

UNIVERSITY OF MUMBAI
No.UG / 159 of 2008

CIRCULAR :-

A reference is invited to the scheme of papers at the B. Sc. degree course vide this office Circular No. UG/ 66 of 2002 dated 31st January, 2002 and the Principals of the affiliated colleges in Science are hereby informed that the recommendation made by the Board of Studies in Microbiology at its meeting held on 8th January, 2008 has been accepted by the Academic Council at its meeting held on 27th February, 2008 vide item No. 4.19 and that, in accordance therewith, the syllabus in the Subject of Food Production and Food Processing (Applied Component) at the T.Y.B.Sc. examination has been revised as per Appendix and that the same will be brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032
16th April, 2008.

for I/c REGISTER

To,

The Principal of the affiliated colleges in Science.

A.C./4.19/27.02.2008

No.UG/159-/ of 2008,

MUMBAI-400 032

16th April, 2008

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Science.
- 2) The Chairperson, Board of Studies in Microbiology.
- 3) The Controller of Examinations,
- 4) The Co-Ordinator, University Computerization Centre,

for I/c. REGISTRAR

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO) the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the subject adopted by the Academic Council referred to in the above Circular and that, no separate

UNIVERSITY OF MUMBAI



Revised Syllabus

For the
Food Production and Food Processing
(Applied Component Subject)

at the
T.Y.B.Sc. examination

(With effect from the academic year 2008-2009)

T.Y.B.Sc (Applied Component Subject) Food Production and Food Processing

(Revised Syllabus w.e.f. 2008-2009)

	Paper I: Food Production	No. of Lect.
Unit 1	Food Science and Nutrition	15
Unit 2	Traditional Production Methods	15
Unit 3	Modern Methods of Food Production	15
Unit 4	Production of Fermented Foods and Beverages, Nutraceuticals	15
	Paper II : Food Processing	
Unit 1	Principles of Processing of Foods	15
Unit 2	Principles and Methods of Food Preservation	15
Unit 3	Food Safety and Quality Assurance	15
Unit 4	Food Packaging and Marketing	15

- Each paper shall have four periods per week.
- Each practical shall be of four periods per week.
- Each Theory Paper shall be assessed for 60 marks at the annual examination
- Practicals based on each Paper shall be assessed for 40 marks at the annual examination
- A 5-6 pages Written Report on A Commercial/Home-made Food Product with its production/processing method, analysis of the physical, sensory and microbiological characteristics and comments on its safety for human consumption shall be included in the Practical Journal. The same shall be evaluated for 10 marks at the annual University Practical examination.

Paper I

Food Production

Objectives: To develop 1) an understanding of the significance of various foods in human nutrition, and 2) an awareness of food production technology

Unit-1: Food Science and Nutrition

15 lectures

- 1.1. Chemical nature, source and functions of nutrients (5)
Examples: Protein, carbohydrates, fats, minerals, vitamins, water, fibre, antioxidants, phytochemicals.
- 1.2. Food Additives – Intentional/unintentional, general (3)
Examples: Antioxidants, chelating agents, colouring agents, emulsions, flavours and flavour enhancers, flour improvers, humectants, and anticaking agents, leavening agents, nutrient supplements, nonnutritive sweeteners, pH controlling agents.
- 1.3. Energy value of foods (2)
Methods of measurement of energy, value of nutrients – direct and indirect
Basal metabolic rate – measurement and factors affecting BMR
- 1.4. Adequate diet: Food guide (2)
- 1.5. Nutritional disorders due to deficiency and excess of nutrients (3)
Vitamin deficiency – Pernicious anemia, scurvy, night blindness, rickets
Protein deficiency – kwashiorkor
Mineral deficiency – due to iron, iodine, calcium

Unit-2: Traditional Production Methods

15 lectures

- 2.1. Animal Food Production (5)
- Dairy farm management
- Poultry farm management
- Animal breeding
- 2.2. Methods of Plantation (4)
- crop rotation
- farming practices
- methods of irrigation
- fertilizers – chemical and microbial
- insecticides – chemical and microbial
- organic farming
- plant breeding technique
- 2.3. Aquaculture (2)
- General principles
- Prawn and oyster farming
- 2.4. Foods of Microbial Origin (4)
- Mushroom – Agaricus and Pleurotus
- SCP – fungal, algal, bacterial.

Unit-3: Modern Methods of Food Production

15 lectures

3.1..General Methodology of Genetic Engineering

(1)

3.2..Applications of Genetic Engineering

(8)

- modification of plant nutritional content
- modification of plant – taste and appearance
- plant yield
- fruit ripening
- edible vaccines

3.3..Plant Tissue Culture

(2)

3.4..Transgenic Animals

(2)

3.5..Nanotechnology

(2)

Unit-4: Production of Fermented Foods and Beverages, 15 lectures

Nutraceuticals

(3)

4.1.. Beverages: wine and beer

(2)

4.2.. Milk Products: cheese (cheddar, camembert), yoghurt

(2)

4.3.. Animal products: Fermented Sausages

(2)

4.4.. Plant products: Idli

(2)

4.5.. Fermented Soyabean Products – miso, tofu, soy sauce

(2)

4.6.. Nutraceuticals

(2)

4.7.. Probiotic Foods

Practicals based on Paper I

- 1) Estimation of carbohydrate from milk
- 2) Estimation of protein in milk
- 3) Estimation of protein from soybean flour and gram flour
- 4) Plant tissue culture preparation
- 5) Demonstration: a) Effect of growth promoting substances on plant growth
b) Mushroom cultivation
- 6) Planning of a diet : Report of 2 pages
- 7) Estimation of Vitamin C from lemon juice
- 8) Determination of iodine number
- 9) Study of microbial fermentation of idli batter – DMC, SPC, LAB count, titrable acidity (at 2hrs and 8hrs of incubation)

Text books:

- 1) Glick and Pasternak 3rd Edition. ASM Press. Molecular Biotechnology: Principles and Applications of Recombinant DNA –
- 2) S.K. Kulkarni. Nanotechnology: Principles and Practices. Capital Publishing Co.
- 3) Sawhney S.K. and R. Singh 2005 Introductory Practical Biochemistry. Narosa Pub House Pvt. Ltd.
- 4) Mudambi R. and M. V. Rajagopal 2001- Fundamentals of Food and Nutrition 4th edn New Age International Ltd Publication .
- 5) Swaminathan M. Principles of Nutrition and Dietetics 2nd edn
- 6) Banerji G. C. 1998 ..8th edn ..a Textbook of Animal Husbandry

References :

- 1) Modern Food Science Journal 2007
- 2) The Hindu Survey of Indian Agriculture 2007

Paper II

Food Processing

Objectives: To develop an awareness of the role of a microbiologist/biotechnologist in the food processing industry for preservation of food and for maintaining hygienic quality of processed foods.

Unit-1: Principles of Processing of Foods

15 lectures

I.1..Processing of cereal grains

- milling, parboiling, flakes, puffs
- malting, starch extraction, gluten extraction
- pasta products

(5)

I.2..Processing of fruits and vegetables

- jams, jellies, squash
- ketchup, pickles, sauce

(3)

I.3..Processing of pulses

- soya chunks

I.4..Processing of oilseeds (extraction of oil)

(1)

I.5 Probiotics, Prebiotics, synbiotic foods

(1)

I.5..Processing of meat, fish, eggs

(3)

- aging, tenderizing, curing
- fish processing
- egg protein, egg foam

I.6..Effect of Processing on Nutritive Value of Foods

(2)

- newer methods of food processing: Microwave, high pressure, Ohmic heating, radiation sterilization, minimally processed foods

Unit-2: Principles and Methods of Food Preservation

15 lectures

2.1.. Physical Methods

(5)

- blanching, pasteurization, canning
- chilling, freezing
- irradiation
- dehydration

2.2..Chemical Methods

(5)

- salt, sugar
- Na benzoate, metabisulphite
- citrate, acetate

2.3..Emerging Preservation Technologies

(5)

- natural antimicrobials, hydrostatic pressure, electric pulse, light pulse, high magnetic pulse

Unit-3: Food Safety and Quality Assurance

15 lectures

3.1..Principles of food spoilage

(3)

- physical, chemical
- microbial

3.2..Food Hazards

(3)

- microbial ---bacterial, fungal, protozoal, viral, emerging food pathogens
- non microbial ---adulteration, natural, artificial colouring agents, Metals, etc.

3.3..Food Analysis (3)
Sensory, chemical, microbiological, rapid detection methods.
CDC Programs—PulseNet, FoodNet.

3.4..Safe Process design and operation (4)
- GMP, HACCP, food hygiene and sanitation, risk assessment
- flow sheets

3.5..Food Standards and Laws (2)
-national, international legislation and agencies
governing food and its quality

Unit-4: Food Packaging and Marketing

15 lectures

- 4.1.. Functions of packaging (2)
- 4.2..Types of packages (2)
- 4.3.. Types of packaging material (3)
- 4.4.. Labeling, printing (2)
- 4.5.. Food and food packaging interaction (2)
- 4.6.. Shelf-life testing (2)
- 4.7.. Transportation and storage (2)

Practicals based on Paper II

- (1) Preparation of ketchup
- (2) Preparation of jam
- (3) MIC of salt/sugar/other preservative
- (4) Detection of spoilage causing organisms
- (5) Food adulteration
- (6) RPT of milk
- (7) Types of packaging
- (8) Testing of packaging material
- (9) Study of Probiotic food sample.

Text books:

- 1) Van Garde S. J. and M. Woodburn 1999...Food Preservation and Safety-Principles and Practice. Surabhi Publications
- 2) Manay N.S. and Shadasaraswamy 2001. Foods-Facts and Principles. New Age International (P) Ltd, 2nd edn.
- 3) Sivashankar B. 2002-Food Processing and Preservation. Prentice Hall of India Pvt Ltd.
- 4) Clive de Blackburn and Peter Mc Clure..Food borne Pathogens. (Hazards, risk analysis and control)..CRC Wood Publishing Ltd.

References :

- 1)Indian Food Industry AFST Journal(s) 2007
- 2)The Hindu Survey of Indian Agriculture 2007

T.Y.B.Sc Applied Component Food Production and Food Processing

ANNUAL PRACTICAL EXAMINATION ASSESSMENT PATTERN

PARTICULARS	PRACTICAL 1	PRACTICAL 2
<i>Colorimetric/Titrimetric problem</i>	20 marks	15 marks
<i>Practical Journal Recording</i>	----	10 marks
<i>Rapid Platform Test</i>	5marks	-----
<i>Food Adulteration</i>	5marks	-----
<i>Spots</i>	----	10 marks
<i>Report Writing</i>	10 marks	
<i>Total marks</i>	40 MARKS	40 MARKS
<i>GRAND TOTAL</i>	80 MARKS	

ANNUAL THEORY EXAMINATION ASSESSMENT PATTERN

1. Every Paper will have 5 questions of 12 marks each (total 60 marks).
2. 4 questions will be from each of the 4 units in curriculum. There shall be internal choice as per UGC guidelines.
3. Fifth question shall comprise of any one essay or any three notes/short questions from any of the units.
