

UNIVERSITY OF MUMBAI



Syllabus for the T.Y.B.Sc. (APPLIED COMPONENT)

Program: B.Sc.

**Course: Food Production and Processing
(USACFP)**

(Credit Based Semester and Grading System with
effect from the academic year 2013–2014)

Programme: B.Sc

Course : Applied Component(USAC)

(Semester –V & VI)

PREAMBLE

Applied Component was introduced for T.Y.B.Sc. class in the academic year 1979-80 with a view to enhance essence for employability. There are several combinations of Applied component courses with Microbiology as a Major Course. The three applied component courses under the umbrella of BOS in Microbiology are-

- i. Biotechnology (USACBT)**
- ii. Food Production and Processing (USACFP)**
- iii. Medical Laboratory Technology (USACMT)**

In the syllabi of these applied components, applied topics having commercial propositions have been incorporated that further adds to the enhancement of entrepreneurial potential and skills amongst the learners.

From the academic year 2011-12, the University has introduced Credit Based Semester and Grading System (CBSGS) with continuous evaluation involving Internal Assessment and External Assessment. Accordingly the existing syllabi of these applied components have been restructured to fit into the CBSGS pattern. Sub-committees were formed with Dr. D.B.Thakare as the convener, BOS members as co-conveners and Head/ Senior teachers from affiliated colleges as members of these sub-committees.

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.
Food Production & Processing (Applied Component)
Course code - USACFP
SEMESTER V

Course Code	UNIT	TOPICS	Credits	Lec / Week
USACFP501		FOOD PRODUCTION AND PROCESSING (General Principles)	2	
	I	Food Science and Nutrition		1
	II	Traditional Production Method		1
	III	Principles of Food Processing		1
	IV	Principles and Methods of Food Preservation		1
USACFP5P1		Practicals based on above course in theory	2	4

SEMESTER VI

Course Code	UNIT	TOPICS	Credits	Lec / Week
USACFP601		Food Production and Processing (Applications and Q.A)	2	
	I	Modern Methods of Food production		1
	II	Production of Fermented Food and Beverages		1
	III	Food Safety and Quality Assurance		1
	IV	Food Packaging and Marketing		1
USACFP6P1		Practicals based on above course in theory	2	4

T. Y. B.Sc. (Food Production & Processing)
APPLIED COMPONENT Syllabus
Credit Based and Grading System
To be implemented from the Academic year 2013-2014
SEMESTER V

Course Code	UNIT	TOPICS	Credits	Lec / Sem
USACFP501		FOOD PRODUCTION AND PROCESSING (General Principles)	2	(60 lect
	I	1. Food Science and Nutrition 1.1 Chemical Nature, Source and Functions of Nutrients. Examples Proteins, Carbohydrates, Fats, Minerals, Vitamins, Water, Fibre, Antioxidants and phytochemicals. (05L) 1.2 Food Additives – Intentional / Unintentional, general. Examples : Antioxidants, chelating agents, colouring agents, emulsions, flavours and flavour enhancers, flavour improvers, humectants and anticaking agents, leavening agents, nutrient supplements, non nutritive sweeteners, pH controlling agents (03L) 1.3 Energy Value of Foods. Methods of measurement of energy, value of nutrients – direct and indirect, basal metabolic rate – measurement and factors affecting BMR. (02L) 1.4 Adequate Diet : food guide (02L) 1.5 Nutritional Disorders due to deficiency and excess of Nutrients. Vitamin deficiency- pernicious anemia, scurvy, night blindness, rickets. Protein deficiency : Kwashiorkar, Mineral deficiency due to iron, iodine and calcium. (03L)		15 Lectures
	II	Traditional Production Methods 2.1 Animal Food Production – Dairy farm management, Poultry farm management, Animal breeding. (05L) 2.2. Methods of Plantation – Crop rotation, Farming practices, methods of irrigation, fertilizers- chemicals and microbial, Insecticides – Chemical and Microbial, Organic farming, Plant breeding techniques. (04L) 2.3. Aquaculture – General Principles, Prawn and Oyster farming. (02L) 2.4 Foods of Microbial Origin- Mushroom – Agaricus and Pleurotus., SCP – Fungal, algal, bacterial. (04L)		15 lectures

	III	Principles of Processing of Foods 3.1 Processing of cereal grains- milling, parboiling, flakes, puffs. Malting, starch extraction, gluten extraction. Pasta products. (05L) 3.2 Processing of Fruits and vegetables.- Jams, jellies, Squash. Ketchup, pickles and Sauce. (03L) 3.3 Processing of Pulses – Soya chunks. (01L) 3.4 Processing of Oilseeds (extraction of oil) (01L) 3.5 Probiotic, Prebiotics, synbiotic foods . (01L) 3.6 Processing of Meat, Fish Eggs.- Aging, tenderizing, curing. Fish processing. Egg protein, egg foam. (02L) 3.7 Effect of processing on Nutritive Value of Foods- Newer methods of food processing- Microwave, high pressure, Ohmic heating, radiation sterilization, minimally processed foods. (02L)		15 Lectures
	IV	Principles and Methods of Food Preservation 4.1 Physical Methods- Blanching, pasteurization, canning. Chilling, freezing. Irradiation, dehydration. (05L) 4.2 Chemical Methods – salt, sugar, Na-benzoate, metabisulfite, citrate, acetate. (05L) 4.3 Emerging Preservation Technologies- Natural antimicrobials, hydrostatic pressure, electric pulse, light pulse, high magnetic pulse. (05L)		15 Lectures

Practicals -

USACFP5P1	Practicals based on above courses in theory 1. Estimation of Carbohydrates from milk. 2. Estimation of proteins from milk. 3. Estimation of Proteins from Gram flour. 4. Preparation of Ketchup. 5. Preparation of Jam. 6. MIC of Salt, Sugar and other preservatives. 7. Detection of spoilage causing organisms. 8. RPT of Milk.	2	60 Lec / Sem
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SEMESTER VI

Course Code	UNIT	TOPICS	Credits	Lec /Sem
USACFP601		FOOD PRODUCTION AND PROCESSING (Applications and Quality Assurance)	2	60 Lect
	I	Modern Methods of Food Production 1.1 General Methodology of genetic Engineering. (01L) 1.2 Applications of Genetic Engineering – Modification of plant nutritional content, modification of plant taste and appearance.- plant yield, fruit ripening, edible vaccines. (08L) 1.3 Plant Tissue Culture (02L) 1.4 Transgenic Animals (02L) 1.5 Nanotechnology (02L)		15 Lectures
	II	Production of Fermented Foods and beverages 2.1 Beverages : Wine and Beer (03L) 2.2 Milk products : Cheese(Cheddar Camembert)Yoghurt(02L) 2.3 Animal Products : Fermented sausages (02L) 2.4 Plant Products: Idli (02L) 2.5 Fermented Soyabean Products – miso, tofu, soy sauce(02L) 2.6 Nutraceuticals (02L) 2.7 Probiotic foods (02L)		15 Lectures
	III	Food Safety and Quality Assurance 3.1 Principles of food spoilage- Physical, Chemical and Microbial (03L) 3.2 Food Hazards : Microbial – bacterial, fungal, protozoal, viral, emerging food pathogens. Food hazards: Nonmicrobial- adulteration, natural/artificial colouring agents, metals, etc. (03L) 3.3 Food analysis – Sensory, chemical, microbiological, rapid detection methods, CDC programs – pulseNet, FoodNet. (03L) 3.4. Safe Process Design and Operation – GMP, HACCP, Food Hygiene and sanitation, risk assessment, flow sheets(04L) 3.5 Food Standards and Laws- National, International legislation and agencies governing food and its quality (02L)		15 Lectures
	IV	Food Packaging and marketing		15

		4.1 Functions of Packaging (02L) 4.2. Types of Packages (02L) 4.3 Types of Packaging materials (03L) 4.4 Labelling and Printing (02L) 4.5 Food and food packaging interaction (02L) 4.6 Shelf life testing (02L) 4.7 Transportation and Storage (02L)		Lectures
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Practicals -

USACFP6P1	Practicals based on above courses in theory. 1. Plant Tissue Culture preparation 2. Demonstration of a) Effect of growth promoting substances on plant growth b) Mushroom cultivation 3. Estimation of Vitamin C from lemon juice 4. Determination of Iodine number. 5. Study of Microbial fermentation of Idli batter DMC, SPC, LAB count, Titratable acidity (2 to 8 hrs incubation) 6. Food adulteration 7. Types of Packaging 8. Testing of packaging material 9. Study of Probiotic food samples.	2	60 Lec/Sem
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References

Course: USACFP-501 and USACFP- 601

- Glick and Pasternak, 3rd Edi. ASM Press. Molecular Biotechnology- Principles and Applications of Recombinant DNA.
- Kulkarni S. K. Nanotechnology : Principles and Practices. Capital Publ. Co.
- Sawhney S. K. And R Singh. 2005. Introductory Practical Biochemistry. Narosa Publ. Pvt Ltd.
- Mudambi R and Rajagopal M. V. 2001. Fundamentals of food and nutrition. 4th Edi. New Age International Ltd. Publ.
- Swaminathan M. Principles of Nutrition and Dietetics. 2nd Edi
- Banerjee G. C. 1998. 8th Edi. Text book of Animal Husbandary.
- Modern Food Science Jou. 2007.
- The Hindu Survey of Indian Agriculture. 2007.
- Van Garde S. J. And Woodburn M. 19909. Food Preservation and Safety- Principles and Practice.
- Manay N. S., and Shadasaraswamy. 2001. Foods –facts and principles. New Age International Pvt Ltd. 2nd Edi.
- Clive de Blackburn and Peter Mc Clure. Food Bourne pathogens- Hazards, Risks analysis and Control. CRC Wood Publ. Co.
- Indian Food Industry. AFST Jou. 2007

Modality of Assessment :

Theory Examination Pattern:

A) Internal Assessment - 40%

40 marks.

Theory

40 marks

Sr No	Evaluation type	Marks
1	One Assignment/Case study/Project	10
2	One class Test (multiple choice questions / objective)	20
3	Active participation in routine class instructional deliveries(case studies/ seminars//presentation)	05
4	Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05

B) External examination - 60 %

Semester End Theory Assessment - 60%

60 marks

- i. Duration - These examinations shall be of two hours duration.
- ii. Theory question paper pattern :-
 1. There shall be **five** questions each of **12** 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. Each question will be of **24** marks with options.
 3. Questions may be sub divided into sub questions a, b, c & d only, each carrying **six** marks **OR** a, b, c, d,e & f only each carrying **four** marks and the allocation of marks depends on the weightage of the topic.

Practical Examination Pattern:

(A)Internal Examination:-

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

(B) External (Semester end practical examination) :-

Sr.No.	Particulars	Marks
1.	Laboratory work	80
2.	Journal	10
3.	Viva	10

Semester end practical examination in applied component shall be conducted by the concerned department of the Institute/ College at the end of each semester and the marks of the candidates are to be sent to the University in the prescribed format.

Semester V:

Practical examination will be held at the college / institution at the end of the semester. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

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

Semester VI

Practical examination will be held at the college / institution at the end of the semester. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

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