	Processing of Condensed and Dried Milk Products	4	CC	4	75	25	100
	Paper-XXXXII	DTTH-3514	Food safety and Quality Assurance	4	CC	4	75	25	100
	Paper-XXXXIII	DTTH-3515	Dairy Process Engineering	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-XXXXIV	Practical Based on DTPR-3513		2	PR	2	50	-	50
	Paper-XXXXV	Practical Based on DTPR-2514		2	PR	2	50	-	50
	Paper-XXXXVI	Practical Based on DTPR-2515		2	PR	2	50	-	50
	Paper-XXXXVII	Report on Summer Activity		-	PR	3	75	-	75

	Paper No.	Course Number	Course Title	Hr/ Week	Type of Course	Credit	Marks		Total
							ESA	CIA	
Sem. VI	Paper-XXXXVIII		3 Months Industrial Training	-	CC	30	750		750
		Marks Distribution	Training completion, Certificate, seminar			20	500		500
			Report Writing			05	125		125
			Seminar and Viva-Voce			05	125		125

Note: 1. The ESA part of practical and Industrial Project should be completely assessed and evaluated by external examiner.

2. The external examiner should be appointed for practical and industrial training ESA part.

3. * Sign denotes that internal assessment should be based on seminar/Interview skill/expected component of the course.
4. Student should submit the Report based on summer industrial training.
5. For VI semester students can opt Elective-I or Elective-II pattern.
6. Student should submit the certificate of three months industrial training from respective industries.

ESA: End Semester Assessment,

CIA: Continues Internal Assessment,

GE: General Education Component,

CC: Core Skill Courses,

PR: Practical Skill Courses,

CIA of 25 Marks (Theory): 15 Marks for college level internal test & 10 Marks for Assignment,

CIA of 25 Marks (Practical): 15 Marks for college level internal practical test & 10 Marks for Record Book and Field Note Book submission.

Swami Ramanand Teerth Marathwada University, Nanded

Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-I: Communication Skills (BAAGE-111)

Maximum Marks: 100 **Credits: 4** **Periods: 45**

Unit I: Basic Grammar: (13 Periods)

Introduction, Grammar Word Classes (Open & Closed), Sentence – Kinds – Transformation, Phrase, Clause and its kinds, Simple, Complex & Compound sentences, (Only definitions & Structure), Tenses - Use of verbs in the Sentences

Unit II: Vocabulary: (10 Periods)

Morphology, Synonyms & Antonyms, One Word Substitution, Homophones & Homonyms

Unit III: Communication Skills: (10 Periods)

Definition & Types, Communication Cycle & Barriers, Principles for Effective Communication, Varieties in English (Indian, British & American).

Unit IV: Writing Skills: (12 Periods)

Letters (Formal & Informal), Report Writing (Scientific and Formal), Memorandum, Curriculum Vitae, Personal Employment Interview, Group Discussion. Phonetics: 44 sounds, consonants, vowels & Diphthongs, Transcription of words, Accent, Syllable cluster and Intonation.

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & Meera Banerji
2. A Practical English Grammar A.J. Thomson –Oxford
3. Mastering English Grammar – S.H.Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English -J.Sethi & P.V.Dhamija
7. Radiance-Tense

Swami Ramanand Teerth Marathwada University, Nanded

Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied Faculties)

First Year (Semester I)

Paper-II Basics of Computer (BAAGE-112)

Maximum Marks: 100 **Credits: 4** **Periods-45**

Unit I: Basics of Computer: (10 Periods)

Introduction to computer, Definition and Types. Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Unit II: Computer Operation: (13 Periods)

Operating Computer using GUI Based Operating System: What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows;

Unit III: MS-Office: (10 Periods)

Introduction to MS-Word: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document. MS- Excel, Power Point. Internet concept & definition, WWW, URL, http, Browsers, Search engines etc.

Unit IV: Computer Networking: (12 Periods)

Basic of Computer networks; LAN, MAN, WAN; Concept of Internet; Applications of Internet. Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

Reference Books:

1. Introduction of Computer Science- Pcushman & R. Mata Toledo, McGraw Hill
2. Computer fundamentals – P.K. Sinha – BPB New Delhi.
3. Microsoft Office – 2000Complete – BPB Practicals

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Dairy Technology

First Year (Semester I)

Paper-IV: Principles of Food Processing (DTTH-111)

Marks: **100** **Credits: 4** **Periods: 45**

Unit-I: Food processing principles: (10 Periods)

Introduction, sources of food, scope and benefit of industrial food preservation, perishable, non-perishable food, causes of food spoilage. Preservation by salt and sugar – Principle, method, equipment and effect on food quality

Unit-II: Thermal processing methods of preservation: (11 Periods)

Thermal processing methods of preservation – Principle and equipments: Canning, blanching, pasteurization, sterilization, evaporation, etc. Need and principle of concentration, methods of concentration, Thermal concentration, freeze concentration, membrane concentration, changes in food quality by concentration

Unit-III: Food preservation by use of low temperature: (13 Periods)

Food preservation by use of low temperature – principle, equipments and effect on quality, Chilling, cold storage, freezing etc.

Preservation by drying dehydration and concentration – principle, methods, equipment and effect on quality : Difference, importance of drying and dehydration over other methods of drying and dehydration, equipments and machineries, physical and chemical changes in food during drying and dehydration

Unit-IV: Preservation by radiation, chemicals and preservatives: (11 Periods)

Preservation by radiation, chemicals and preservatives: Definition, methods of irradiation, direct and indirect effect, measurement of radiation dose, dose distribution, effect on microorganisms. Deterioration of irradiated foods- physical, chemical and biological, effects on quality of foods. Preservation of foods by chemicals: antioxidants, mold inhibitors, antibodies, acidulants etc. Preservation by fermentation- Definition, advantages, disadvantages, types, equipments

Recent methods in preservation: pulsed electric field processing, high pressure processing, Processing using ultrasound, dielectric, Ohmic and infrared heating. Theory, equipments and effect on food quality.

Recommended Readings:

1. Food Processing and Preservation- Subbulaksmi G., and Udipi S.
2. Principles of Food Science- Vol. II- G. Borgstron, Mc. Millan Co. Ltd. London.

3. Principles of food preservation Part I& II- Owen R. Fenemma.
4. Food Science- Potter, CBS publishers.
5. Technology of Food Preservation - N.W. Desroiser and N.W. Desrosier

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Dairy Technology

First Year (Semester I)

Paper-V: FOOD CHEMISTRY (DTTH-112)

Marks: **100** **Credits: 4** **Periods: 45**

Unit-I Nature scope and development of food chemistry**:** (10 Periods)

Nature scope and development of food chemistry, role of food chemist. Moisturein foods, Role and type of water in foods, Functional properties of water, role of water in food spoilage and food safety, Water activity and sorption isotherm.

Unit-II: Carbohydrates : (11 Periods)

Classification and nomenclature of carbohydrates, Functional characteristics of different carbohydrates (sugar- water relationship, sweetness), Structure and function of carbohydrates: monosaccharide, oligosaccharide and polysaccharide, Browning Reactions .Enzymatic and non-enzymatic browning reaction, Millard--action, caramelization, method to control non enzymatic reaction;

Unit-III: Protein and Lipids in Food: (13 Periods)

Role of proteins in foods, Classification and structure of amino acids, essential amino acids, classification and structural organization of proteins-primary structure, secondary structure and tertiary structure, Physicochemical properties- ionic properties, protein denaturation, gelation and hydrolysis, Protein content and composition in various foods- cereal grains, legumes and oilseed proteins, proteins of meat, milk, egg and fish,

Lipids in Food:- Role and use of lipids /fat, occurrence, fat group classification, Physicochemical aspects of fatty acids in natural foods, hydrolysis, reversion ,polymorphism and its application, Chemical aspects of lipolysis, auto oxidation, antioxidants, Technology of fat and oil processing- Refining, Hydrogenations, Inter esterification

Unit-IV: Vitamin and Enzyme (11 Periods)

Definition of vitamin, type of vitamin, Water soluble (Vit B-1, B-2, B-3, C) and Fat soluble (Vit A, D, E, K)- their structure and functions.:

General properties of enzymes, enzyme action, classification andnomenclature of enzymes, coenzymes enzyme inhibition, isozymes, Carbohydrates (Amylases, celluloses, pectinases, vertases) Proteases, Lipasesand oxidases in food processing, Enzyme applications in food industry

Reference Books:

1. Principles of Biochemistry, 4th edition- David L, Nelson and M.M. Cox (2005) Maxmillan/Worth publishers/W.H. Freeman and Company- Lehninger
2. Biochemistry, 2nd edition- R.H. Garrett and C.M. Grisham (1999). Saunders college publishing N. Y. and Sons N.Y.
3. Fundamentals of Biochemistry, 2nd edition- Donald Voet, Judith G, Voet andCharlotte W. Pratt (2006), John Wiley and Sons, INC.
4. Biochemistry (2004) - J. David Rawn, Panima, Publishing Corporation, New Delhi.

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Dairy Technology

First Year (Semester I)

Paper-VI: FUNDAMENTALS OF MICROBIOLOGY (DTTH-113)

Marks: **100** **Credits: 4** **Periods: 45**

UNIT-I: History and Scope of Microbiology: (11 Periods)

History and Scope of Microbiology, Important contributions of various scientists, Scope of microbiology, Introduction to microorganisms - bacteria, algae, fungi, protozoa and viruses. Importance of bacteria ,yeast , and moulds in foods

UNIT-II: General Characteristics of Microorganisms: (12 Periods)
General Characteristics of Microorganisms, Structure of Prokaryotic and Eukaryotic cell, Morphology of bacteria: Size, Shape and Arrangements, Cytology of bacteria - structure & functions of cell wall, cell membrane, capsules & slime layer, flagella, Pilli, nuclear material, mesosome, ribosome and spores.

UNIT-III: Growth of microorganisms: (11 Periods)

Growth curve : physical and chemical factors influencing growth and destruction microorganisms,

UNIT-IV: Control of Microorganisms: (11 Periods)
Control of Microorganisms: Definitions of Sterilization, Disinfection, Antiseptic, Germicide, Microbiostasis, Antisepsis, Sanitization, Mode of action, application and advantages of: Physical agents, Chemical Agents , Gaseous Agents.

Preservation of microbial cultures

Reference Books:

1. Industrial Microbiology- CBS Publisher-Prescott Dunn,
2. Microbiology fundamentals and applications- Edition, 6. Publisher, Agrobios,2003. PurohitS.S.
3. Food Microbiology- A.S. M. press Washington-Doyle, Beuchatand Montville
4. Food Microbiology-Frazier W.C. and Westhoff D.C.1988.
5. Microbiology-Chapman& Hall, New York.
6. Essentials of the Microbiology of Foods -Mossel, D.A.A., Corry, E. L., Struijk, C. B., and Baird, R. M. 1995. John Wiley & Sons. New York,

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B. Voc. Dairy Technology

First Year (Semester I)

Paper-VII: Practical Based on Principles of Food Processing (DTPR-111)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	Demonstration of various machineries used in food processing.
2	Demonstration on effect of blanching on quality of foods.
3	Demonstration on canning and bottling of fruits and vegetables.
4	Production and preservation of food by high concentration of sugar i.e. preparation of jam/jelly
5	Production and preservation of food by using salt e.g. Pickle
6	Production and preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid
7	Production and preservation of food by using chemicals.
8	Production and preservation of coconut shreds using humectants.
9	Drying of fruit slices in cabinet drier
10	Demonstration on drying of green leafy vegetables
11	Osmotic dehydration of foods e.g. candy
12	Production and preservation of milk by condensation/concentration.
13	Demonstration of preserving foods under cold v/s freezing process.
14	Production and preservation of food by fermentation (Sauerkraut, idli, tempeh, curd, dhokla etc.)

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First Year (Semester I)

Paper-VIII: Practical Based on Food Chemistry (DTPR-112)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	To Study safety measures in laboratory
2	To Study preparation of various solutions
3	Determination of moisture in food sample.
4	Determination of protein in food sample.
5	Determination of ash/minerals in food sample.
6	Determination of crude fat in food sample.
7	Determination of acidity of food sample/beverages
8	Determination of pH of food samples
9	Determination of total, non-reducing and reducing sugars.
10	Determination of vitamin C content in food sample.
11	Determination of pigments in food sample.

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First Year (Semester I)

Paper-IX: Practical Based on Fundamentals of Microbiology (DTPR-113)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	Basic rules in microbiology laboratory
2	Introduction to microbiology laboratory
3	Study of Microscope
4	Cleaning and sterilization of glass wares
5	Preparation of nutrient agar media
6	Preparation of serial dilutions
7	Techniques of Inoculation
8	Staining methods
9	Pure culture techniques (Streak Plate/Pour)
10	Introduction to identification procedures
11	Growth Characteristics of Bacteria: Determination of microbial numbers, direct plate count, generation time
12	Factors Influencing growth, pH, temperature, growth curve for bacteria
13	Methods of microbial culture preservation (Bacteria and yeast)
14	Basic rules in microbiology laboratory

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Certificate, Diploma, Advanced Diploma and B.Voc Degree (Agriculture and Allied Faculties)

First Year (Semester II)

Paper-X: Personality Development (BAAGE-124)

Maximum Marks: 100 **Credits: 4** **Periods: 45**

UNIT-I: Personality Development: (Periods: 11)

Introduction to personality development: The concept personality- Dimensions of theories of Freud & Erickson- personality – significant of personality development. The concept of success and failure: What is success? - Hurdles in achieving success - Overcoming hurdles - Factors responsible for success, What is failure - Causes of failure. SWOT analyses.

UNIT-II: Attitude & motivation: (Periods:11)

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude - Advantages –Negative attitude - Disadvantages - Ways to develop positive attitude - Difference between personalities having positive and negative attitude. Concept of motivation - Significance - Internal and external motives - Importance of self-motivation- Factors leading to de-motivation

UNIT-III: Interpersonal Relationship: (Periods: 11)

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem – Low self-esteem - Symptoms - Personality having low self-esteem - Positive and negative self-esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviors - Lateral thinking.

UNIT-IV: Overall personality development: (Periods: 12)

Other aspects of personality development: Body language, Problem-solving, Conflict and Stress Management, Decision making skills, Leadership and qualities of a successful leader. Character building, Team-work, Time management, Work ethics, Good manners and etiquette. Employability quotient: Resume building, The art of participating in Group Discussion. Facing the Personal (HR & Technical) Interview.

Refrence Books:

1. "Personality Development and Soft Skills" by Barun Mitra
2. The Only Skill That Matters by Jonathan A. Levi
3. "Personality Development" by Swami Vivekananda

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First Year (Semester II)

Paper-XI: Environmental Study (BAAGE-125)

Maximum Marks: 100 **Credits: 4** **Periods: 45**

Unit-I: Ecosystems: (Periods: 11)

Introduction, Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs. Ecological pyramids: Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Aquatic ecosystems (ponds)

Unit-II: Biodiversity: (Periods: 11)

Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega diversity nation. biodiversity Hot-spots of India. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III: Environmental Biology: (Periods: 12)

Environmental Pollution; Introduction, Definition, Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution f. Thermal pollution g. nuclear hazards. Disaster Management; Natural disaster- Earthquake, Tsunami, Cyclone, Tornedo, Chemical Disaster- Bhopal Gas Tragedy, Nuclear Disaster- Chernobil.

Unit-IV: Natural Resources: (Periods: 11)

Renewable and Nonrenewable Resources; Solar Energy, Wind Energy. Forest Resources, Metal Mines, Crude Oil Mines. Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people. Environmental ethics. Population growth, Population explosion.

REFERENCES:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad —

380 013, India, Email: mapin@icenet.net (R)

3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill lnc.480p

4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

5. Cunningham, W. P. Cooper, T. H. Gorhani, E & Hepworth, M.T.2001. Environmental Encyclopedia, Jaico Publ. House. Mumbai, 1196p

6. Dc A.K., Environmental Chemistry, Wiley Eastern Ltd.

7. Down to Earth, Centre for Science and Environment(R)

8. Gleick, 11.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p

9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society , Bombay (R)

10. Heywood, VII & Watson, R.I. 1995 . Global Biodiversity Assessment. Cambridge Univ. Press 1140p. .

11. Jadhav & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.

12. Mckinncv, M.L. & Schoch. R.M. 1996. Environmental Science systems & Solutions. Web enhanced edition. 639p.

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B. Voc. Dairy Technology

First Year (Semester II)

Paper-XIII: Cereal Processing (DTTH-124)

Marks: **100** **Credits: 4** **Periods: 45**

Unit-I: Introduction to Cereal: (13 Period)

Present status and future prospects of cereals and millets; morphology: physicochemical properties; chemical composition and nutritive value

Unit-II: Rice Processing: (10 Period)

Rice: Paddy processing and rice milling: conventional milling, modern milling, milling operations, milling machines, milling efficiency, by-products of rice milling. Quality characteristics influencing final milled products. Parboiling: rice bran stabilization and its methods; aging of rice; enrichment – need, methods; processed foods from rice – breakfast cereals, flakes, puffing, canning and instant rice

Unit-III: Wheat, Corn Processing: (12 Period)

Wheat: break system, purification system and reduction system; extraction rate and its effect on flour composition; Quality characteristics of flour and their suitability for baking. Corn: Corn milling – dry and wet milling, starch and gluten separation, milling fractions and modified starches. Barley: Malting and milling

Unit-IV: Sorghum and Millets Processing: (10 Period)

Sorghum: milling, Malting, Pearling and industrial utilization Millets: Importance of Millet, composition, processing of millets for food uses, major and minor millets Products and By-product of cereal

Millets: infant foods from cereals and millets, breakfast cereal foods – flaked, puffed, expanded, extruded and shredded products, etc

Text Books:

1. Reference Books
2. Technology of cereals - Kent
3. Hand Book of cereal science and technology- O.R. Fennema, Markus Karel

4. PHT of cereals, pulses, oilseeds- A. Chakrawarthy
5. Utilization of Rice- Luh.

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B. Voc. Dairy Technology

First Year (Semester II)

Paper-XIV: Confectionery Technology (DTTH-125)

Marks: **100** **Credits: 4** **Periods: 45**

Unit-I: Introduction of confectionery: (10 Period)

History, Traditional confectionary goods, Types of confectionary, classification of confectionery products raw materials/ ingredients-Sugar, Sugar qualities, physical, chemical, Optical properties. sugar grinding, Dextrose, Fructose, Lactose, caramel, maltose, Honey, sorbitol, xylitol, Iso-malt, soy maltose, Poly-dextrose, Mannitol. Whipping, Release agent, thickeners, Acidulents, Milk and Milk Products, Flavours for confectionery, emulsifiers and other additives, Starch derivatives, colours used in confectionary. Production of glucose syrup, Acid hydrolysis, enzyme hydrolysis

Unit-II: Cocoa Processing: (12 Period)

Cocoa processing: Cocoa bean, processing, roasting, Fermentation, production of Cocoa butter Cocoa powder, its quality. Chocolate Processing: Ingredients, mixing, refining, Cinching, Tempering, Molding, Cooling, Coating, Fat bloom

Unit-III: High Boiled Sweets: (10 Period)

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,.

Unit-IV: Toffee Tablets Processing: (13 Period)

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, Industrial production, checklist of faults and remedy.

Tablets: Definitions, recipe, composition, wet granulation, Slugging, Manufacture of Tablet, and Checklist of tablet faults. Marshmallow and. Nougat: Definition, composition, recipe, and method of manufacture. Nougat

Reference Books;

Sugar Confectionary and Chocolate Manufacture - R. Less and E.B. Jackson

Industrial Chocolate Manufactory and Use- S.T. Beekelt

Chocolate, Cocoa& Confectionary Sci. & Tech. - Bernared W. Minifie

Basic Baking- S.C. Dube

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B. Voc. Dairy Technology

First Year (Semester II)

Paper-XV: Introduction to Food Microbiology (DTTH-126)

Marks: **100** **Credits: 4** **Periods: 45**

Unit-I: Introduction of microbiology: (11 Period)

Introduction of microbiology, History and significance of food microbiology. Classification of microbes, Structure of microbes, Metabolism of microbes.

Unit-II: Environmental and food microbiology: (12 Periods)

Environmental microbiology: microbiology of air, soil, and water

Food contamination and public health: food poisoning

Unit-III: Food microbiology and spoilage: (11 Period)

Food microbiology and spoilage of fruits and vegetables, milk and milk products, cereals and cereal products. Industrial microbiology: Industrial application of microbes

Unit-IV: Thermal inactivation of microbes: (11 Period)

Thermal inactivation of microbes: pasteurization, sterilization etc. concept of TDT, F, Z and D values. Factors affecting heat resistance. Antimicrobial agents: mechanism and action

Reference Books:

Food microbiology by V. Ramesh, MJP publishing.

Food microbiology by W.C. Frazier, Ist Edition by Mcgraw Hill Pub. Co. New York.

Modern Food Microbiology, J.M. Jay. CBS publisher.

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B. Voc. Dairy Technology

First Year (Semester II)

Paper-XVI: Practical Based on Cereal Processing (DTPR-124)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	Determination of physical properties of cereal grains
2	Determination of chemical properties of cereal grains
3	Determination of ash content of cereal grains
4	Determination of moisture content of cereal grains
5	Determination of crude protein content of cereals
6	Determination of fat content of cereal grain
7	Studies on cooking quality of cereals;
8	Preparation of malt;
9	Value added products from cereals and millets
10	Production of modified starch
11	Preparation of different cereal products(Puffed rice)
12	Preparation of different rice products (Idli)

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First Year (Semester II)

Paper-XVII: Practical Based on Confectionery Technology (DTPR-125)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	Production of invert sugar
2	Preparation of high boiled sweets;
3	Preparation of Toffee
4	Preparation of Groundnut Chikki
5	Preparation of decorative cake
6	Preparation of Chocolate
7	Preparation of traditional ; Indian Confection;
8	Preparation of shrikhandwadi
9	Preparation of milk chocolate
10	Preparation fruit toffee
11	Preparation of flour based confectionery
12	Preparation of milk cake
13	Preparation of petha
14	Preparation of fruit candy
15	Preparation of rasogolla
16	Visit to Confectionary Industry

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B. Voc. Dairy Technology

First Year (Semester II)

Paper-XVIII: Practical Based on Introduction to Food Microbiology

(DTPR-126)

Marks: **75** **Credits: 3**

Pr. No.	Practical Title
1	An introduction to microbiology, aseptic technique and safety.
2	Preparation of culture media.
3	To sterilize the media and equipment.
4	To prepare serial dilutions.
5	Plating techniques
6	Culturing the bacteria on a solid media by using serial dilution method and determining the number of viable cells in the culture (standard plate count).
7	Introduction to microscopy and to study cell morphology with simple staining.
8	To study cell morphology and cell arrangement with negative stain.
9	To stain bacteria with gram stain.
10	To stain bacterial cells by wet-mount technique to check the mobility (flagellin) in bacterial cell.
11	To stain bacterial cells with malachite green stain to check the presence of endospore.
12	Isolation of mold from foods.
13	Microbial examination of cereal and cereal products
14	Microbial examination of fruits and vegetable products
15	Microbial examination of milk

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Choice Based Credit System (CBCS) (Semester Pattern)

Theory Examination

Question Paper Pattern (B.Voc.)

Dairy Technology

Maximum Marks: 75 **Time: 3.00 Hrs**

Q1. Long Answer Type Question ..... (15 Marks).

OR

(a) Short Answer Type Question..... (8 Marks)

(b) Short Answer Type Question..... (7 Marks).

Q2. Long Answer Type Question ..... (15 Marks).

OR

(a) Short Answer Type Question..... (8 Marks)

(b) Short Answer Type Question..... (7 Marks).

Q3. Long Answer Type Question ..... (15 Marks).

OR

(a) Short Answer Type Question..... (8 Marks)

(b) Short Answer Type Question..... (7 Marks).

Q4. Long Answer Type Question ..... (15 Marks).

OR

(a) Short Answer Type Question..... (8 Marks)

(b) Short Answer Type Question..... (7 Marks).

Q5. Write a short note on (**Any three** of following); (15 Marks)

(a) .....(5 Marks)

(b) (5 Marks)

(c) (5 Marks)

(d) (5 Marks)

(e) (5 Marks).

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Choice Based Credit System (CBCS) (Semester Pattern)

Practical Examination

Question Paper Pattern (B.Voc.)

Maximum Marks: 50 **Time: 4.00 Hrs**

Q1. Perform the Major Experiment .....(20 Marks).

Q2. (a) Perform the Minor Experiment.....(10 Marks).

(b) Describe procedure and working of the Minor Experiment..... (10 Marks).

Q3. (a) Viva -voce .....(5 Marks).

(b) Submission of Field Collection and Samplings during Field Visits and Excursions ..... (5 Marks).

Dr.S.N.Landge

Chairman

(B.Voc Animal Husbandry And Dairy Science