

**SOPHIA COLLEGE
AUTONOMOUS**

affiliated to
University of Mumbai

**Proposed Syllabus for
Program: B.Sc.**

Class: T.Y.B.Sc.

Course: Applied component

**FOOD PRODUCTION AND
PROCESSING**

(SBSAPC503/603)

**To be Implemented from
Year 2020-21**

Programme: B.Sc
Course : Applied Component
(Semester –V & VI)
PREAMBLE

Applied Component was introduced by the University of Mumbai for the T.Y.B.Sc class in the academic year 1979-80 with a view to enhance essence for employability of the graduates of the University. Several combinations of Applied component subjects are available with Microbiology as a major course in the University of Mumbai. **Under autonomy** Sophia college students choosing to study Microbiology (both 6 units and 3 units) at T.Y.B.Sc level are offered **Food Production and Processing** as the applied component subject.

In the syllabus of this applied component, **Food Production and Processing**, applied topics having commercial importance have been incorporated which further adds to the enhancement of entrepreneurial potential and skills amongst the learners.

As mentioned in the outline of the syllabus, each semester (Semester –V & VI) consists of one theory and one practical course of 100 marks each.

T. Y. B.Sc.

Applied Component: Food Production & Processing Course code SBSAPC503/603

SEMESTER V

COURSE CODE	UNIT	TOPICS	CREDITS	LEC /WEEK
SBSAPC503		FOOD PRODUCTION AND PROCESSING (General Principles)	2	4
	I	Food Science and Nutrition		1
	II	Traditional Methods of Food Production		1
	III	Basic Principles of Food Processing		1
	IV	Food Spoilage and Food Preservation		1
SBSAPCP503		Practicals based on above course in theory	2	4

LEARNING OBJECTIVES:

Topics included in this semester aim

- to revise knowledge on nutritional values of food with respect to their impact on human health.
- to acquaint students with importance of balanced diet.
- to give the students an overview of traditional methods of producing food.
- To give an insight into processing of basic foods.
- to familiarize them with basic principles of food spoilage.
- To equip them with various methods of preservation of foods.

LEARNING OUTCOME:

- The students will acquire knowledge with respect to nutritional requirements of Humans.
- They will learn the basic principles of balanced diet and will be able to plan a balanced meal .
Students will understand the disorders caused by nutritional deficiencies.
- They will gain comprehensive account of production of traditional foods.
- Students will be acquainted with various techniques of processing of plant and animal based foods.
- Students will learn identify the type and cause of food spoilage and
- It will help to choose /devise appropriate preservation methods to prevent the food losses due to spoilage.
- Students will become competent for various post graduate courses in food science technology, which will enhance their chances to be employed in food industry.

SEMESTER VI

COURSE CODE	UNIT	TOPICS	CREDITS	LEC / WEEK
SBSAPC603		Food Production and Processing (Advanced methods, Applications and Quality Assurance)	2	4
	I	Advanced Methods of Food production		1
	II	Contemporary and functional foods		1
	III	Food Safety and Quality Assurance		1
	IV	Food Packaging		1
SBSAPCP603		Practicals based on above course in theory	2	4

LEARNING OBJECTIVES:

Topics included in this semester aim

- To impart knowledge on recent trends in food production
- To familiarize learners with the use of genetic engineering techniques in plant and animal-based food production.
- To introduce the concept of functional foods and their health benefits.
- To create awareness about microbial and nonmicrobial food hazards .
- To highlight the significance of contemporary laws and standards related to food safety and quality.
- To give them comprehensive account of food packaging and the importance of food package labeling.

LEARNING OUTCOME:

- Students will be trained to understand the role and responsibilities of food analysts and food safety officers.
- This will also help to provide clarity on various subjects related to food safety
- They will be skilled to respond to issues related to food safety emergencies. They will become competent to use FSSAI guidelines.
- The students will also acquire knowledge about implementing HACCP system in food industry
- The learner will be able to select suitable packaging material to according to the food item.
- It will also help them comprehend details mentioned on food packages.

**T. Y. B.Sc. APPLIED COMPONENT Syllabus
(Food Production & Processing)
To be implemented from the Academic year 2020-2021**

SEMESTER V

COURSE CODE	UNIT	TOPICS	LECTURES /TOPIC	CREDITS	LEC / SEM
SBSAPC503		FOOD PRODUCTION AND PROCESSING (General Principles)		2	(60 lect
	I	1.Food Science and Nutrition			15 lectures
		1.1 Source and Functions of Nutrients. :Proteins, Carbohydrates, Fats, Minerals, Vitamins, Water, Fibres, Antioxidants and phytochemicals	4		
		1.2 Nutritional Disorders due to deficiency and excess of nutrients. 1.3 Vitamin deficiency- pernicious anemia, scurvy, night blindness, rickets. Protein deficiency : Kwashiorkar, Mineral deficiency due to iron, iodine and calcium.	4		
		1.4 Energy Value of Foods. Methods of measurement of energy, value of nutrients – direct and indirect, basal metabolic rate – measurement and factors affecting BMR.	2		
		1.5 Balanced Diet : food guide	2		
		1.6 Effect of processing on nutritive value of food Food additives (examples of Anti-caking agents Antioxidants, Emulsifiers , Colours, Humectants, Flavours, Flavour enhancers , Thickeners, Stabilisers, Glazing agent, Gelling agents, Raising agents) , ill effects of food additives	3		
	II	Traditional Methods of Food Production			15 lectures
		2.1 Overview of Agricultural Methods– Crop rotation, Farming practices, methods of irrigation, Plant breeding techniques	4		
		2.2 fertilizers and Insecticides - chemicals and microbial, Organic farming.	2		
		2.3. Animal Food Production – Overview of Dairy farm management and Animal breeding, Poultry farm management	3		
		2.4. Aquaculture – General Principles	1		
		2.5 Production of Fermented foods: Idli , Bread, Alcoholic beverages	5		

		(Champagne), cheese (Swiss), Soysauce			
	III	Basic Principles of Foods Processing			15 Lectures
		3.1 Processing of cereal grains- Rice : milling, parboiling, flakes, puffs. Wheat : Pasta products.	3		
		3.2 Processing of Fruits and vegetables.- Jams, Ketchup	2		
		3.3 Processing of Coffee , Tea, Coca	3		
		3.4 Oil extraction from seeds, refining, hydrogenated oils	2		
		3.5. Milk processing: Production of butter	1		
		3.6 Processing of Eggs: mayonnaise	1		
		3.7 Newer Techniques of food processing: Microwave Processing , Ohmic heating, Minimal Processing of Fruits and Vegetable	3		
	IV	Food spoilage and Food Preservation			15 Lectures
		4.1 Principles of food spoilage: Types and causes -Physical, Chemical and Microbial spoilage -Overview of factors affecting shelf life of food	4		
		4.2 Physical Method of food preservation :Principle and applications- High temperature-Blanching, Pasteurization, Canning low temperature- Refrigeration, Freezing Dehydration, Freeze drying	5		
		4.3 Chemical Methods of food preservation :Principle and applications– Inorganic and organic chemical preservatives	3		
		4.4 Emerging Preservation Technologies- Irradiation, High hydrostatic pressure, electric pulse, light pulse, Natural antimicrobials.	3		

Practicals -

SBSAPCP503	Practicals based on above courses in theory 1. Estimation of lactose content of milk. 2. Estimation of Proteins content of milk 3. Determination of Iodine number of fat 4. Estimation of Vitamin C content of fruits 5. Study of Microbial fermentation of Idli batter : DMC, LAB count, Titrable acidity 6. Demonstration of Effect of growth promoting substances on plant growth 7. Detection of organisms causing spoilage of vegetables/fruits/eggs. 8. Determination of TDP and TDT value for spoilage bacteria. 9. MIC of chemical preservatives (benzoate/metabisulphite). 10. Preparation of Ketchup/ Preparation of Jam. 11. Assignment: A) Balanced diet for specific group B) Report on food additives/preservatives present in any one commercial product and their effect on human health. (5+5=10 marks in practical exam)	2	60 Lec / Sem
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SEMESTER VI

COURSE CODE	UNIT	TOPICS	LECTURES /TOPIC	CREDITS	LEC /SEM
SBSAPC 603		FOOD PRODUCTION AND PROCESSING (Advanced methods, Applications and Quality Assurance)		2	60 Lect
	I	Advanced Methods of Food Production			15 Lectures
		1.1 Plant Tissue Culture : methods and applications in agriculture	2		
		1.2 Genetic Engineering :General Methodology	1		
		1.3 Applications of Genetic Engineering in agriculture– Modification of plant nutritional content, modification of plant taste and appearance.- plant yield, fruit ripening, GM Foods: Brinjal, Tomato, golden rice -Edible vaccines	4		
		1.4 Transgenic livestock for enhanced nutrition and food production	2		
		1.5 Foods of Microbial origin: Mushroom production ,SCP, Spirulina	4		
		1.6 Applications of Nanobiotechnology -Use of nanoparticles for delivery of bioactive constituents, nanoencapsulation	2		
	II	Contemporary and Functional foods			15 Lectures
		2.1 Beverages : Sports and energy drinks	2		
		2.2 Milk products : Frozen desserts	1		
		2.3 Animal Products : Meat processing & Ready to eat products (sausages/ salami)	2		
		2.4 Breakfast Cereals, Pulses – Soya chunks	2		
		2.5 Functional Foods and their bioactive constituents- Green tea, Dark chocolates, Flax seeds, Fish oils, Rice bran oil	4		
		2.6 Prebiotics and Probiotics	2		
		2.7 Artificial sweeteners, Gluten free and lactose free formula diet	2		
	III	Food Safety and Quality Assurance	5		15 Lectures
		3.1 Food Hazards: Microbial – bacterial, fungal, protozoal, viral, emerging food pathogens. CDC programs – PulseNet, FoodNet.			
		3.2 Food hazards: Nonmicrobial- Intentional, Incidental adulteration, PFA act	3		
		3.3 Food analysis – Sensory analysis, microbiological, rapid detection methods, Sampling plans	4		

		3.4. Safe Process Design and Operation – HACCP	1		
		3.5 Food Standards and Laws- National, International legislation and agencies governing food and its quality . ISI, AGMARK, FSSAI, ICMSF, Codex Alimentarius, ISO22000	2		
	IV	Food Packaging			15 Lectures
		4.1 Functions and Requirements of Food Packaging	2		
		4.2. Types and forms of Packages	2		
		4.3 Types of Food Packaging materials	4		
		4.4 Food package labeling : types and significance	3		
		4.5 Package testing parameters	3		
		4.6 Special feature / Innovative packages	1		

Practicals -

SBSAPCP603	Practicals based on above courses in theory. <ol style="list-style-type: none"> 1. Estimation of Protein content of SCP 2. Estimation of antioxidants by phosphomolybdate method 3. Mushroom cultivation 4. Isolation of Probiotic microorganisms in commercial food samples. 5. Microbiological analysis of icecream/kulfi (as per standards) 6. RPT for milk 7. Detection of Food adulteration 8. Types of Packages 9. Testing of packaging material 10. Detection of organisms responsible for food infection /intoxication from raw foods (Project work: 10 marks for report in practical exam) 11. Visit to Plant Tissue Culture centre 	2	60 Lec/Sem
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References

Course: SBSAPC503

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3. Manay N. S. and Shadasaraswamy, 2008, **Foods –facts and principles**, 3rd Edn. New Age International Pvt Ltd.
4. Shivshankar B, 2005, **Food Processing and Preservation**, Eastern Economy Edn. Prentice Hall of India Pvt. Ltd.
5. Shrilaxmi B, 2003, **Food Science**, 3rd Edn. New Age International Publishers.
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7. Success Story on Bt Brinjal in Bangladesh. September 2018 Published by: Asia-Pacific Association of Agricultural Research Institution (APAARI) Under the: Food and Agriculture Organization of the United Nation (FAO)
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Read more: <http://www.madehow.com/Volume-3/Cereal.html#ixzz6LkjdosmI>
12. Singanusong R. and Garba U., Rice Bran and Rice Bran Oil, 1st edition, Editors: Ling Xin and Cheong Xuebing Xu, Paperback ISBN: 9780128128282, eBook ISBN: 9780128128299 Academic Press and AOCS Press January 18, 2019

Additional References

1. Indian Food Industry Mag. Volume 34 No.6 Nov-Dec 2015 (Novel Technologies for Food Preservation)
2. FSSAI Manuals and booklets : <https://fssai.gov.in/creativecatalogue/display?dispalyTypeId=3>
 - The Purple book- Diet and diseases
 - Food safety Magic Box
 - DART
 - Food Safety on Wheels : Operational manual
 - Guidance Document On Food Safety Management Systems: HACCP implementation
3. FSSAI video library: <https://fssai.gov.in/fssaivideolibrary/allepisodeList?seriesId=16>
 - Introductory Course in Food Safety and Nutrition
 - Basic Course in Food and Nutrition
 - Advance Course in Food and Nutrition
 - Detect Adulteration through Rapid Testing
4. CDC website: <https://www.cdc.gov>

Modality of Assessment : Theory

Examination Pattern:

A) Internal Assessment - 25% 25 marks.

Theory

25 marks

Sr No .	Evaluation type	Marks
1	One class Test (multiple choice questions / objective)	20
2	Active participation in routine class instructional deliveries (seminars/presentation)	05

B) External examination - 75 %

Semester End Theory Assessment - 75%

75 marks

- i. Duration - These examinations shall be of two and half hours duration.
- ii. Theory question paper pattern :-
 1. There shall be **Five** questions each of **15** marks. On each unit there will be one question & fifth one will be based on all the four units.
 2. All questions shall be compulsory with internal choice within the questions.
 3. Each question may be sub divided into sub questions and the allocation of marks depends on the weightage of the topic.

Practical Examination Pattern: SBSAPCP503 and SBSAPCP503

(A) Internal Examination:-

There will not be any internal examination/ evaluation for practicals.

(B) External (Semester end practical examination) :- 100 marks each semester

Sr.No.	Particulars	Marks
1.	Laboratory work	60 (25+20+15)
2.	Journal	10
3.	Viva	10
4.	Quiz/spots	10
5.	Project work and report / Assignment	10

In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from the Head of the Department/ Co-ordinator of the department ; failing which the student will not be allowed to appear for the practical examination.