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

(Third 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**: 2021-22
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 2021-22 (Third Year Syllabus)

- **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

$$SGPA = \frac{\text{Sum (Course Credits) X Number of Grade Points in concerned Course Gained by the Student}}{\text{Sum (Course Credits)}}$$

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.

$$CGPA = \frac{\text{Sum (All six Semester SGPA)}}{\text{Total Number of Semester}}$$

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-202	Dairy Technology	3	3	15	60	75

FPP-203	Processing Technology of Cereals, Legumes and Oil seeds	3	3	15	60	75
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	3	6	25	25	50

	Technology					
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-V

Skill Development Components

G.M.D. Arts, B.W. Commerce and Science College, Sinnar, Dist. Nashik

B. Voc. (Food Processing and Preservation) Degree Course

(Food Processing and Preservation) (A.Y.2021-22)

Third Year Semester V

FPP-301: Food regulation and quality control 4 Credits (60 Hrs)

Learning Objectives:

1. To study in depth the theory and practice of food safety in food, beverage and allied industries.
2. To take cognizance of recent advances and the impact of genetic methods on the food industry.
3. To develop the students understanding of quality management, its role, its implementation in process management and the integration of management systems for product quality, safety and environmental care.

Learning Outcomes:

1. Be able to critically evaluate the recent developments in the control of food safety.
2. Have an integrated view of the issues involved.
3. Be able to conduct risk assessments of food safety problems including genetic modification.
4. Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.
5. Be able to explore the history and basic ideas underlying quality management and have a detailed knowledge of the role of Quality Management (QM) in modern management.
6. Demonstrate knowledge of quality management systems, their implementation and the practical steps needed for implementation.
7. Know how to control and maintain a quality management system.

Unit-I

Introduction

- Food safety issues; physical, chemical and microbiological contaminants, bovine spongiform encephalopathy (BSE), genetically modified organisms and genetically modified foods and food safety system.

Physical and Chemical Contaminants

- Metals, mineral (soil, engine oil, stones), plant (leaves, twigs, pods and skins), animal (hair, bone, excreta, blood, insects, larvae).

- Safety evaluation of food ingredients
- Major pathways by which chemical residues and contaminants enter the food chain.
- Agrochemicals and veterinary drugs, packaging materials, process equipment and ingredient impurities. Mycotoxins
- Marine and Freshwater toxins (formally known as Phycotoxins)
- Plant toxins and toxic plants
- Toxic Mushrooms

Unit-II

Microbiology Food Safety

- The significance of food borne disease.
- Recent emerging pathogens.
- Non-bacterial agents – Protozoa; Cryptosporidium parvum., Toxigenic fungi; mycotoxins of Aspergillus. Food borne viruses; gastroenteritis viruses.
- Spongiform encephalopathies; bovine spongiform encephalopathy (BSE).
- Factors affecting the emergence of pathogens.

Unit –III

Control of Food Safety and Quality Management

- Definitions and terminology in Quality Management Systems
- History of quality control and quality management
- Quality management theories and their authors
- Quality Management Systems ISO 9000 – ISO 2000
- Environment Management System- ISO 14000
- Laboratory Management System - ISO 17025
- Food Safety Management System -ISO 22000

Unit- IV

- Good Manufacturing Practices (GMPs);
- Hazard Analysis and Critical Control Point (HACCP) concept;:
- Prevention of Food adulteration Act (PFA Act)
- Food Safety and Standards Authority of India (FSSAI)

References:

1. Schmidt, R.H. and Rodrick, G.E. (2005). Food Safety handbook. John Wiley & Sons, Inc. Altug, T. (2002). Introduction to Toxicology and Food. CRC Press.

2. Food Chemical Safety, Volumes 1 & 2 (2002), Edited by Watson, D.J., CRC Press.
3. Macdonald, John, (2003).Total quality management in a week / John Macdonald. 3rd ed. Hodder & Stoughton.
4. Oakland, John S. (2003). Total quality management: text with cases 3rd ed. Oxford;
5. Burlington, MA: Butterworth-Heinemann.

FPP-302: FOOD PACKAGING 4 Credits (60 Hrs)

Learning Objectives:

1. To impart comprehensive overview of the scientific and technical aspects of food packaging.
2. To provide knowledge on packaging machinery, systems, testing and regulations of packaging.

Learning Outcomes:

1. Understand the principles, the fundamentals and the importance of packaging systems in the supply chain of food
2. Acquire knowledge on major packaging systems for foods and beverages in what concerns the materials, properties and their relation with the foods shelf-life and performance in the supply chain.
3. Be able to design evaluation schemes and to interpret laboratory results in order to select optimized packaging systems
4. Have an overview of physical, mechanical and chemical properties of the materials
5. Understand the impact of packaging on the safety of the food product and the role regarding food security

Unit-I

Introduction & Impact on the environment

- Packaging Functions and Requirements
- Printing of packages
- Barcodes & other marking
- Labeling Laws

Unit-II

Glass bottles Metal packaging, Metals and internal coatings

- Types and closure systems
- Raw-materials and composition
- Properties and uses
- Types of cans and innovations
- Properties and uses

Unit-III

Paper and board

- Materials types

- Construction and mechanical resistance

Unit-IV

Plastic packaging

- Polymer properties and plastics
- Types and production of packages
- Properties and uses

Unit-V

Packaging and Preservation technologies

- Frozen and dried
- Thermal processing and aseptic filling
- Modified atmosphere packaging

Food contact materials & Shelf-life

- Chemical hazards
- Overall and specific migration
- Legislation and guidelines
- Factors affecting shelf-life: temperature, light, oxygen, aw, packaging
- Shelf-life estimation: direct and accelerated methods, mathematical simulation

References:

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012
2. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and 46 Professional, 1992
3. Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003

FPP-303: SPICES & FLAVOUR TECHNOLOGY **4 Credits (60 Hrs)**

Learning Objectives:

1. Grain knowledge about the basis types of spices and aromatic herbs
2. The relevant legislation and decrees hygienic and microbiological requirements for seasoning.
3. Acquire skills to distinguish - distinguish the different kinds of spices and a mixture recommend it for specific food applications (bakery and confectionery, meat products, ready meals, beverages, etc.)

Learning Outcomes:

1. Acquiring knowledge and skills in solving problems related to the preservation and use of spices
2. Ability to understand foreign cultures and customs
3. Ability to work independently
4. Professional knowledge
5. Skilled at utilizing and processing information

Unit-I

Introduction

Production and processing scenario of spice and its scope, Production and processing scenario of flavor.

Unit-II

Major Spices

Post-Harvest Technology, Composition, Processed products of spices: Ginger, Chill, Turmeric, garlic, Pepper and Cardamom.

Unit-III

Minor spices

Minor spices, Ajwan, coriander, cumin, cinnamon, fenugreek, garlic, mustard, mace, nutmeg, onion, saffron, tamarind, cloves, mint and asafetida

Unit-IV

Types and sources of flavours

Types of flavours, Sources of flavours (natural, processed and added), Flavour composites (natural, semi-synthetic and synthetic). Flavours production in fermented foods.

Unit-V

Extraction and analysis of flavor components

Extraction of flavours from various sources, conditions and extracting agents. Analysis of flavours components (Subjective and objective)

Flavors in industries

Formulations of flavours. Flavours of soft drinks, Baking and confectionery industries, Standard specification of flavours.

FPP – 304 Lab- Spices & Flavour Technology 3 Credits (45 Hrs)

1. Extraction of oleoresins-Turmeric, ginger, pepper, clove
2. Steam distillation of spices
3. Detection of microbial quality and adulteration in spices
4. Determination of curcumin content in turmeric
5. tudy of standard specification of spices
6. Preparation of curry powder
7. Preparation of Indian Masala for different foods
8. Storage and packaging of spices
9. Storage and packaging of spices
10. Visit to spice industry

References:

1. Spices – vol. II - Parry J.W.
2. Spice and condiments - Pruthi J.S.
3. Herbs and spices - Rosemery Hemphill
4. The book of spices - Rosen garten, F. and Livington Jr.
5. Spices and herbs for the Food Inudstry - Lewies, Y.S.
6. Spices Vol. I and II; Tropical Agril. Series - Purseglove, J.W. Brown E.G., Green C.L. And Robbins SRJ.
7. Food Flavourings - P.R. Ashust
8. Food Flavouring composition, - J. Merrory manufacture and uses

FPP – 305: Project – I 3 Credits

Project: New Product Development

Semester-V

General Education

Components

Third Year Semester V

General Education Components:

FPP – 306 Entrepreneurship-I 4 Credits (60 Hrs)

UNIT –I The Entrepreneurial Evolution

Nature & Development of Entrepreneurship.

The Entrepreneurial Decision Process.

Role of Entrepreneurship.

Entrepreneurial background & characteristics.

UNIT –II Starting an Enterprise

New Venture Formation.

Resource requirement to set-up & start-up & operate Enterprise.

Licenses/Permissions/Approvals/etc.

Government schemes for Enterprises.

UNIT –III Creativity in Enterprise

Idea Generation.

Creative Problem Solving.

Product Identification & Development.

The Plans.

UNIT –IV Managing the Enterprise

Organization structure.

Functions/Activities/Processes/Systems.

Growth/Development of the Enterprise.

Exiting the Enterprise

References:

- ✓ Entrepreneurship – 6th Edition. Robert D Hisrich, Michael P Peters, Dean A Shepherd. McGraw-Hill.
- ✓ Entrepreneurship – David Stokes, Nick Wilson, Martha Mador.South-Western Cencage Learning.
- ✓ The Oxford Handbook of Entrepreneurship – Mark Casson, Bernard Yeung, AnuradhaBasu, Nigel Wadeson. Oxford University Press.
- ✓ Entrepreneurship in India. Dr Sanjay Tiwari, DrAnshuja Tiwari. Sarup & Sons.
- ✓ Patterns of Entrepreneurship Management. 3rd Edition. Jack M Kaplan, Anthony C Warren. John Willey & Sons Inc

FPP – 307 Human Resource Management 4 Credits (60 Hrs)

1. INTRODUCTION OF HRM

HRM: definition, scope, functions and objectives

Policies and principles of human resource management

HRM model

Application: challenges of HRM

2. EMPLOYEE SELECTION AND EVALUATION

Employee selection – selection process

Employee selection methods – job analysis, biographical information, interviews, references, letters of recommendation

Evaluation – job evaluation and performance appraisal; definition, process, challenges and methods

Application: uses of psychological testing in employee selection Process

3. TRAINING AND DEVELOPMENT

Training and Development – nature, scope, process and goals of training programs

Training need analysis, training methods

Employee welfare – Definition and types

Application: Assessment centre

4. WAGES AND INCENTIVES

Employee remuneration: components, theories, factors

Incentive payments: definition, importance, types

Employee benefits and services: definition, types

Application: token economy

References:

1. Aswathappa, K. (2005). *Human Resource Management and Personnel Management: Text and Cases*. 4th ed. New Delhi: McGraw Hill.

2. Dessler, G. &Varkkey,B.(2009).Human Resource Management. New Delhi : Pearson

3. Rao, V.S.P. (2005). Human Resource Management: Text and Cases. New Delhi: Excell

FPP – 308 Projects / Survey / Seminar / Model 4 Credits

Topics

1. Market Survey, Product Planning, Innovativeness & Creativity, and Presentation of project concept note / product plan.
2. Organization of resources and utilities, Regularity in production & adhering to Plan, Positioning of product in market.
3. Skill Development, Product Quality Control and Evaluation.
4. Marketing Strategy (type of consumer, product costing, etc), Preparation of Marketing Material (Brochure containing product information, etc), Sales volumes, Profit generated including C/B ratio and Payback period, etc.
5. Record keeping (for Raw material), Financial records related to product, Preparation of product manual.
6. Project Report should be prepared based on ELP experience of students for micro/small/medium scale industry level, presentation of report, oral performance.
7. Preparation of report.

Semester-VI

Skill Development

Components

G.M.D. Arts, B.W. Commerce and Science College, Sinnar, Dist. Nashik

B.Voc- (Food Processing and Preservation) Degree Course

(Food Processing and Preservation) (A.Y.2018-19)

Third Year- Semester – VI

Skill Development Components

FPP-311: Food Safety, Hygiene & Sanitation 4 Credits (60 Hrs)

Learning objectives:

1. Knowledge Capability: This is the understanding of appropriate and relevant fundamental and applied scientific knowledge with the ability to use and apply that knowledge in a wide range of situations, including new situations within the professional discipline.
2. Problem Solving: The ability to apply scientific principles and methods to identify and solve problems associated with a particular area of professional expertise.

Learning outcomes:

On completion of this course, students should be able to:

1. Identify food safety hazards and their control
2. Identify & prevent potential sources of food contamination
3. Apply a range of food quality systems
4. Prepare a food safety plan

Unit - I

Contamination

Introduction of sources of contamination, Concept of food Safety and Management.

Classification of food according to ease with which it spoils.

Conditions & signs of spoilage in fresh, dry & preserved food.

Unit - II

Food Born Diseases

Mode of transmission of disease &food born illness,Bacterial & Viral food intoxications, Naturally occurring intoxications, Food allergies, control of food bornillness

Unit – III

Personal Hygiene & safety

Necessity for personal hygiene, health of staff,

Personal appearance, sanitary practices habits protective clothing Importance of rest and e xercise, Safety at the work place

Unit – IV

Sanitary procedures:

Importance of sanitary procedures in Food processing,Special Food Operations

Introduction, mobile food units, vending machines, street side foods and diseases, Cleaning procedures – Cleaning & sanitizing , their importance.

Unit – V

Pest control

Importance, Classification of pest, effect of pesticides on pest & their methods of applicait-ion , precaution to be taken while handling pesticides

Reference Books:

1. Food Hygiene & Sanitation S. Roday
2. Hospitality industry handbook on Hygiene & safety – Lisa Gordomn – Davis
3. Principles of food sanitation – Norman G .Marriott & Gravani
4. Essentials of food sanitation – Norman G .Marriott & Robertson

FPP-312: Waste & By-products Utilization 4 Credits (60 Hrs)

Learning Objective:

1. This subject is aimed to develop an understanding among the students on
2. Origin and type of waste and by products, waste identification, classification and composition.
3. Need for treatment and utilization. Impact of waste disposal on environment.
4. Food waste water treatments.
5. Legal and statutory requirements for food waste handling, treatment and disposal.

Learning Outcome:

On successful completion of this course, students will be able to;

1. Identify various waste from food industries and understand their characteristics
2. Understand various methods of waste treatment and disposal
3. Understand various by products from food industry waste
4. Design and develop a functional ETP plant to suit requirement.
5. Understand legal aspects related to food waste disposal.

Unit – I

Food industry By-products and Waste: Introduction, status in India, definition, origin and type of waste and by-products, their identification, classification, composition and characterization, need for treatment and utilization, impact on environment, food waste as source of biogenic raw material and energetic utilization.

Unit – II

Introduction to Food Waste treatments, basic unit operations, techniques & equipment for treatment, primary treatments like screening, sedimentation, skimming, floatation coagulation & flocculation, flow equalization, filtration, adsorption, chemical oxidation, membrane separation, ion exchange. Anaerobic & aerobic digestion of organic wastes, activated sludge process, biomass generation & its utilization.

Unit – III

Food Wastes and By-products Related to Specific Processing Industries like fruit and vegetables (apple, orange, mango, potato etc.), dairy industry, oil and oil seeds industry, sugar industry, grains and milling industry, fermentation (alcohol and beer), livestock and poultry, fish, meat.

Unit – IV

Brief Case Studies involving (i) utilization of whey from dairy industry, (ii) Utilization of specific plant by-products for recovery of proteins, pectins, dietary fibres, antioxidants, colorants etc. (iii) Utilization of biomass for production of animal feed, compost and bio-gas.

Unit – V

Waste handling and treatment, Farm wastes, Incineration of solid food waste and its disposal. Future Trends, introduction to legal and statutory requirements for food waste handling, treatment and disposal.

Reference Books:

1. Waste Management for the Food Industries, by Ioannis S. Arvanitoyannis, First edition 2008, Elsevier Inc, USA.
2. Food and Agricultural Wastewater Utilization and Treatment, Sean X. Liu, First edition 2007 Blackwell Publishing, Iowa 50014, USA.
3. Managing Food Industry Waste, ROBERT R. ZALL, First edition, 2004, Blackwell Publishing Professional, Iowa, USA.
4. The Treatment and Handling of Waste by Bradshaw AD Chapman & Hali. Alternative Strategies for the Treatment of Food Processing Waste by Rockey J.
5. Food Processing Waste Management by Green J.H. AVI Publication 7. Post harvest Technology of Fruits and Vegetables by L.R. Verma. Indus Pub

FPP – 313: Novel Food Processing Technologies 4 Credits (60 Hrs)

Learning Objectives:

1. Provides insightful, first-hand experiences of many pioneering experts involved in the development and commercialization of foods produced by novel processing technologies

2. Presents case studies of commercial products preserved with the leading non thermal technologies of high pressure processing and pulsed electric field processing

3. Features alternative novel techniques, such as dense phase carbon dioxide, ozone, ultrasonics, cool plasma, and infrared technologies utilised in food preservation sectors

Learning Outcome:

1. In depth understanding of novel and innovative food sciences and emerging technologies
2. Understanding and ability to apply these novel technologies and the underpinning science to preserve and control the nutritional, microbiological and functional properties of foods.
3. Ability to apply and adapt novel technologies to real-life innovative products and processes

Unit - I

Principles of high pressure processing (HPP), use of high pressure to improve food safety and stability. Effects of high pressure on food quality, Modeling High Pressure Processing Pressure effects on microorganisms, enzyme, texture and nutrients of food. Modeling HP processes.

Unit - II

Pulsed electric fields processing Historical background, PEF treatment systems, main processing parameters. PEF for processing of liquid foods and beverages, PEF Processing for solid foods.

Unit – III

Food Safety aspects, Mechanisms of microbial and enzyme inactivation by HPP and PEF, Food safety aspects of pulsed electric fields, and high pressure processing.

Unit – IV

Osmotic dehydration, Mechanism of osmotic dehydration, effect of process parameters on mass transfer, determination of moisture and solid diffusion coefficient, application of osmotic dehydration, Athermal membrane concentration, Athermal membrane concentration of liquid foods and colours: osmotic membrane distillation, direct osmosis, membrane modules, Applications of membrane concentration.

Unit – V

Radio frequency electric fields Processing by radio frequency electric fields s equipments, RFEF non-thermal inactivation of yeasts, bacteria and spores, electrical costs, Ultrasound processing, Fundamentals of ultrasound, ultrasound as a food preservation and processing aid, effects of ultrasound on food properties, Alternate thermal processing: Microwave heating: dielectric properties of foods, heat and mass transfer in microwave processing, application of microwave processing for foods.

Reference Books:

1. Sun, Da-Wen, Emerging Technologies for Food Processing, Academic Press, 2005
2. Barbosa-Canovas, Tapia & Cano, Novel Food Processing Technologies, CRC Press-2004
3. Ohlsson, Minimal Processing technologies in the food industry, Wood head Publishing Limited, 2002 4. Rao E. S. Food Quality Evaluation. Variety Books. 2013

4. Pomeranz Y and Meloan CE. Food Analysis – Theory and Practice, CBS Publishers and Distributors, New Delhi. 2002.
5. eilgard, Sensory Evaluation Techniques, 3rd ed. CRC Press LLC, 1999.
6. Amerine, Pangborn & Roessler, Principles of Sensory Evaluation of food, Academic Press, London, 1965.

FPP – 314: Implant Training: Report & Seminar **3 Credit**

FPP – 315: Dissertation **3 Credit**

Semester-VI

General Education

Components

G.M.D. Arts, B.W. Commerce and Science College, Sinnar, Dist. Nashik

B.Voc- (Livestock Production and Management) Degree Course

(Livestock Production and Management) (A.Y.2018-19)

Third Year- Semester – VI

General Education Components

LPM – 316: Entrepreneurship-II 4 Credits (60 Hrs)

UNIT –I Enterprise and Entrepreneurship

Functional areas of Management (Contexts of Finance- HR- Marketing- Manufacturing- etc.)

Personality- Attitudes- Work Behaviour- Ability- Values- Job Performance

Localization/Globalization

Value-based Leadership

UNIT –II Principles of Management

Management Ideas

Developing Mission- Vision- Values

P-O-L-C (Planning-Organizing-Leading-Control)

Stakeholders interests

UNIT –III Strategizing

Strategic Management Process- Corporate Strategy.

SWOT - Porter's Generic Strategy.

Value-Chain- VRIO Blocks (Value-Rarity-Inimitability-Organizational).

5-Forces. STEPLE. Strategy Diamond

UNIT –IV Principles of Organisation

Goals- Objectives- MBO- Balanced Score-Card.

Organization Structures & Change.

Organization Culture.

Social Networks.

REFERENCES :

- Management Fundamentals - Management & Entrepreneurship: Concepts, Application, Skill-Development. Robert N Lussier. South-Western Cengage Learning.4th Edition.
- The Oxford Handbook of Entrepreneurship – Mark Casson, Bernard Yeung, Anuradha Basu, Nigel Wadeson. Oxford University Press.
- Entrepreneurship Development in India. Sami Uddin. Mittal Publications.

- Dynamics of Entrepreneurial Development & Management - Vasant Desai. Himalaya Publishing House.

FPP-317: Organizational Behavior 4 Credits (60 Hrs)

INTRODUCTION

1.1 Organizational Behaviour: concept, scope, challenges and opportunities

1.2 Foundations of individual behaviour: ability, biographical characteristics, learning, attitudes and job satisfaction, personality and values

1.3 Innovations in organization planning: flexi time, flexi plan and job enrichment

1.4 Application: time management

2. MOTIVATION PROCESS

2.1 Motivation: concept, nature & process of motivation

2.2 Theories of motivation

2.3 Intrinsic and extrinsic motivation and incentive systems

2.4 Application: Emotional Intelligence in organizational setting

3. JOB SATISFACTION AND STRESS AND CONFLICT

3.1 Factors affecting on job satisfaction

3.2 Work stress: sources, consequences, managing stress-individual and organizational approach

3.3 Concept, causes, consequences of conflicts and methods of conflict resolution

3.4 Application: group dynamics

4. LEADERSHIP

4.1 Nature and characteristics of successful leaders' types

4.2 Functions and approaches; trait, behavioral and contingency models

4.3 Role of power in leadership

4.4 Application: management grid

References:

1. Aamodt, M. G. (2001). *Industrial/organizational psychology*. New Delhi: Cengage.
2. Luthans, F. (2005). *Organizational behavior (12th Ed.).* New York: McGraw Hill.
3. McShane, S. L. & Von Glinow, M. A. (2007). *Organisational Behaviour*. New Delhi: McGraw Hill.
4. Moorhead, G. & Griffin, R. W. (2005). *Organisational Behaviour.* New Delhi: Biztantra.
5. Muchincky. (2009). *Psychology applied to work*. New Delhi: Cengage.
6. Riggio, R. E. (2003) Introduction to Industrial/Organizational Psychology (4th d.). New Jersey: Prentice-Hall.

7. Robbins, S., Judge, T.A., &Sanghi, S. (2009). *Organizational behavior (13th Ed.).* New Delhi: Pearson Education.

FPP – 318: Disaster Management 4 Credits (60 Hrs)

Unit: I Definition and types of disaster Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires.

Unit: II Study of Important disasters Earthquakes and its types, magnitude and intensity, seismic zones of India, major fault systems of India plate, flood types and its management, drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g) Earthquakes, Landside). Social Economics and Environmental impact of disasters.

Unit: III Mitigation and Management techniques of Disaster Basic principles of disasters management, Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warming Systems, Building design and construction in highly seismic zones, retrofitting of buildings.

Unit IV Training, awareness program and project on disaster management Training and drills for disaster preparedness, Awareness generation program, Usages of GIS and Remote sensing techniques in disaster management, Mini project on disaster risk assessment and preparedness for disasters with reference to disasters in Sikkim and its surrounding areas.

References:

1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.

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