



Maratha Vidya Prasarak Samaj's

**G. M. D. ARTS, B. W. COMMERCE & SCIENCE
COLLEGE,**

Nashik-Pune Highway, Sinnar, Dist.Nashik-422 103

Department of B. Voc.

(Food Processing and Preservation)

Syllabus
For
Bachelor of Vocation
In
Food Processing and Preservation
(First Year)

Annexure-II

1. **Title of the Course:** Bachelor of Vocational in Food Processing and Preservation
2. **Course Level:** UG
3. **Syllabus to be implemented from the Academic year:** 2020-21
4. **Preamble of the Syllabus:**

Preamble:

Savitribai Phule Pune University, Pune is offering a three year Bachelor Program in Vocational Education (B. Voc.) in Food Processing and Preservation from Academic year 2018-19. The curriculum design of this program is undertaken in the following framework (Preamble).

a) Although there has been remarkable progress in all sectors of education in last couple of decades, the less regulated area of the education sector-vocational training—seems to have lost its significance/importance. This has led to the widening gap between the supply and demand for skilled manpower across various food processing industries and R&D organizations. This shortage of skills has translated directly into unemployment among an increasing number of graduates who pass-out every year and are forced to bare- trained in order to become marketable. This program is designed to produce a skilled manpower so that wide variety of options in different sectors of Food Processing would be available and it will improve the opportunities for the unemployed youths in the country in both the private and public sectors.

b) According to recent survey of FICCI (Federation of Indian Chambers of Commerce & Industry) on skill demand in food processing industries, it has been observed that a majority percentage of organizations are dissatisfied with the skills of the available trained manpower. For instance, 58% of the respondents were dissatisfied with technical skills and knowledge needed for the job. Also 72% showed discontent with employees' ability to use appropriate and modern tools, equipment, and technologies specific to their job roles. This programme aims to provide some solution for this problem and this would facilitate to improve:

- (i) Quality of training
- (ii) High drop-out rates
- (iii) Linkages with Universities and industry
- (iv) Inadequacy of resources

c) This program is intended to offer practical, hands on training and skills needed to pursue an occupation. It will provide options to the students to select the courses of their choice which are

directly aligned to land a job in a chosen profession or a skilled trade. The end result of this program is to enable an individual to at train self-employment.

Aims & Objectives:

1. To provide basic knowledge and application of Food Processing and Preservation.
2. To offer both theoretical and practical inputs in Food Processing and Preservation.
3. To develop Application skills among the students.

Program Structure:

The three year B. Voc. Course (full time) has a specific feature of multi point entry and multi point exit provision. After completing one year of course, if any student desire to leave he/she will be awarded Diploma, subject to the condition of earning the required credit points. Similarly after completing the second year he/she will be awarded Advance Diploma and once the candidate completes the third year candidate will be awarded the degree of Bachelor of Vocational (Food Processing and Preservation). If any student desires to take admission to some other university, at any other stage i.e., on completing first year, he/she may take admission to second year in same branch. Similarly, on completing the second year, one can take admission to third year.

Program Outcome:

Vocational Education is education that prepares the students for specific job role in various sectors in food processing industries and Professional organization. It trains the students from a trade, technician or professional position in R & D organizations for specific job roles.

The program outcomes are the skills and knowledge which the students have at each exit level/at the time of graduation. These outcomes are generic and are common to all exit levels mentioned in the program structure.

- i. Students with vocational training can find work in several state and central government organizations, non-profit groups, and academic institutions and in private sectors as well.
- ii. This program prepares students for specific types of occupations and frequently for direct entry into the market.
- iii. After completion of this program students will have enough competences, to get benefit from market opportunities.
- iv. This program would enable students to update their knowledge and professional skills for entering the work force executing income generating activities or occupying better positions
- v. At each exit level of this program, students will be able to

- a) Apply knowledge of general education subjects and skill development subjects to the conceptualization of food processing technologies.
- b) Designing and formulation of new food products, on the basis of consumers demands, development of methodology/technologies of food processing, design that meet solutions needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- c) Conduct and undertake investigations of problems of including design of processing technology for various type food, food analysis, food quality and safety aspects and interpretation of data in order to provide valid conclusions.
- d) Create, select and apply appropriate processing technology/techniques, resources, modern processing tools in order to improve the quality, safety and the shelf life fresh and process food.
- e) Communicate effectively on minimal processing activity and value addition to the farmers/producers/grower at large, such as being able to comprehend and write effective reports, design documentation and make effective presentations.
- f) Demonstrate understanding of the social, health, safety, legal and cultural issues and the consequent responsibilities relevant to Food processing.
- g) Understand and commit to professional ethics and responsibilities and norms/regulation for manufacturing of process food and its effects on health.
- h) Understand the impact of food processing technologies solutions in a societal context and demonstrate technical know-how and understanding of food safety, quality for sustainable development.

STRUCTURE OF SYLLABUS

To be implemented from the academic year 2020-21

➤ **Title of the course:** BACHELOR OF VOCATION (FOOD PROCESSING AND PRESERVATION)

➤ **Skills to be acquired after completion of 1st Year :**

After successful completion of the 1st year, the student shall be able to perform the following skills.

1. Student will be able to know Fundamentals of Food and Nutrition and Principles of Food Preservation
2. Student will obtain knowledge of Food Biochemistry, Food Microbiology and Processing Technology of Fruits & Vegetables

- **Self-Employment and Employment Opportunities:** On successful completion of the course the candidates can either get employed, or become a self-employed / performer in any one of the following fields.

1. To develop proficiency skill in producing different nutritious food products.
2. Processing Technology of Fruits & Vegetables

➤ **Skills to be acquired after completion of 2nd Year :**

After successful completion of the 2nd year, the student shall be able to perform the following skills.

1. Food Chemistry, Dairy Technology, Processing Technology of Cereals, Legumes and Oil seeds
2. Food Biotechnology, Animal Products Technology and Bakery & Confectionary Technology

- **Self-Employment and Employment Opportunities:** On successful completion of the course the candidates can either get employed, or become a self-employed / performer in any one of the following fields.

1. Students will get job in industries like Food, Animal Products Bakery & Confectionary.
2. Can start its own industries like Food, Animal Products Bakery & Confectionary.

➤ **Skills to be acquired after completion of 3rd Year :**

After successful completion of the 3rd year, the student shall be able to perform the following skills.

1. Food Regulation & Quality Control, Food Packaging Technology, Plant Design & Technology, Spices & Flavor Technology, Food Analytical Techniques.
2. Entrepreneurship Development, Food Safety, Hygiene & Sanitation, Waste & Byproducts Utilization, Novel Food Processing Technologies, Fermentation Technology

- **Self-Employment and Employment Opportunities:** On successful completion of the course the candidates can either get employed, or become a self-employed / Entrepreneur in any one of the following fields.

1. Student can start own Food Industry.

5. **Faculty of the Course : B.Voc.**

6. **Eligibility for Admission:**

The eligibility condition for admission to B. Voc. Programme shall be **10+2 or equivalent**, in any stream **from any recognized board or university**.

The candidate with 10+2 year or ITI/ Agri course in any branch is eligible for the course.

7. **Duration of the Course:**

The duration of the B. Voc. Course will be of **Three Years**.

- **First Year : B. Voc. - Diploma in Food Processing and Preservation**
- **Second Year : B. Voc. - Advanced Diploma in Food Processing and Preservation**

▪ **Third Year : B. Voc. – Bachelor of Vocational in Food Processing and Preservation**

Exit Options:

Bachelor of Vocation (B. Voc.) is launched under the scheme of University Grants Commission for skill development based on higher education leading to Bachelor of Vocation (B. Voc.) Degree with multiple exits as Diploma/Advanced Diploma under the National Skill Qualification Framework (NSQF). The B. Voc. programme incorporates specific job roles and their National Occupational Standards along with broad based general education.

1. B. Voc. Programme has been designed as per National Skill Qualification Framework emphasizing on skill based education.

2. **LEVELS OF AWARD:**

The certification levels shall lead to certificate/Diploma/Advanced Diploma/ B. Voc. Degree in Food processing Preservation.

Award	Duration	Corresponding NSQF level
Certificate in Food Processing and Preservation	6 Months	4
Diploma in Food Processing and Preservation	1 Year	5
Advanced Diploma in Food Processing and Preservation	2 Years	6
B. VOC. Degree in Food Processing and Preservation	3 Years	7

The suggested credits for each of the years are as follows:

NSQF level	Skill component credits	General education credits	Normal calendar duration	Exit point /awards
6 Months	18	12	One Semester	Certification in Food Processing and Preservation
Year 1	36	24	Two Semesters	Diploma in Food Processing and Preservation
Year 2	36	24	Four Semesters	Advanced Diploma in Food Processing and Preservation
Year 3	36	24	Six Semesters	Degree in Food Processing and Preservation
Total	108	72		

Eligibility criteria for Admission:

1. A candidate will be eligible to join 1st semester of B. Voc. Food Processing and Preservation course, if he/she has passed 10+2 examination (Science Stream) or 10+2 vocational stream related to Food Production/Food Processing of recognized Board/university, or any other examination recognized as equivalent thereto.
2. The course of study of B. Voc. shall be divided in to six semesters and university examination will be held at the end of every semester in the months of November/December (for semester I, III & V) and May/June (for semester II, IV & VI) or as fixed by the University.
3. Semester examination will be open to regular candidates who have been on the rolls of a college affiliated to this University and meet the attendance and other requirements.

Admission, Registration and Promotion Process:

Admission will be done on the basis of Percent mark obtained by candidate in Twelfth science or Common entrance test conducted by college or admission criteria as decided by the authority for first semester.

The students will have to clear / qualify at least 50% of theory papers / courses from second semester and all papers / courses (inclusive of theory and practical) from first semester for getting promoted to second year. Similarly the students will have to clear / qualify at least 50% of theory papers / courses from fourth semester and all papers / courses (inclusive of theory and practical) from third semester for getting promoted to third year.

Dropout students will be allowed to register for second or third year as and when the concerned courses are offered by the College, however he/she should not exceed more than twice the duration of the course from the date of first registration at the Centre. Therefore, for obtaining B. Voc. degree a student will have to complete all semesters successfully within 6 years/12 semesters.

Admission fees:

The admission fees for B. Voc. (Food Processing and Preservation) would be as decided by the University.

Vocational Educational Programme Implementation Committee (VEPIC):

The Vocational Educational Programme Implementation Committee (VEPIC) will consist of the Principal as a Chairman, course coordinator and two faculty of the concern course/specialization as

members. The Committee will monitor the smooth functioning and implementation of the B. Voc. program in Food Processing & Preservation.

Choice Based Credit and Grading System (CBCS):

The choice based credit and grading system has been adopted. This provides flexibility to make the system more responsive to the changing needs of our students, the professionals and society. It gives greater freedom to students to determine their own pace of study.

- Students will have to earn 30 credits for the award of Six Month Certificate in Vocational in Food Processing & Preservation.
- Students will have to earn 60 credits for the award of one year Diploma in Vocational (D. Voc.) in Food Processing & Preservation.
- Students will have to earn 120 credits for the award of two year Advance Diploma in Vocational (Adv. D. Voc.) in Food Processing & Preservation.
- Students will have to earn 180 credits for the award of three year Bachelor Degree in Vocational (B. Voc.) in Food Processing & Preservation.

Credit-to-contact hour Mapping:

- One Credit would mean equivalent of 15 periods of 60 minutes each for theory lecture.
- For laboratory course/ workshops/internship/field work/project, the credit weightage for equivalent hours shall be 50% that for lectures.
- For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures.

Attendance:

Students must have 75 % of attendance in each course for appearing examination otherwise he / she will not be strictly allowed for appearing the examination of each course. However, students having 65 % attendance may request Head of the concerned Institution for the condolence of attendance on medical ground.

8. Intake Capacity of Students: Maximum 50

9. Examination:

Evaluation Methods:-

The assessment will be based on Continuous Internal Assessment (CIA) and semester end examination (SEE).

There shall Continuous Internal Assessment for each theory paper. In each semester, 35 marks shall be for CIA and 40 marks for ESE for the paper carrying total 75 marks. For papers carrying total 50 /100 marks, there shall be 25/50 marks for CIA and 25/50 marks for ESE. CIA and ESE shall be added while declaring the final result.

Continuous Internal Assessment (CIA):-

The internal marks shall be assigned on the basis of tutorials/home assignment/seminar presentation and weekly tests/class test/ preliminary examination to be conducted by the concerned college. These marks shall be communicated to the University before commencement of semester end examination.

End Semester Examination (ESE):

- The end semester examination for each theory and practical paper shall be conducted by the University at the end of each semester.
- Duration of theory examination shall be of three hours for a paper of 75 marks and two and half hour for a paper of 50/40 marks. Practical examinations shall be of three hour duration for every semester end examination respectively.
- The respective college is advised to arrange maximum number of experiments from the list of experiments provided with the syllabus or experiments based on theory syllabus.
- Assessment of laboratory courses and project will also have same weightage for internal and semester end assessment. Semester end practical examination will be of 40 marks and 35 marks will be for internal examination. Student must perform at least eight experiments from each laboratory course. The semester end practical examination will be conducted at the end of each semester along with the theory examination.
- Students without certified journal shall not be allowed to appear for the practical examination.

Examination Scheme

- A student shall be evaluated for his/her academic performance in a course through class tests, tutorials, practicals, homework assignments, term papers, field work, seminars, quizzes, Test examinations, teachers assessments and the End-Semester Examination as applicable.
- At the end of the semester, there would be an End Semester Examination as per syllabus. For the examination of First Year, the minimum percentage for passing for each course code, practical examination and ESE is 40 %, failing which he/she will get F grade for that course code. This rule will be progressively applicable for higher classes in next consecutive years.

- The project work shall be evaluated by midterm seminar(s), quality of work carried out, project report submission and the viva-voce examinations.
- The industrial/field training shall be evaluated through the quality of work carried out, the report submission and presentation(s).

Rule for combined passing:

- To pass the examination a candidate must obtain minimum 40% of Marks in each End Semester Examination & CIA taken together, however the candidate must obtain minimum 35% of Marks at the End Semester Examination.
- To pass a subject where there is no provision of class test, the candidate must obtain 40% of Marks in the End Semester Examination.
- If the candidate remains absent for CIA, his performance should be treated as “Zero” Marks.

Results Grievances / Redressal

Grievances / redressal committee will be constituted in the college to resolve all grievances relating to the evaluation. The committee shall consist of the Principal of the college, the concerned teacher of a particular course and senior faculty member. The decision of Grievances / redressal committee will have to be approved by Competent Authority.

Earning Credits:

At the end of every semester, a letter grade will be awarded in each course for which a student had registered. A student's performance will be measured by the number of credits that he/she earned by the weighted Grade Point Average (GPA). The SGPA (Semester Grade Point Average) will be awarded after completion of respective semester and the CGPA (Cumulative Grade Point Average) will be awarded by the university at the respective exit point.

Grading System:

The grading reflects a student-own proficiency in the course. A ten point rating scale shall be used for the evaluation of the performance of the students to provide letter grade for each course and overall grade for the B. Voc. Program. Grade points are based on the total number of marks obtained by him / her in all heads of the examination of the course. The grade points and their equivalent range of marks are shown in Table-I

Table I: Ten point grade and grade description

Marks Obtained (%)	Grade Point	Letter Grade	Description
90-100	9.00- 10	O	Outstanding
80-89	8.00-8.90	A++	Exceptional
70-79	7.00-7.90	A+	Excellent
60-69	6.00-6.90	A	Very Good
55-59	5.50-5.90	B+	Good
50-54	5.00-5.40	B	Fair
45-49	4.50-4.90	C++	Average (Above)
41-44	4.1-4.49	C	Average
40	4.0	P	Pass
< 40	0.0	F	Fail (Unsatisfactory)
	0.0	AB	Absent

- Non-appearance in any examination / assessment shall be treated as the students have secured zero marks in that subject examination / assessment.
- Minimum P grade (4.00 grade points) shall be the limit to clear / pass the course / subject. A student with F grade will be considered as “failed” in the concerned course and he / she has to clear the course by appearing in the next successive semester examinations. There will be no revaluation or recounting under this system.
- Every student shall be awarded grade points out of maximum 10 points in each subject (based on 10 point scale). Based on the grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and CGPA will be given at respective exit point.

Computation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average)

Grade in each subject / course will be calculated based on the summation of marks obtained in all modules.

The computation of SGPA and CGPA will be as below

Semester Grade Point Average (SGPA) is the weighted average points obtained by the students in a semester and will be computed as follows

Sum (Course Credits) X Number of Grade Points in concerned Course Gained by the Student

SGPA = -----

Sum (Course Credits)

The SGPA will be mentioned on the grade card at the end of every semester.

The Cumulative Grade Point Average (CGPA) will be used to describe the overall performance of a student in all semester of the course and will be computed as under.

Sum (All six Semester SGPA)

CGPA = -----

Total Number of Semester

The SGPA and CGPA shall be rounded off to the second place of decimal.

Grade Card

Results will be declared and the grade card (containing the grades obtained by the student along with SGPA) will be issued by the university after completion of every semester. The grade card will be consisting of following details.

- Title of the courses along with code opted by the student.
- Credits associated with the course.
- Grades and grade points secured by the student.
- Total credits earned by the student in a particular semester.
- Total credits earned by the students till that semester.
- SGPA of the student.
- CGPA of the student (at respective exit point).

Cumulative Grade Card

The grade card showing details grades secured by the student in each subject in all semesters along with overall CGPA will be issued by the University at respective exit point.

Paper Code Description:

The course offered by the university shall have an alphanumeric course code consisting of a string of six characters. The first three characters in a course code shall be capital letters identifying the responsible general component (BVG) and skill development components in Food Processing & Preservation (FPP) of the B. Voc. course. The next three numerical digits give the following

10. Structure of the Course:

Semester-I				Mark		
Paper Code	Title	No. of Credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Total Credits = Skill Development Components + General Education Components (18 + 12=30)						
Skill Development Components						
FPP-101	General Biochemistry and Microbiology	3	3	35	40	75
FPP-102	Fundamentals of Food and Nutrition	3	3	35	40	75
FPP-103	Principles of food preservation	3	3	35	40	75
FPP-104	Lab-General Biochemistry and Microbiology	3	6	35	40	75
FPP-105	Lab-Fundamentals of Food and Nutrition	3	6	35	40	75
FPP-106	Lab- Principles of food Preservation	3	6	35	40	75
General Education Components						
FPP-107	Communication English	4	4	50	50	100
FPP-108	Functional Marathi	4	4	50	50	100
FPP-109	Introduction to Constitution	2	2	25	25	50
FPP-110	Democracy, Election and Governance	2	2	25	25	50
Physical Education						Grade
Total		30	39	350	400	750

Semester-II				Mark		
Paper Code	Title	No. of credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Skill Development Components						
FPP-111	Food Biochemistry	3	3	35	40	75
FPP-112	Food Microbiology	3	3	35	40	75
FPP-113	Processing Technology of Fruits & Vegetables	3	3	35	40	75
FPP-114	Lab- Food Biochemistry	3	6	35	40	75
FPP-115	Lab- Food Microbiology	3	6	35	40	75
FPP-116	Lab- Processing Technology of Fruits & Vegetables	3	6	35	40	75
General Education Components						
FPP-117	Basics of Computer	3	3	35	40	75
FPP-118	Soft Skills	3	3	35	40	75
FPP-119	Lab- Basics of Computer	3	3	35	40	75
FPP-120	Lab- Soft Skills	3	3	35	40	75
Total		30	39	350	400	750

B. Voc. (Food Processing and Preservation) Semester III & IV

Semester-III				Mark		
Paper Code	Title	No. of Credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Total Credits = Skill Development Components + General Education Components (18 + 12 = 30)						
Skill Development Components						
FPP-201	Food Chemistry	3	3	15	60	75
FPP-202	Dairy Technology	3	3	15	60	75
FPP-203	Processing Technology of Cereals, Legumes and	3	3	15	60	75

	Oil seeds					
FPP-204	Lab-Food Chemistry	3	6	25	25	50
FPP-205	Lab-Dairy Technology	3	6	25	25	50
FPP-206	Lab-Processing Technology of Cereals, Legumes and Oil seeds	3	6	25	25	50
General Education Components						
FPP-207	Personality Development	3	3	35	40	75
FPP-208	Human values	3	3	35	40	75
FPP-209	Lab-Personality Development	3	6	35	40	75
FPP-210	Lab-Human values	3	6	35	40	75
Total		30	45	350	400	750
Semester-IV				Mark		
Paper Code	Title	No. of credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Skill Development Components						
FPP-211	Food Biotechnology	3	3	15	60	75
FPP-212	Animal Products Technology	3	3	15	60	75
FPP-213	Bakery & Confectionary Technology	3	3	15	60	75
FPP-214	Lab-Food Biotechnology	3	6	25	25	50
FPP-215	Lab-Animal Products Technology	3	6	25	25	50
FPP-216	Lab- Bakery & Confectionary Technology	3	6	25	25	50
General Education Components						
FPP-217	Environment Science	4	4	50	50	100
FPP-218	Applied Psychology	4	4	50	50	100

FPP-219	Marketing Strategies	4	4	50	50	100
Total		30	39	350	400	750

Bachelor of Vocation (Food Processing and Preservation)

B. Voc. Third Year (V and VI Semester)

Semester- V				Mark		
Paper Code	Subject Title	No. of Credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Total Credits = Skill Development Components + General Education Components (18 + 12 = 30)						
Skill Development Components						
FPP-301	Food Regulation & Quality Control	4	4	50	50	100
FPP -302	Food Packaging Technology	4	4	50	50	100
FPP -303	Spices Flavor Technology	4	4	50	50	100
FPP -304	Lab: Spices Flavor Technology	3	6	35	40	75
FPP -305	Project New Product Development	3	6	35	40	75
General Education Components						
FPP -306	Entrepreneurship-I	4	4	50	50	100
FPP -307	Human Resource Management	4	4	50	50	100
FPP -308	Project / Survey /Seminar /Model	4	4	50	50	100
		30	36	370	380	750
Semester- VI						
Paper Code	Subject Title	No. of Credits	Hrs. /week	Internal (CIA)	External (ESE)	Total
Total Credits = Skill Development Components + General Education Components (18 + 12 = 30)						
Skill Development Components						
FPP -311	Food Safety, Hygiene & Sanitation	4	4	50	50	100
FPP -312	Waste & By-products Utilization	4	4	50	50	100

FPP -313	Novel Food Processing Technologies	4	4	50	50	100
FPP -314	Lab- Implant Training Report & Seminar	3	6	35	40	75
FPP -315	Dissertation	3	6	35	40	75
General Education Components						
FPP -316	Entrepreneurship-II	4	4	50	50	100
FPP -317	Organizational Behaviour	4	4	50	50	100
FPP -318	Disaster Management	4	4	50	50	100
		30	36	370	380	750

11. Equivalence of previous syllabus along with propose syllabus.: Nil (This is first time syllabus is prepared for new course)

12. University Terms:

As per academic calendar of the university

- Diploma, Advance Diploma and Degree Certificate will be provided by the Savitribai Phule Pune University, Pune
- Format of certificate will be similar to the format of passing certificate.
- First year mark-sheet will be provided by the college.
- First year mark-sheet will be signed by the Principal of college and College Examination Officer in the affiliated colleges.
- Second year and third year mark-sheet will be signed by the COE of Savitribai Phule Pune University, Pune

13. Subject wise Detailed Syllabus:

Semester-I

Skill Development

Components

Skill Development Components

FPP-101: General Biochemistry and Microbiology

3 Credits (45 Hrs)

Learning Objectives:

1. To learn and understand the chemistry with respect to role and functionality of constituents of the food.
2. Students will develop knowledge and understanding of different food microorganisms and know different techniques used to detect microorganisms.

Learning Outcome:

1. Student will be able to understand basic chemistry of carbohydrates, lipids and proteins.
2. Student will be able to know the basics of microbiology.

Unit-I

Carbohydrates

- Definition and classification.
- Properties –optical and chemical.
- Structure of glucose: ring structure, Haworth & Fischer's projection, pyranoses, furanoses, isomers, mutarotation.
- Triose, pentose, hexose, heptoses - examples & structures.
- Derived monosaccharides: glycosides, furano acids, sugar phosphates, uronic acids, sugar alcohol.
- Disaccharides, glycoside linkage, lactose, maltose, sucrose.
- Oligosaccharides – Trisaccharides, structure of raffinose.
- Polysaccharides – Homo and heteropolysaccharides, structures starch, cellulose, mucopolysaccharides.
- Biological significance

Unit-II

Lipids

- i. Classification simple compounds.

- ii. Chemistry of fatty acids, unsaturated and saturated fatty acids, triglycerides, saponification alkyl ether phospho glycerides, sterols, cholesterol, prostaglandins, glycol lipids.
- iii. Functions of lipid.

Proteins

- i. Classification based on properties of solubility & heat. coagulability. Fibrous, globular proteins and functions.
- ii. Protein structures: conformation and configuration, primary structure determination, secondary structure α - helix & β -pleated sheet, tertiary & quaternary structure.
- iii. Classification of amino acids: based on acid – base properties.
- iv. Properties of amino acids – solubility, ampholyte, Zwitterions isoelectric pH.
- v. Peptide bonds – Concepts of biological peptide bond formation, types.
- vi. Enzymes – Concepts, definition, nature, active site, properties, physico-chemical factors contributing to catalytic efficiency of enzymes.

Unit-III

Nucleic acids

- Structure of nitrogen bases & base pairing.
- Structure of nucleosides & nucleotides, ribose, deoxyribosesugars.
- DNA: properties, forms, structure, function as genetic material. Types of DNA
- RNA : Structure, function, types (r-RNA, m-RNA, t-RNA)
- Comparative account of DNA & RNA.
- PH & buffers - pH titration curve, PK value.

Unit-IV

Introduction and Scope of Microbiology:

Definition and history of microbiology, contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, importance and scope of microbiology.

Microscope: Construction and working principles of different types of microscopes-compound, dark field, Phase contrast, Fluorescence and Electron (Scanning and transmission).

Unit-V

Sterilization:

Principles and Applications of (a) Physical Methods- Autoclave, Hot air oven, Laminar airflow, Seitz filter, Sintered glass filter, Membrane filter, (b) Chemical methods- Alcohol, Aldehydes, Phenols, Halogens, Gaseous agents and (c) radiation methods- UV rays, Gamma rays.

Staining techniques:

Principle and types of staining

Microbial Taxonomy:

Concept of microbial species and strains, prokaryotes and eukaryotes, classification of bacteria based on- (a) morphology (shape and flagella), (b) staining reaction, (c) nutrition and (d) extreme environment.

Unit-VI**General Account of Viruses and Bacteria:**

Bacteria – ultrastructure of bacterial cell (both Gram positive and Gram negative) including, endospore and capsule. Viruses-Structure and classification

Principles of Microbial Nutrition:

The requirements for carbon, nitrogen, sulfur growth factors etc, role of oxygen in nutrition, nutritional categories among microorganisms.

Microbial growth:

Kinetics of microbial growth, growth curve synchronous growth, factors affecting bacterial growth.

Reference Books for Biochemistry:

1. Lehninger: Principles of Biochemistry, 4th edition, by David L. Nelson and M.M. Cox (2005) Maxmillan/Worth publishers/W.H. Freeman and Company.
2. Biochemistry, 2nd edition by R.H Garrett and C. M. Grisham (1999). Saunders College Publishing, N. Y. Sons, NY.
3. Biochemistry (2004) by J. David Rawn, Panima Publishing Corporation, New Delhi.
4. Biochemistry, 4th edition, by L. Stryer(1995). W.H. Freeman and Co. NY.
5. Fundamental of Biochemistry, 2nd ed., by Donald Voet, Judith G. Voet and Charlotte W. Pratt(2006), John Wiley and Sons, INC.

Reference Books for Microbiology:

1. Atlas, R.M. (1998) Microbiology: Fundamental and applications, 2nd edition, Macmillan Publishing Company, New York.
2. Pelezar, M.J., Chan, E. G. S. and Krieg, N.R. (1999) Microbiology.
3. Heritage, J., Evance, E.G.V. and Killington, R.A. (1999) Microbiology in action, Cambridge University Press.

4. Prescott, L.M., Harley, J.P. and Klein, D.A. (1999) Microbiology, W.C.B. Oxford.

FPP-104: Lab. - General Biochemistry and Microbiology 3 Credits (45 hrs)

1. Qualitative tests for:
 - i. Carbohydrates – Benedict’s test.
 - ii. Protein – Biuret test.
 - iii. Nucleic acid – Diphenylamine(DNA) and orcinol (RNA) tests
2. Preparation of various solutions and buffers.
3. Qualitative identification of proteins / amino acids
4. Determination of crude lipids, physicochemical constants.
5. To measure pH and Temperature of given sample.
6. Microscopy:
 - i. Different parts of a compound microscope.
 - ii. Use and care of compound microscope.
 - iii. Visit to see an electron microscope.
7. Construction, operation and utility of laboratory equipments
 - i. Autoclave
 - ii. Hot air oven
 - iii. Incubator
 - iv. pH meter
 - v. High speed centrifuge
 - vi. Colorimeter/ spectrophotometer
 - vii. Anaerobic jar
 - viii. Bacterial Filters
 - ix. Laminar air flow.
8. Demonstration of presence of bacteria from – soil/ water/ air/ milk
9. Demonstration of yeast, fungi, actinomycetes, algae, protozoa etc.
10. Microscopic examination of bacteria:
 - i. Monochrome staining
 - ii. Negative Staining
 - iii. Gram’s staining
11. Hanging drop technique to demonstrate bacterial motility
12. Micrometry

Learning Objective:

1. Student will enable to understand the importance of nutrient in our daily diet.
2. Student will enable to formulate nutritionally enriched food products as per the requirement.

Learning Outcome:

1. To develop proficiency skill in producing different nutritious food products.
2. Operating & management of balanced diets for different age groups
3. Make different processed food products with quality assurance.
4. Assessment of nutritional status of the women and children

Unit-I

Basic concept of Food: Nutrient, Nutrition, Classification of Food, Classification of Nutrients.

Food constituents - Definition, occurrence, properties and metabolism of Protein, Carbohydrate and Lipids.

Unit- II

Enzymes - Definition, classification, enzyme kinetics.

Browning reactions in foods:

- i. Non enzymic browning: Maillard reaction, browning of ascorbic acid, caramelization of sugars.
- ii. Enzymic browning: Definition, mechanism, control measures.

Unit-III

Biochemical changes in foods of plant and animal origin: fruits, vegetables, cereals, pulses, oilseeds, meat, poultry, seafood, dairy and their products)

Unit-IV

Concept of food and nutrition - Elements of nutrition, Food groups and role of nutrients. Energy metabolism - BMR

Unit-V

Recommended dietary allowances, Balanced diet for different age groups (Infancy to old age).

Unit- VI

Malnutrition-Causes, types, symptoms and prevention, Assessment of nutritional status of the community, National nutrition policy

References:

1. Biochemistry of Foods:- N.A.M. Eskin, H.M. Henderson, R. J. Townsend.

2. Introduction to the Biochemistry of Foods: Z. Berk.
3. Industrial Enzymes: Structure, Function and Applications - Julio Polaina and Andrew P. MacCabe.
4. Food and Nutrition: - M. Swaminathan.
5. Human Nutrition: - S. Mudambi.

FPP-105: Lab. - Fundamentals of Food and Nutrition

3 Credits (45 Hrs)

1. Qualitative identification of carbohydrates.
2. Estimations of amino acids in foods.
3. Qualitative identification of lipids.
4. Qualitative & quantitative determination of vitamins.
5. Determination of auto oxidative rancidity of fat and oils.
6. Calculation of BMR and body surface area
7. Calculation of energy value of food.
8. Planning and calculation of nutritive value of balanced diet for different age groups.
9. Assessment of nutritional status of an individual by anthropometric method and diet survey.
10. Enrichment and fortification of daily diet.
11. Computation of energy requirement on the basis of physical activity
12. ACU units.

FPP-103: Principles of Food Preservation

3 Credits (45 Hrs)

Learning Objective:

To acquaint the students with fundamental principles and various techniques of food preservation.

Learning Outcome:

1. Student will enable to understand different food preservation techniques, process.
2. Student will enable to extend shelf life of different food product by using the various methods of food preservation.

Unit-I

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 – 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 – Principle, equipments and effect on quality (Chilling, cold storage, freezing etc.)

Unit-IV

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-V

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

Unit-VI

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.

Reference Books:

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
6. Introduction to Food Science & Technology- G.P. Stewart & M.A. Amerine
7. Food Processing Operations Vol. III -M.A. Joslyn and J.J. Heild.
8. Preservation of Fruits and Vegetables- Giridhari Lal, G.S. Siddappa, and G.L. Tondon

FPP-106: Lab. -Principles of Food Preservation

3 Credits (45 Hrs)

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. Preservation of food by high concentration of sugar i.e. preparation of jam

5. Preservation of food by using salt e.g. Pickle
6. Preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid
7. Preservation of food by using chemicals.
8. 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. Drying of foods using freeze-drying & spray drying process.
13. Preservation of milk by condensation/concentration.
14. Demonstration of preserving foods under cold v/s freezing process.
15. Preservation of food by fermentation (Sauerkraut, idli, tempeh, curd, dhokla etc.)
16. Visit to any food processing industry/unit.

Semester-I

General Education

Components

Semester-I

FPP-107: Communicative English-I

4 Credits (60 Hrs)

Theory

Unit I:

- a) The Clause Elements: S, V, O, C, A
- b) The Basic Sentence Types: Declarative, Interrogative, Imperative, Exclamative
- c) The Tenses: Past, Present, and Future Time
- d) The Punctuation: Punctuation Marks and Capitalisation
- e) Word Power: Forming Nouns, Adjectives, Verbs, Adverbs, Synonyms, and Antonyms
- f) Forming Marathi Alternatives and Translation

Reference Books:

1. A Practical English Grammar (4th Ed.) by A. J. Thomson and A. V. Martinet (New Delhi: Oxford University Press, 1997)
2. A Communicative Grammar of English (3rd Ed.) by Geoffrey Leech (London: Routledge Publication, 2013)
3. Professional Communication Skills by A. K. Jain & Others (New Delhi: S. Chand & Company Pvt. Ltd., 2014)

FPP-108: Functional Marathi

4 Credits (60 Hrs)

Theory

१. भाषेचे स्वरूप

घटक :- १.१ भाषा म्हणजे काय ?

१. भाषेच्या व्याख्या

२. भाषेची अवसकेता महत्त्व

३. भाषेची वैशिष्ट्ये

४. भाषेची कार्य

२. संवाद लेखन

घटक २.१ संवादाचे स्वरूप

२.२ संवादाची महत्त्व व गरज

२.३ संवाद कौशल्य आणि विकास

२.४ संवाद: एक कला

३. संभासन कौशल्य:-

घटक ३.१ कौटुंबिक संभासन

३.२ कार्यालयीन संभासन

३.३ सार्वजनिक सभा संमेलनांतील स संभासन

३.४ औपचारिक संभासन

३.५ अनौपचारिक संभासन

४. घटक ४.१ वृत्पत्राची बातमी लेखन

४.२ दूरदर्शन वरील बातमी लेखन आकशवाणी वरील बातमी लेखन

४.३ बातमी लेखनाची वैशिष्ट्ये

४.४ बातमी लेखांचे महत्त्व व गरज

५. मुलाखत लेखन

घटक ५.१ मुलाखात स्वरूप व उद्दिष्ट्ये

५.२ मुलाखात प्रकार

५.३ मुलाखत महत्त्व व वैशिष्ट्ये

संदर्भ ग्रंथ:

१. व्यावहारिक मराठी: डॉ. लीला गोविलकर
२. व्यावहारिक मराठी: डॉ. स्नेहल तावरे
३. व्यावहारिक उपयोजित मराठी: डॉ. संदीप सांगळे
४. उपयोजित मराठी: डॉ. संजय लांडगे
५. प्रसार माध्यमे आणि मराठी भाषा: डॉ. भास्कर शेळके

UNIT 1: PHILOSOPHY OF THE INDIAN CONSTITUTION

- a) Constitutional History of India
- b) Role of Dr. B.R. Ambedkar in Constituent Assembly
- c) Preamble – Source and Objects
- d) Sovereign and Republic
- e) Socialist and Secular
- f) Democratic – Social and Economic Democracy
- g) Justice – Social, Economic and Political
- h) Liberty – Thought, Expression, Belief, Faith and Worship
- i) Equality – Status and Opportunity
- j) Fraternity, Human Dignity, Unity and Integrity of the Nation

UNIT 2: FUNDAMENTAL RIGHTS

- a) Right to equality
- b) Right to freedoms
- c) Right against exploitation
- d) Right to freedom of religion
- e) Cultural and educational rights
- f) Right to property
- g) Right to constitutional remedies

UNIT 3: DIRECTIVE PRINCIPLES OF STATE POLICY

- a) Equal Justice and free legal aid
- b) Right to work and provisions for just and humane conditions of work
- c) Provision for early childhood, Right to education and SC, ST, weaker section
- d) Uniform Civil Code
- e) Standard of Living, nutrition and public health
- f) Protection and improvement of environment
- g) Separation of Judiciary from executive
- h) Promotion of International peace and security

UNIT 4: FUNDAMENTAL DUTIES

- a) Duty to abide by the Constitution
- b) Duty to cherish and follow the noble ideals
- c) Duty to defend the country and render national service
- d) Duty to value and preserve the rich heritage of our composite culture

- e) Duty to develop scientific temper, humanism, the spirit of inquiry & reform
- f) Duty to safeguard public property and abjure violence
- g) Duty to strive towards excellence

Reference Books:

- a) D. D. Basu, Introduction to the Constitution of India, LexisNexis
- b) Granville Austin, The Constitution of India: Cornerstone of a Nation, Oxford University Press
- c) Subhash Kashyap, Our Constitution, National Book Trust
- d) M.P. Jain, Indian Constitutional Law, LexisNexis
- e) V.N.Shukla, Constitution of India, Eastern Book Company
- f) P.M. Bakshi, The Constitution of India, Universal Law Publishing
- g) M.V.Pylee, Constitutional Government in India, S. Chand
- h) V. S. Khare, Dr. B.R.Ambedkar and India's National Security

FPP-110: Democracy, Election and Governance

2 Credits (30 Hrs)

Chapter 1 Democracy- Foundation and Dimensions

- a. Constitution of India
- b. Evolution of Democracy- Different Models
- c. Dimensions of Democracy- Social, Economic, and Political

Chapter 2 Decentralization

- a. Indian tradition of decentralization
- b. History of panchayat Raj institution in the post independence period
- c. 73rd and 74th amendments
- d. Challenges of caste, gender, class, democracy and ethnicity

Chapter 3 Governance

- a. Meaning and concepts
- b. Government and governance
- c. Inclusion and exclusion

References:

1. Banerjee-Dube, I. (2014). A history of modern India. Cambridge University Press.
2. Basu, D. D. (1982). Introduction to the Constitution of India. Prentice Hall of India.
3. Bhargava, R. (2008). Political theory: An introduction. Pearson Education India. 2
4. Bhargava, R., Vanaik, A. (2010) Understanding Contemporary India: Critical Perspective. New Delhi: Orient Blackswan.

5. Chandra, B. (1999). Essays on contemporary India. Har-Anand Publications.
6. Chatterjee, P. (1997). State and Politics in India.
7. Guha, R. (2013). Gandhi before India. Penguin UK.
8. Jayal, N.G. (2001). Democracy in India. New Delhi: Oxford University Press.
9. Kohli, A. (1990). Democracy and discontent: India's growing crisis of governability. Cambridge University Press.

Semester-II

Skill Development

Components

Skill Development Components

FPP-111: Food Biochemistry

3 Credits (45 Hrs)

Learning Objectives:

To learn and understand the chemistry with respect to role and functionality of constituents of the food.

Learning Outcome:

- To learn and understand the chemistry of various Food micronutrient used in foods along with their role and properties
- Students will learn about basic reaction in food and their kinetics; nucleic acid, digestion and electrophoresis - protein electrophoresis, protein purification.

Unit-I

Nature scope and development of food Biochemistry, role of food chemist. Moisture in foods.

- i. Role and type of water in foods.
- ii. Functional properties of water, role of water in food spoilage and food safety.
- iii. Water activity and sorption isotherm.

Unit-II

Carbohydrates

- 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 reation, Millard reaction, caramelization, method to control non enzymatic reaction
- Modification of carbohydrates- unmodified and modified starches, modified celluloses.
- Dietary fibers NDF, ADF, Cellulose, hemicellulose, pectin and carbohydrates digestibility – sugars and starch and their energy values.

Unit-III

Protein in Food

- i. Role of proteins in foods.
- ii. Classification and structure of amino acids, essential amino acids, classification and structural organization of proteins-primary structure, secondary structure and tertiary structure.
- iii. Physicochemical properties- ionic properties, protein denaturation, gelation and hydrolysis.
- iv. Protein content and composition in various foods- cereal grains, legumes and oilseed proteins, proteins of meat, milk, egg and fish.
- v. Functional properties of proteins in foods – water and oil binding, foaming, gelation, emulsification.
- vi. Effects of processing on functional properties of proteins-heat processing alkali treatments, chilling, freezing, dehydration and radiations
- vii. Unconventional sources of proteins- SCP fish protein concentrates, leaf proteins.

Unit-IV

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-V

Vitamin

- 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.

Unit-VI

Enzyme

- General properties of enzymes, enzyme action, classification and nomenclature of enzymes, coenzymes enzyme inhibition, isozymes.
- Carbohydrases (Amylases, cellulases, pectinases, vertases) Proteases, Lipases and oxidases in food processing.

- Enzyme applications in food industry

Nucleotides and Nucleic acids:

Building blocks- bases, sugars and phosphates, structure and nomenclature of nucleosides and nucleotides, polynucleotides - DNA (A, B, Z, DNA) and RNA (rRNA, mRNA, tRNA).

Reference Books:

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

FPP-114: Lab-Food Biochemistry

3 Credits (45 Hrs)

1. Determination of moisture in food sample.
2. Determination of protein in food sample.
3. Determination of ash/minerals in food sample.
4. Determination of crude fat in food sample.
5. Determination of acidity & pH in food sample/beverages.
6. Determination of total, non-reducing and reducing sugars.
7. Determination of vitamin C content in food sample.
8. Determination of pigments in food sample.
9. Estimation of calcium, iron and zinc in food products.

Learning Objectives:

Students will develop knowledge and understanding of different food microorganisms and different techniques used in its detection.

Learning Outcome:

1. Students will understand causes of food spoilage of different foods and its type.
2. To enable the students to gain an insight into basic aspects of food microbiology.
3. To understand the advanced techniques in microbial analysis of food.

Unit-I

- Introduction- definition, history of microbiology of food. Types of microorganisms normally associated with food- bacteria, yeast and moulds.
- Spoilage of food; factors affecting spoilage of foods and associated micro flora.
- Biochemical changes caused by microorganisms- putrefaction, lipolysis, etc.

Unit-II**Factors affecting growth and survival of microorganisms:**

- Extrinsic factors- relative humidity, gaseous atmosphere.
- Intrinsic factors- nutrient content, water activity, oxidation reduction potential.
- Sources of contamination. Contamination of food-stuff, vegetables, fruits, cereals, pulses, oilseeds, milk and meat during handling and processing.

Unit-III**Deterioration and spoilage of various types of food products-**

- Fruits, vegetables, cereal and cereal products, meat and meat products, fish and other sea foods
- Prevention of spoilage of these foods

Unit-IV**Food borne infections and food poisoning:**

- Bacterial with examples of infective and toxic types- *Clostridium*, *Salmonella*, *Shigella*, *Staphylococci*, *Compilobacter*, *Escherichia*, *Bacillus* etc..
- Mycotoxins in food with reference to *Aspergillus* species. *Protozoe*. Prevention of food borne diseases.

Unit-V**Principles of food preservation:**

- Control of microorganisms by asepsis, use of low and high temperatures, water activity, preservatives.

- Preservation and maintenance of industrially important microorganisms- serial dilution, oil layer, lyophilization, liquid nitrogen, etc.

Unit-VI

- Indicator organisms, microbiological quality assurance systems in food industry, GMP, use of HACCP to ensure microbiological safety of food, food regulations and standards.

References:

1. Food Microbiology by M.R. Adams and M.O. Moss
2. Food Microbiology by W.C. Frazier
3. Dairy Microbiology by E .M. Foster.
4. Modern food Microbiology by James M. Jay.
5. Food borne bacterial pathogens by M.P. Doyle
6. Basic Food Microbiology by G.J. Banwart

FPP-115: Lab. - Food Microbiology

3 Credits (45 Hrs)

Study of compound microscope.

- ✓ Study of autoclave/retort
- ✓ Cleaning and sterilization of glassware
- ✓ Preparation of nutrient broth, potato dextrose and nutrient agar media.
- ✓ Pure culture techniques(Streak plate and pour plate)
- ✓ Gram staining and study of morphology of bacterial cell
- ✓ Microbial examination of table containers and packaging materials.
- ✓ Microbial examination of cereal and cereal products
- ✓ Microbial examination of meat and meat products
- ✓ Assessment of quality of raw milk by MBRT
- ✓ Bacteriological analysis (*Coliform* count) of water by MPN method
- ✓ Estimation of *Salmonella* from food sample.
- ✓ Estimation of *Staphylococcus* from food sample.

FPP-113: Processing Technology of Fruits and Vegetables

3 Credits (45 Hrs)

Learning Objective:

To enable the students to know the post-harvest management systems and processing technologies for preservation of fruits & vegetables and various value added products.

Learning Outcome:

- ✓ To develop proficiency skill in producing different types of processed fruits & vegetables products.
- ✓ Operating & maintenance the modern processing equipments & machineries
- ✓ To make different processed fruit & vegetable based products with quality assurance and safety.
- ✓ Process of packaging, storing & marketing

Unit-I

An over view of production and processing scenario of fruits and vegetables in India and World. Post harvest management of fruits and vegetables-control of losses in harvesting, and handling operations. Scope of fruit and vegetable preservation industry in India. Present status, constraints and prospects.

Unit-II

Morphology, structure and composition of fruit and vegetable Maturity standards: Importance, methods of maturity determinations, maturity indices for selected fruits and vegetables. Harvesting of important fruits and vegetables. Fruit ripening: chemical changes, regulations, methods.

Unit-III

Storage practices: Modified & Controlled atmospheric storage, hypobaric storage, cool store.

Commodity treatments- chemicals, wax coating, pre-packaging.

Post Harvest handling, packaging & transport system for various fruits & vegetables and packaging house operations.

Unit-IV

Overview of principles and preservation methods of fruits and vegetables. Commercial processing of major fruits and vegetables (jam, jellies, marmalade, purees, concentrates, preserve, candy, toffee/bar etc.)

Unit-V

Processing technology for manufacturing of fruit juices, pulp, RTS beverage, nectars, squash, syrups, cordials, Carbonated.

Unit-VI

Processing of Tomato: paste, ketchup, sauce, puree, soup, chutney etc.

Drying and dehydration technology of fruits and vegetables: preparation of raisins, anardana, dried fig, dried leafy vegetables, juice powders, flakes, wafers, chips etc. Fermented fruits and vegetables products like sauerkraut, pickles, wines etc. Utilization of By-products and wastes from fruits and vegetables processing industry

References:

1. Post Harvest Physiology, Handling and Utilization of Tropical and Subtropical Fruits and Vegetable- E. B. Pantastico, AVI Publishing Company, INC.
2. Post Harvest: An Introduction to the Physiology and Handling of Fruits and Vegetables- R.B. Wills, M.B. Mc Glasson, D. Graham, T.L. Lee and E.G. Hall.
3. Post Harvest Technology of Fruits and Vegetables: Handling, Processing, Fermentation and Waste Management Vol. I and II- Verma L. R. and Joshi V.K.
4. Fruit and Vegetable Preservation Principles and Practices -Srivastava R.P. and Sanjeev Kumar
5. Preservation of Fruits and Vegetables-Khader
6. Fruit and Vegetable Preservation -Bhutani R.C.
7. Principles of Fruit Preservation- Morris, Thomas Norman,.
8. Preservation of fruits and vegetables- Giridharilal, G.S. Siddappa and G.L. Tandon.
9. Fruit and Vegetable Technology- Duckworth.

FPP-116: Lab.- Processing Technology of Fruits and Vegetables

3 Credits (45 Hrs)

1. Studies on maturity indices of fruits and vegetables.
2. Studies on extension of shelf life.
3. Studies on use of chemicals for ripening of fruits and vegetables
4. Studies on pre-packaging.
5. Studies on physiological disorders - chilling injury of banana and custard apple
6. Canning/bottling of mango/guava/papaya fruits
7. Preparation of fruit jam: apple/mango/guava/ papaya/aonla/ strawberry.
8. Preparation of fruit jelly/marmalade: wood apple/ sweet orange/mandarin/guava/ tamarind.
9. Preparation of fruit preserve and candy
10. Preparation of fruit RTS beverage.
11. Preparation of carbonated beverage.
12. Preparation of fruit squash
13. Preparation of fruit syrup.
14. Preparation of pickle/ mixed pickle
15. Preparation of grape raisin/ anardana/ dried fig etc.
16. Preparation of dried ginger/ amchur/ onion and garlic

Semester-II

General Education

Components

First Year Semester-II

General Education Components:

FPP-117: Basics of Computer

3 Credits (45 Hrs)

UNIT-I

Introduction to computers: Characteristics, history and evolution, generation and types of computers. Computer architecture; Input and output devices; primary and secondary storage devices; central processing unit. Operating system: Types, booting, DOS commands, Windows and its applications.

UNIT-II

M.S. Office: Word, Excel and Power Point. Computer virus: Symptoms, detection and protection. Introduction to internet: World Wide Web, database, e-mail and chat. Role and use of computers in aquaculture.

UNIT-III

Creating a database, modifying table creating forms, queries and reports and protecting the database Windows vista, MS-office 2007-2010, Internet explorer, online collaboration tools

Practical/Tutorial

- ✓ MS-DOS commands.
- ✓ Windows and its applications.
- ✓ MS Word and its applications.
- ✓ MS Excel and its application.
- ✓ MS Power Point and its applications.
- ✓ Antivirus and its applications.
- ✓ Internet – browsing, surfing, e-mail and chat.
- ✓ Creating database
- ✓ Windows vista, MS-office 2007-2010, Internet explorer
- ✓ Uses and applications of computers in sericulture.

FPP-118: Soft Skills

3 Credits (45 Hrs)

Unit 1.

Introduction to Soft Skills, Aspects of Soft Skills, Effective communication Skills, Classification of Communication, Personality Development

Unit 2:

Positive Thinking, Telephonic Communication Skills, Telephonic Communication Skills: Part II, Communicating Without Words, Paralanguage

Unit 3:

The Language of Touch, Meta-communication, Listening Skills, Types of Listening

Unit 4:

Negotiation Skills I, Negotiation Skills II, Culture as Communication: Part I, Communicating across Cultures: Part II, Organizational Communication

Unit 5:

Communication Breakdown: Part I, Communication Breakdown: Part II, Advanced Writing Skills, Principles of Business Writing, Types of Business Writing: Part I

Unit 6:

Business Writing: Part II, Business Letters, Business Letters: Format and Style, Types of Business Letter: Part I, Business letter: Part II

Unit 7:

Writing Reports, Types of Report, Strategies for Report Writing: Part I, Strategies for Report Writing: Part II, Evaluation and Organization of Data

Unit 8:

Structure of Report: Part I, Structure of Report: Part II, Report Style: Part I, Report Style: Part II, Group Communication Skills

Unit 9:

Leadership Skills, Group Discussion Part I, Group Discussion Part II, Meeting Management, Adaptability & Work Ethics

Unit 10:

Advanced Speaking Skills, Oral Presentation, Speeches & Debates, Combating Nervousness, Patterns & Methods of Presentation, Oral Presentation: Planning & Preparation

Unit 11:

Making Effective Presentations, Speeches for Various Occasions, Interviews, Planning & Preparing (Part I): Effective Résumé, Planning & Preparing (Part II): Effective Résumé

Unit 12:

Drafting an Effective Resume, Facing Job Interviews: Part I, Facing Job Interviews: Part II,
Emotional Intelligence & Critical Thinking, Applied Grammar

1. Seminars
2. Paper Presentation
3. Group Discussion
4. Tutorials
5. Measuring the development scale in the students
6. Project report writing

References:

1. Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today's Young Talent by Bruce Tulgan
2. Soft Skills Training: A Workbook to Develop Skills for Employment by Frederick H. Wentz
3. Personality Development and Soft Skills by Barun Mitra
4. Soft Skills Personality Development for Life Success by Prashant Sharma
5. Personality Development and Soft Skills by Barun Mitra

14. Recommended Books: Provided under each Semester Detailed Syllabus

15. Qualification of Teacher:

Master's Degree with 55% marks (or an equivalent grade in a point scale wherever grading system is followed) in the relevant subject or an equivalent degree from an Indian/foreign University.

16. Detailed Syllabus CD : Soft copy of syllabus Provided with proposal

Dr. P. V. Rasal
Principal