



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
(Second 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 be re-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 for the academic year 2018-2019, 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 information. The first digit specifies the first semester of first year of the UG course. Second and third digit specifies the serial number of the general and skill development component.

10. Structure of the Course:

Course Structure of F.Y. B. Voc. (Food Processing and Preservation)

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 -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-III

Skill Development

Components

FPP-201: Food Chemistry

3 Credits (45 Hrs)

Learning objective:-

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

Unit- I

Water

The basic molecule of life, physical properties of water, properties of hydration, solvation, sorption isotherm, Bound water, free water, water activity, distribution of water in various foods and moisture determination, filtration Technology for water and foods: RO, UF,NF, etc.

Carbohydrates

General classification, distribution and importance, physical and chemical properties, synthesis and breakdown of glucose, starch, cellulose and pectic substances, Gums and mucilage etc.

Unit- II

Lipids

General classification, structure, physical and chemical properties, components of fattyacid, Technology of edible fats and oils- Refining, Hydrogenation and Inter-esterification

Proteins

Importance, classification, structure of amino acid, peptide and proteins, primary,secondary, tertiary and quaternary structure of proteins, source and distribution,physical and chemical properties, Functional properties of proteins eg. organoleptic, solubility, viscosity ,binding gelation / texturization , emulsification , foaming etc.

Unit-III

Food Flavour and Colours

Definition and basic tastes, Chemical structure and taste, Description of food flavours and Flavour enhancers. Food pigments (chlorophyll, carotenoids, anthocyanins and flavonoids, beet pigments, caramel), application of food flavor and colour in food industry.

Unit- IV

Food Additives:

Definition, Functions, legal approval, major additives used in food processing, nutrient supplements, functional foods, phytochemicals and nutraceuticals

Food Industry Enzyme

Introduction, nature, classification, nomenclature, role, specificity, hypothesis- lock andkey, induced to fit, Enzymatic and Non-Enzymatic Browning, Maillard Reaction, Caramelization reaction, Enzymes in food industry. Industrial Uses of Enzymes.

Unit- V

Vitamins and minerals

Vitamin: Chemistry, bioavailability and role of vitamins in food- outline.

Minerals: Definition, trace elements, Toxic metals, occurrence, bioavailability and role of in food.

Reference Books for Food Chemistry:

1. Food Chemistry- Vol-I - Fennama O.R.
2. Food Chemistry - Mayer L.H.
3. Food Chemistry-H.-D. Belitz, Werner Grosch, Peter Schieberle

FPP-204: Lab - Food Chemistry

3 Credits (45 Hrs)

1. Determination of moisture from food by different methods.
2. Determination of total carbohydrates, starch, sugars, dietary fibers.
3. Determination of crude proteins, amino acids,
4. Qualitative identification of proteins / amino acids
5. Determination of crude lipids, physicochemical constants.
6. Preparation of mineral solution by tri-acid digestion.
7. Estimation of different minerals from the food samples.
8. Smoking points at fats & oils
9. Assay of amylases, lipases, proteases.
10. Estimation of saponification value.

Note: Students should perform at least 08 practical

Learning Objectives:-

To get acquainted with the processing technology of milk and milk products

Unit- I**Livestock and dairy building:**

Importance of livestock, their importance species and breeds, functional requirement, site selection, types of dairy barn, planning, layout and requirement of dairy barns.

Milk Societies, buying and collection of milk, transportation of milk, milk reception in dairies. Quality and quantity test at reception

Unit- II**Dairy Chemistry and Microbiology**

Introduction, Milk- Definition composition, food and nutritive value, physico-chemical properties. Microbiological Properties of milk, Judging and Grading of milk,

Unit- III**Milk Processing**

Filtration / clarification, Storage of milk, Standardization – simple problems in standardization, Homogenization, Pasteurization-Types of pasteurization process, Sterilization of milk. Equipments used in each process-Cream separating centrifuges, Pasteurizers (Heat Exchangers), Homogenizers, Bottle and pouch fillers, Milk Chillers.

Unit- IV**Manufacture of Dairy Products**

Manufacture of Ice Cream, Cream, Paneer, Butter, Ghee, Milk powder, Khowa, Cheese and milk based sweets (Only method of preparation)

Equipment used for manufacture of each product like Butter churn, ghee boiler, Evaporator, Nozzel, Spray and Drum Dryers etc.

Unit- V**Manufacture of other Dairy Products and sanitization**

Manufacture of Homogenized, Standardized, rehydrated, Toned Milk and Sweetened Condensed milk, Extraction of casein from milk – properties - composition and industrial uses. Production of lactose and whey

Fermented products – Yoghurt, Curd, acidophilus milk, butter milk

Dairy plant sanitization – Cleaning in place – bottle and can washing, cleaning of tankers and silos – Detergents and sanitizers used.

Reference Books for Dairy Technology:

1. Outlines of Dairy Technology-Sukumar De
2. Technology of Milk Processing-Khan Q A and Padmanabhan
3. Principles of Dairy Processing-Warner J N
4. The Fluid Milk Industry Henderson J L
5. Indian dairy Products-Rangappa K S and Acharya K L

FPP- 205: Lab- Dairy Technology

3 Credits (45 Hrs)

1. Sampling and analysis of milk-physicochemical properties, and tests for quality.
2. Clarification and separation of milk for cream.
3. Heat processing of milk-pasteurization by different methods.
4. Preparation of butter
5. Preparation of ghee
6. Preparation of ice-cream.
7. Preparation of dahi, shrikhand and lassi.
8. Preparation of khoa and khoa based sweets such as peda, gulabjamun.
9. Preparation of channa and channa based sweets such as rasogola.
10. Preparation of cheese and yoghurt.
11. Preparation of special milks
12. Visit to dairy plant

Note: Students should perform at least 08 practical

FPP-203: Processing Technology of cereals, Legumes& Oil seeds.

3 Credits (45 Hrs)

Learning Objectives:

To get acquainted with the processing technology of cereals, legumes and oilseeds.

Unit-I

Present status and future prospects of cereals, legumes and oilseeds in India. Production, morphology, physicochemical properties, classification and types, composition and nutritive value.

Unit-II

Post harvest processing of cereals, legumes and oilseeds at home scale, cottage scale and commercial scale for drying, Parboiling of paddy, rice, corn sorghum, pearl millet processing, dal milling.

Unit-III

Wheat types, classification, milling of wheat, flour types, Physico-chemical properties of flours. uses for manufacture of cakes, breads, biscuits, macaroni products.

Unit-IV

Soaking, cooking, sprouting, fermentation of grains and manufacture of processed products. Oil extraction from oilseeds by different methods, oil refining, oilseeds and legumes meals and manufacture of different products.

Unit-V

Manufacture of different products from cereals, legumes and oilseeds flours such as bhakri, roti, traditional products, extruded food products etc.

Reference Books for Processing Technology of cereals & Legumes, Oil seeds:

1. Technology of Cereals- Kent
2. Post harvest Technology of Cereals, legumes and Oilseeds- Chakrawarthy
3. Post harvest Biotechnology of Legumes-Salunkhe DK and Kadak SS
4. Post harvest Biotechnology of Oilseeds - Salunkhe DK and Kadak SS

FPP- 206: Lab- Processing Technology of cereals, Legumes & Oils seeds.

3 Credits (45 Hrs)

1. Morphology and physicochemical properties of cereals, legumes and oilseeds.
2. Parboiling of paddy, rice milling and rice products, other cereal products.
3. Milling of wheat and wheat based products
4. Milling of sorghum, corn and millets.
5. Milling of legumes and legume based products
6. Extraction of oil from different methods.
7. Soaking, sprouting of legumes and cooking of dal.
8. Fermented products from legumes.
9. Production of breakfast cereals.
10. Production of traditional cereals, legumes and oilseed meals products

Note: Students should perform at least 08 practical

Semester-III

General Education

Components

FPP-207: Personality Development

3 Credits (45 Hrs)

Learning Objective:

The objective of the subject is bring about personality development with regard to the different behavioral dimensions that have far reaching significance in the direction of organizational effectiveness.

Learning Outcome:

To create awareness in the participants with regard to the different aspects of Interpersonal relations based on the ideas envisaged in Transactional Analysis and their relative significance in the context of the functional effectiveness of organizations.

Unit-I

Self-Analysis: SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem.

Unit-II

Creativity: Out of box thinking, Lateral Thinking.

Unit-III

Attitude: Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette.

Unit-IV

Motivation: Factors of motivation, Self-talk, Intrinsic & Extrinsic Motivators.

Unit-V

Goal Setting: Wish List, Smart Goals, Blue print for success, Short Term, Long Term, Life Time Goals. Time Management Value of time, Diagnosing Time Management, Weekly Planner to do list, Prioritizing work.

References:

- The 7 habits of highly effective people by Stephen Covey
- Think and Grow Rich by Napoleon Hill
- The Power of Positive Thinking by Dr. Norman Vincent Peale
- The Only Skill That Matters by Jonathan A. Levi

FPP-208 : Human values

3 Credits (45 Hrs)

Chapter I: Human values: Introduction, Concept, Types of values, Personality development: Introduction, Meaning, Elements, Nature and Importance

Chapter II: Social work, Concept, Ideals of Social work objectives and nature, Need and importance

Chapter III: Constitutional Values, Democracy, Types, Duties, Responsibilities Fundamental Rights and Power Importance

Chapter IV: Self dependency and Self management Meaning Objectives/ Purpose, Importance Self Strength and weaknesses.

FPP-209 Personality Development (Activity based)

3 Credits (45 Hrs)

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Extempore.
3. Technical Topic Presentation

FPP-210 Human values (Activity based)

3 Credits (45 Hrs)

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Seminar
3. Tutorial
4. Presentation

References:

- Human Values by A. N. Tripathi
- Human Values and Professional ethics by
- Professional Ethics and Human Values by M. Govindrajan, S. Natrajan and V. S. Senthikumar
- Foundation Course in Human Values and Professional Ethics by R. R. Gaur
- Human Values and Human Rights by Justice D M Dharmadhikari

Semester-IV

Skill Development

Components

FPP-211: Food Biotechnology

3 Credits (45 Hrs)

Learning Objectives:-

To study the biotechnological aspects involved in food and its application for development of food in relation to food security. It is expected to learn genetics, molecular biology and basis for developments of genetically modified foods and their safety issues involved in food biotechnology

Unit-I

Prospectus of Bio-Technology Molecular genetics i.e. fundamentals of molecular biology with special reference to chemistry and biology and DNA. (Primary secondary and tertiary) structures.

Unit-II

Biological role of DNA in cell metabolism, Genetic recombination mechanisms and technique used for improvement in microbial strains, Applications of genetical control mechanism in industrial fermentation process.

Unit-III

Recombinant-DNA technology (plasmids, plasmids vectors and cloning), Cell and tissue culture, Continuous cultures.

Unit-IV

Secondary metabolites synthesis, Application of Biotechnology in food industries, nutraceuticals, agriculture and Nutritional genomics. Genetically modified foods.

Unit-V

Application of biotechnology for food plant waste utilization, Bio-gas plant, Bio technology approach for the exploitation of food and industrially important microorganisms,

References:

1. Advances in Biotechnology Vol.1 Murayy Moo-Young (Scientific and Engineering principles) C.W. Gambell and C.Vezina
2. Advances in Biotechnology Vol-II Murayy Moo-Young (Fuels, chemicals, foods and waste treatments) C.W. Gambell and C.Vezina
3. Advances in Biotechnology Vol-III Muray Moo-Young (Fermentation Products)
4. Microbial Technology-Vol-I Peppler and Perlman (Microbial Process)
5. Industrial Microbiology- L.E. Casida
6. Modern Industrial Microbiology and Biotechnology-Neduka Okafor.

FPP- 214: Lab-Food Biotechnology

3 Credits (45 Hrs)

1. Study of auxotroph, Micro propagation through tissue culture
2. Strain improvement through U.V. mutation for lactose utilization
3. Chemical mutagenesis using chemical mutagens (Ethidium bromide)
4. Determination of survival curves using physical and chemical mutagens
5. Isolation and analysis of chromosomal / genomic DNA from *E.coli* and *Bacillus cereus*
6. Separation of protoplast using cellulytic enzymes
7. Introduction of ELISA / Southern blot / DNA finger printing etc
8. Agarose gel electrophoresis of plasmid DNA
9. Pesticide degradation by pseudomonas spp.
10. Study of enzyme activity in food products.

FPP-212: Animals Products Technology

3 Credits (45 Hrs)

Learning objectives:

To learn and understand the processing technology of animal products and its preservation.

Learning Outcome: The students will get exposure in slaughtering techniques, processing and preservation of various meat, fish and poultry products.

Unit - I

Sources and developments of meat and poultry industries and importance in national economy, Definition, classification, structural and chemical classification of meat, and physic-chemical properties of meat muscle, abattoir design and layout.

Unit - II

Pre-slaughter transport and care and antimortem inspection, slaughtering of animals and poultry, post-mortem inspection and grading of meat, Factors affecting post-mortem changes, properties and shelf life of meat, Processing and preservation of meat

Unit - III

Poultry: Structure, composition and nutritional value and post mortem inspection of poultry, processing and preservation of poultry meat.

Egg structure: Composition, quality characteristics, processing and preservation of eggs

Unit - IV

Classification of fish, composition, structure and post mortem changes in fish and quality evaluation. Handling of fresh water fish, Processing and preservation of fish, FSSAI and BIS specifications of fish and fish products

Unit – V

Technology of manufacture of meat and poultry products, slaughter house By-products utilization and abattoir management.

References:

1. Principles of Meat Science - F. J. Forrest
2. Meat Hand Book - Albert Levie
3. Developments in Meat Science Vol. I and II - Ralston Lawrie
4. Poultry Production - R. A. Singh
5. Meat Technology - Gerard F.
6. Fish Processing in India - M. N. Moorjani
7. Fish as a Food Vol. I, II and III - Borgstrom G
8. Fishery By-products Technology - Brody J
9. Outline of meat science and technology-B.D. Sharma
10. Modern abattoir practices and animal Byproducts Technology- B.D. Sharma

FPP- 215: Lab- Animals Products Technology

3 Credits (45 Hrs)

1. Pre-slaughter operations of meat animals and poultry birds
2. Study of post-mortem changes
3. Evaluation of meat quality
4. Preservation of meat by different methods
5. Evaluation of quality and grading of eggs
6. Preservation of shell eggs
7. Quality evaluation of fish
8. Chilling and freezing of fish
9. Preparations of fish protein concentrate
10. Studies on by-products utilization
11. Study to modern slaughter house/abattoir/processing plant

FPP-213: Bakery & Confectionary Technology

3 Credits (45 Hrs)

Learning Objective:-

To get acquainted with the processing technology of Bakery and Confectionery products

Learning outcomes: the students will be familiar to various types of wheat flour, its application in bakery products and skill development in preparation of various bakery and confectionary products.

Unit-I

Wheat: Classification, grading systems, chemical constituents, Milling of wheat- Roller flour milling process, break rolls, reduction roll, design and operation of wheat milling process. Physico-chemical and Rheological properties of dough.

Unit-II

Bakery products-Role of bakery ingredients(Major & minor), bread making methods i.e. straight and sponge dough method, Quality control and testing of raw material, testing of final product, bread faults, staleness and ropiness in bread

Unit-III

Technology for preparation of various baked products from soft wheat viz. Cookies, Biscuits, cakes, role of ingredients, faults and remedies.

Unit-IV

Confectionery Technology- History, traditional confectionery goods, types of confectionery.

Raw materials Ingredients-sugar, sugar qualities, physical, chemical properties dextrose, fructose, lactose, caramel, maltose, honey, sorbitol, mannitol, soya maltose, isomalt etc.

Unit-V

High boiled sweets, Toffee, Fondents-Fudge, Chocolate processing technology- Ingredients, mixing, refining, conching, tempering, molding, cooling, coating, fat bloom. Packaging requirements of bakery and confectionery products.

Reference Books for Bakery & Confectionary Technology:

1. Bakery science and Cereal Technology- NeelamKhetarpaul
2. Technology of Cereals- Kent.
3. Basic Baking- S.C. Dubey.
4. Flour Milling Process-Scott
5. Sugar Confectionery and Chocolate Manufacture- R. Less and E.B. Jackson
6. Chocolate, Cocoa & Confectionery Sci. & Tech.- Bernared W. Minifie
7. Industrial Chocolate Manufacture and use-S.T. Beekelt I.
8. Bread-spensor.

FPP-216: Lab- Bakery & Confectionary Technology

3 Credits (45 Hrs)

1. Determination of gluten content in wheat flour sample
2. Determination of dough raising capacity of wheat flour.

3. Manufacturing technology of bread making.
4. Manufacturing technology of cake and cookies making.
5. Manufacturing technology of biscuit making.
6. Manufacturing technology of different chikki.
7. Manufacturing technology of Chocolate.
8. Manufacturing technology of fruit toffee/ candy.
9. Manufacturing technology of high boiled sweets.
10. Visit to bakery and confectionery industry.

Semester-IV

General Education

Components

Second Year- Semester – IV

FPP-217: Environment Science

4 Credits (60 Hrs)

UNIT-I

Environment: Environment Science, Scope and importance, Components of environment – i) Atmosphere, Composition of atmosphere, ii) lithosphere – Structure of lithosphere, soil formation, soil composition and properties of soil, iii) Hydrosphere – distribution of water on earth, global water balance and hydrological cycle.

UNIT-II

Environment Problems: A) Air pollution – concept, source of air pollution, major atmospheric pollutants, air quality standards monitoring of major air pollutants. B) Water pollution – sources of water pollution, river pollution, underground water pollution, oil pollution, thermal pollution, water pollution due to sewage, effects of water pollution, waste water treatment. C) Noise pollution – sources of noise, effects of noise pollution, noise pollution, noise pollution control equipment silencers and noise absorbing devices, noise standards and industrial noise control. D) Soil pollution – causes of soil pollution major soil pollutants, industrial waste and their role in soil pollution. E) Radiation pollution – sources of radioactive pollution, effects of radioactive pollution on health.

UNIT-III

Impact of industries on Environment: Water pollution episodes due to industrial pollutants, effects of industrial pollutants on aquatic organisms, industrial and underground water quality. Air pollution episodes due to industries-Bhopal gas tragedy, Photochemical smog, Acid Rivers etc. Industrial noise pollution and workers health problems.

UNIT-IV

Water Conservation: water use pattern-water use in industry, Water conservation-methods of water conservation, rain water harvesting, Reuse and recycle of water.

LPM-218 Applied Psychology

4 Credits (60 Hrs)

UNIT –I Understanding The Self

Self-esteem and Subjective well being

Positive Thinking and Optimism

Creative Thinking, Problem Solving and Decision Making

Goal setting and Time management

Motivation

Emotional intelligence

UNIT –II Working with others

Communication (Verbal and Non Verbal)

Empathy and Listening skills

Giving and receiving Feedback

Conflict Management

Team Building and Team work

UNIT –III Balancing work and life

Work Life Conflict

Impression Management

Job satisfaction and Employee satisfaction

Stress Management

UNIT –IV Understanding Leadership and its challenges

The Role of power and expectations

Leadership styles

Leadership functions

Pressures and problems of leadership

References:

- ✓ Schultz.D & Schultz.S., (2010), *Psychology and Work Today*, Indian Edition, Dorling Kindersley Pvt. Ltd, New Delhi, India.
- ✓ Feldman.R.,(2016), *Understanding Psychology* ,Tenth Edition, McGraw Hill Education Pvt. Ltd, India.
- ✓ Kumar.V., (2008), *General Psychology*, Himalaya Publishing House ,India.
- ✓ Weiten.W.,Hammer.E. & Dunn. D.,(2009), *Psychology and Contemporary Life: Human Adjustment*, Wadsworth, Cenagage Learning,USA.
- ✓ Feldman.R.,(2016), *Understanding Psychology* ,Tenth Edition, McGraw Hill Education Pvt.Ltd, India.

LPM-219 Marketing Strategies

4 Credits (60 Hrs)

Marketing as strategy: Understanding new era organizations and the marketing environment today, the role of market orientation, technological advances, global marketing imperative, marketing ethics & social responsibility.

Market opportunity recognition and evaluation: Internal analysis, External analysis, The marketing information system, Buyer behavior, Segmentation & targeting.

Broader Concerns today: Stake holder Concerns & issues Sustainable & Green marketing New paradigms for Organizations & Consumers

Products, Services & Innovation: Marketing's role in new product/new service development managing across the life cycle Marketing channels and the marketing ecosystems

Marketing Planning and Execution: Different approaches to planning for Marketing. Forecasting & Scenario planning Marketing mix & Resource allocation Marketing communication – Multi channel integration Pricing, Branding, Value driven Relationship **New Challenges:** Marketing & the creative industries Marketing & the new media Marketing to the bottom of the pyramid Frugal & grass root Marketing.

References:

- 1 Marketing Strategies, A contemporary approach by Ranchod & Gurau, Pearson India, 2012.
- 2 Strategic Marketing by Xavier, Response Books, 2010.
- 3 Marketing: Planning, Implementation, Control by Pride and Ferrell, Cengage, 2010.
- 4 Strategic marketing problems: Cases & Comments by Kerin & Peterson, Pearson 2012.

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