VIMALA COLLEGE (AUTONOMOUS)

(NAAC Re-accredited (3rd Cycle): A Grade, CGPA-3.50) **(Affiliated to University of Calicut)**

DEGREE OF

BACHELOR OF VOCATION (B.Voc)

IN

FOOD PROCESSING

UNDER THE

FACULTY OF HOME SCIENCE

SYLLABUS

Choice Based Credit and Semester System
(CUCBCSS UG-2014)
(2018 ADMISSION ONWARDS)

VIMALA COLLEGE (AUTONOMOUS)

THRISSUR

KERALA-680009

INDIA

REGULATIONS FOR DEGREE OF

Bachelor of Vocation (B.Voc) In FOOD PROCESSING

1 PROGRAMME OBJECTIVE

The basic objective of the Programme is to open a channel of admission for vocational courses for students, who have done the 10+2 Science and are interested in food processing as carrier

The B.Voc courses are designed with the following objectives,

- To provide judicious mix of skills relating to a profession and appropriate content of General Education.
- To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- To provide vertical mobility to students coming out of 10+2 with vocational subjects.

2 GENERAL PROGRAMME STRUCTURE

Duration: The duration of the B.Voc. FOOD PROCESSING Programme shall be 6 semesters distributed over a period of 3 academic years. The odd semesters (1, 3,5) shall be from June to October and the even Semesters (2, 4, 6) shall be from November to March. Each semester shall have 90 working days inclusive of all examination days distributed over a minimum of 18 weeks of 5 working days consisting of six hours. For final semester internship, the total duration is 450 hours.

Course: The B.Voc programme focuses upon the skill development of the candidate to prepare them as industry-ready professionals. The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components.
The UG programme shall include General Education Component (Code GEC), Core courses (Code SDC) and Audit courses (Code E).

General Education Components

- The general education component provides emphasis to Communication skills, Presentation skills, Health and Safety, Industrial Psychology, Environmental awareness, Entrepreneurship development and other relevant subjects in the field.

- An option for additional language should be provided which enhances the employability outside the state.
- General Education Components should not exceed 40% of the curriculum

The minimum number of courses required for completion of the Diploma in Food Processing is 12, Advanced Diploma in Food Processing is 24 and B.Voc. Food Processing Programme is 36. Total credits in a semester: 30 (equivalent to 450 hours).

Credits:

Ability enhancement courses/ Audit courses: These are courses which are mandatory for a programme but not counted for the calculation of SGPA or CGPA. There shall be one Audit course each in the first four semesters. These courses are not meant for class room study. The students can attain only pass (Grade P) for these courses. At the end of each semester there shall be an examination conducted by the college from a pool of questions (Question Bank) set by the University. The students can also attain these credits through online courses like SWAYAM, MOOC etc. (optional). The list of passed students must be sent to the University from the colleges at least before the fifth semester examination. The list of courses in each semester with credits is given below.

Course with credit	**Semester**
Environment Studies – 4	1
Disaster Management – 4	2
*Human Rights/Intellectual Property Rights/ Consumer Protection – 4	3
*Gender Studies/Gerontology- 4	4

*Colleges can opt any one of the courses.

Grace Marks: Grace Marks may be awarded to a student for meritorious achievements in cocurricular activities (in Sports/Arts/ NSS/NCC/ Student Entrepreneurship) carried out besides the regular class hours. Such a benefit is applicable and limited to a maximum of 8 courses in an academic year spreading over two semesters. No credit shall be assigned for such activities. In addition, maximum of 6 marks per semester can be awarded to the students of UG Programmes, for participating in the College Fitness Education Programme (COFE).

Levels of Awards

B.Voc is programme with multiple exits. Following table shows the various certificates and their duration.

Awards	**Duration**

Diploma	2 Semesters
Advanced Diploma	4 Semesters
B.Voc Degree	6 Semesters

Students are free to exit at any point in the duration of the programme. Only those students who successfully complete the courses and clear the examination are eligible for the certificate. Separate certificate will be awarded for each year for successful candidates. Students who fail in any course may be allowed to move the higher level but won't be eligible for any certificates until she clears previous courses. B.Voc degree will confer to those whose successfully complete the diploma, advanced diploma and project/ internship.

Attendance:

A candidate shall be permitted to appear for the Semester-End examinations only if she satisfies the following requirements:

- She must secure not less than 75% attendance in the total number of working days in each semester.
- She must earn a progress certificate from the head of the institution stating that she has satisfactorily completed the course of study prescribed in the semester as required by these regulations.
- Her conduct must be satisfactory.

It shall be open to the Controller of Examinations to grant condonation of shortage of attendance on the recommendation of the head of the institution in accordance with the following norms.

- The shortage shall not be more than 10%
- Shortage up to 20% shall be condoned once during the entire course provided such shortage is caused by continuous absence on genuine medical grounds.
- Shortage shall not be condoned more than twice during the entire course.
- Candidate who is not eligible for condonation of shortage of attendance shall repeat the semester as per university norms.

If a student registered in first semester of the B.Voc. Computer Science Programme is continuously absent from the classes for more than 14 working days at the beginning of the semester without informing the authorities the matter shall immediately be brought to the notice of the Principal. The names of such students shall be removed from the rolls.

Registration/Re-registration

Every candidate should register for all subjects of the End examinations of each semester. A candidate who does not register will not be permitted to attend the Semester-End examinations; she shall not be permitted to attend the next semester. A candidate shall be eligible to register for any higher semester, if she has satisfactorily completed the course of study and registered for the examination. She should register for the semester at the start of the semester before the stipulated date. College will notify the starting and closing dates for each semester.

Re-joining the course

- Re-joining the course will be allowed to only if the candidate has secured a minimum CGPA of 2.5.
- The candidate should remit the fees prevailing at that time.
- B.Voc governing council will take the decision regarding the re-joining.

College Transfer

College transfer is not allowed in any circumstances.

The purpose of B.Voc programmes is to generate and employ the skilled workforce for national development. Therefore, the B.Voc. Programme will not be considered equivalent to the general academic programmes, which are intended for imparting a basic knowledge component to the student. However, for a qualified candidate opportunity for the pursuit of higher education shall not be declined and their eligibility for admission to higher courses may be treated by the individual Boards of Studies based on merit and relevance.

3 ADMISSION

Eligibility

- The admission to B.Voc programme will be as per the rules and regulations of the University for UG admissions.
- Basic eligibility for B.Voc is 10+2 and above in any stream (No age limit).
- The eligibility criteria for admission shall be as announced by the University from time to time.
- Separate rank lists shall be drawn up for reserved seats as per the existing rules.
- Grace Marks may be awarded to a student or meritorious achievements in co-curricular activities such as Sports/Arts/ NSS/NCC/ Student Entrepreneurship.
- Preferred subjects and index mark calculations will be decided by the respective Board of Studies.

Diploma Holders

Diploma holders (after 10+2) in the parent courses, approved by the University, who satisfies eligibility criteria can be admitted to the higher diploma (3rd semester) based on the availability of the seats and is under the sole discretion of the principal of the college/ B.Voc consortium.

Reservation/Quota

A maximum of 50 students can be admitted to one B.Voc programme. The students can be admitted only to the first semester (except for diploma holders). No students are admitted directly to the Third and Fifth semester in any circumstance except for diploma holders. Diploma holders may be permitted to third semester directly as mentioned above. The reservation rules for B.Voc is the same as that of the regular UG programmes conducted in colleges affiliated to this university. Separate rank lists shall be drawn up for reserved seats as per the existing rules.

Fees Structure

- The course fee and examination fee for the first three years will be decided by the University.

  a) If the course is conducted under Aided stream, equivalent to BSc Computer Science (Aided Stream)

  b) If the course is conducted under Self Finance mode, equivalent to BSc Computer Science (Self Finance Stream)

- The college can collect Caution deposit, PTA fund, special fees, university fees, sports fee etc. according to the norms provided by the university at the time of admission.
- After third year, with the consent of university/UGC, the college can conduct the same programme in self-financing mode (provided UGC not granting further funds). The course fee and examination fee (Regular/improvement/supplementary) structure in self-financing mode will be decided by the University.

Prospectus

The college shall make available to all students admitted a prospectus listing all the courses offered in various departments during a particular semester. The information so provided shall contain the title of the courses, the semester in which it is offered and credits for the courses. Detailed syllabi shall be made available in the college websites.

There shall be a uniform calendar prepared by the college, conduct/schedule of the courses, examinations and publication of results.

5 COURSE EVALUATION

Evaluation (both internal and external) is carried out using mark system. The grading on the basis of total internal and external marks will be indicated for each course and for each semester and for the entire programme;

Indirect Grading System in 10 point scale is as below:

To find semester Grade Point Average (SGPA)

$$SGPA = \frac{\text{Sum of the credit points of all courses in a semester}}{\text{Total credits in that semester}}$$

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + \ldots}{C1 + C2 + \ldots}$$

Where G1, G2..... are grade points and C1, C2...are credits of different courses of the same semester

Credit point of a semester= SGPA X Credit load of the semester

Total marks for each general and skill courses, including lab courses and Project Evaluation cum Programme viva voce shall be 100 marks.

The evaluation scheme for each course shall contain two parts (1) Internal evaluation (2) External evaluation. 20% weight shall be given to the internal evaluation. The remaining 80% weight shall be for the external evaluation.

INTERNAL EVALUATION

20% of the total marks in each course are for internal examinations. The marks secured for internal assessment only needs to be sent to the University by the colleges concerned. The internal assessment shall be based on a predetermined transparent system involving written tests, Classroom participation based on attendance in respect of theory courses and lab involvement/records attendance in respect of Practical Courses. Internal assessment of the project will be based on its content, method of presentation, final conclusion and orientation to research aptitude. The Evaluation process for Internship and project follows 100% external assessment.

Components with percentage of marks of Internal Evaluation of Theory Courses are- Test paper 40%, Assignment 20%, Seminar 20% and Classroom participation based on attendance 20%. For practical courses - Record 60% and lab involvement 40% as far as internal is concerned.(if a fraction appears in internal marks, the nearest whole number is to be taken). For the test paper marks, at least two test papers should be conducted. If more test papers are conducted, the mark of the best two should be taken.

The Split up of marks for Test paper and Class Room Participation (CRP) for internal evaluation are as follows:

Split up of marks for Test paper

Range of Marks in test paper	**Out of 8 (Maximum internal marks is 20)**	**Out of 6 (Maximum internal marks is 15)**
Less than 35%	1	1
35%-45%	2	2
45%-55%	3	3
55%-65%	4	4
65%-85%	6	5
85%-100%	8	6

Split up of marks for Classroom Participation

Range of CRP	**Out of 4** **(Maximum internal marks is 20)**	**Out of 3** **(Maximum internal marks is 15)**
50% ≤ CRP < 75%	1	1
75% ≤ CRP < 85%	2	2
85% and above	4	3

EXTERNAL EVALUATION

Semester-End examinations for theory and practical courses will be conducted by the College. There shall be examinations at the end of each semester for both theory and practical. Failed or improvement candidates will have to appear for the Semester-End examinations along with regular students.

To ensure transparency of the evaluation process, the internal assessment marks awarded to students in each course in a semester shall be notified on the notice board at least one week before the commencement of external examination. There shall not be any chance for improvement for internal marks. The course teacher(s) shall maintain the academic record of each student registered for the course, which shall be forwarded to the Controller of examinations by the college Principal after obtaining the signature of both course teacher and HOD.

The marks secured for internal examination only need to be sent to university, by the colleges concerned.

The external question papers may be of uniform pattern with 80 marks. The courses with 4/5 credits will have an external examination of 2.5 hours duration with 80 marks. The external examination in practical courses shall be conducted by two examiners – one internal and an external.

Internship and Project

Internship and the major project should be carried out in the industry, not necessarily with industry partners. The major idea for an internship is to implement the things learned and to get a real life experience. The Evaluation process follows 100% external assessment

- There will be an internship/project at the end of 2nd and 4th semesters and an internship for the whole sixth semester.
- Every student will be assigned an internal guide, allotted from the parent department concerned or an expert available in the college appointed by the principal or the head of the department.
- The student has to make regular discussions with the guide while choosing the subject/area and throughout the lifetime of the project.
- At least three reviews should be conducted to evaluate the progress of work.

- An evaluation team is constituted for conducting the evaluation. The team consists of an external examiner, allotted by the university from the approved examination panel, representative from the industry and a faculty.
- Students should submit a report of their work. A valid certificate from the organization should be produced as a proof that the work is carried out in the respective organization.
- Students are required to demonstrate the working model of their work (if possible) to the panel of examiners. A viva will be conducted based on the report and students are supposed to clarify the queries regarding their work.
- Mark distribution for internship assessment

Distribution	Marks
Content and relevance of Dissertation	60
Viva	20
Presentation	20

Minimum for pass

The successful completion of all the courses prescribed for the diploma/degree programme with E grade (40 %) shall be the minimum requirement for the award of diploma/degree.

Notes:

- For Project/internship, the minimum for a pass shall be 50% of the total marks assigned to the respective examination.
- A student who does not secure this pass marks in a subject will have to repeat the respective subject.
- If a candidate has passed all examinations of B.Voc. Course (at the time of publication of results of last semester) except project/internship in the last semester, a re-examination for the same should be conducted within one month after the publication of results. Each candidate should apply for this Save-A-Year examination within one week after the publication of last semester results.

Moderation

- Moderation shall be awarded subject to a maximum of 5 % of external total marks to be awarded in Semester.
- For a course concerned, the maximum of moderation awarded shall be limited to 10% of the total marks to be awarded for the external course concerned.
- If a student fails a single course, this limit can be enhanced to 15 % of external in the course.
- However Board of examiners/B.Voc consortium concerned shall have the liberty to fix low percentage of marks for moderation subjected to the conditions mentioned above.

Pattern of Questions for Semester-End Examinations of Theory/Practical Subjects

The question papers of Semester-End examinations of theory subjects shall be able to perform achievement testing of the students in an effective manner. The question paper shall be prepared

- Covering all sections of the course syllabus and total marks from each module should be approximately the same.
- Unambiguous and free from any defects/errors
- Emphasizing knowledge testing, problem solving & quantitative methods
- Containing adequate data/other information on the problems assigned
- Having clear and complete instructions to the candidates.

The external QP with 80 marks and internal examination is of 20 marks. Duration of each external examination is 2.5 Hrs. The pattern of External Examination is as given below. The students can answer all the questions in Sections A&B. But there shall be Ceiling in each section.

Section A
Short answer type carries 2 marks each - 15 questions Ceiling - 25
Section B
Paragraph/ Problem type carries 5 marks each - 8 questions Ceiling - 35
Section C
Essay type carries 10 marks (2 out of 4) 2X10=20

The pattern of questions for practical subjects will be as follows:

Marks Distribution	Total marks
Theory/ Algorithm/Flow diagram	20
Implementation	30
Result/Output	10
Record	10
Viva	10
Total	80

Credit System

Each subject shall have a certain number of credits assigned to it depending upon the academic load and the nature and importance of the subject. The credit associated with each subject will be shown in the prescribed scheme and syllabi. Each course shall have an integer number of credits, which reflects its weightage.

- One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/IT and tutorials;
- For internship/field work, the credit weightage for equivalent hours shall be 50% of that for lectures/workshops;
- 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/workshops.

Grading- Indirect Grading System

Evaluation (both internal and external) is carried out using Mark system .The Grade on the basis of total internal and external marks will be indicated for each course, for each semester and for the entire programme.

Indirect Grading System in 10 -point scale is as below:

Ten Point Indirect Grading System

Percentage of Marks (Both Internal &External put together)	Grade	Interpretation	Grade point Average (G)	Range of grade points	Class
95 and above	O	Outstanding	10	9.5 -10	First Class with Distinction
85 to below 95	A+	Excellent	9	8.5 -9.49	
75 to below 85	A	Very good	8	7.5 -8.49	
65 to below 75	B+	Good	7	6.5 -7.49	First Class
55 to below 65	B	Satisfactory	6	5.5 -6.49	
45 to below 55	C	Average	5	4.5 -5.49	Second Class
35 to below 45	P	Pass	4	3.5 -4.49	Third Class
Below 35	F	Failure	0	0	Fail
Incomplete	I	Incomplete	0	0	Fail
Absent	Ab	Absent	0	0	Fail

- A student who fails to secure a minimum grade for a pass in a course is permitted to write the examination along with the next batch.
- After the successful completion of a semester, Semester Grade Point Average (SGPA) of a student in that semester is calculated using the formula given below. For the successful completion of a semester, a student should pass all courses. However, a student is permitted to move to the next semester irrespective of SGPA obtained.
- SGPA of the student in that semester is calculated using the formula

SGPA = Sum of the credit points of all courses in a semester
Total credits in that semester

- The Cumulative Grade Point Average (CGPA) of the student is calculated at the end of a programme. The CGPA of a student determines the overall academic level of the student in a programme and is the criterion for ranking the students. CGPA can be calculated by the following

  CGPA = Total credit points obtained in six semesters
  Total credits acquired (180)

- SGPA and CGPA shall be rounded off to two decimal places. CGPA determines the broad academic level of the student in a programme and is the index for ranking students (in terms of grade points).
- An overall letter grade (Cumulative Grade) for the entire programme shall be awarded to a student depending on her/his CGPA

6 GRADE CARDS

The College shall issue to the students grade/marks card (by online) on completion of each semester, which shall contain the following information.

- Name of University
- Name of College
- Title of Under Graduate Programme
- Semester concerned
- Name and Register Number of students
- Code number, Title and Credits of each course opted in the semester
- Internal marks, External marks, total marks, Grade point (G) and letter grade for each course in the semester
- The total credits, total credit points and SGPA in the semester (corrected to two decimal places)
- Percentage of total marks

The final Grade/mark Card issued at the end of the final semester shall contain the details of all courses taken during the entire Programme including those taken over and above the prescribed minimum credits for obtaining the degree. However, for the compilation of CGPA only the best performed courses, if any, with maximum grade points alone shall be taken subject to the minimum credits requirements (180) for passing a specific degree. The final grade card shall show the percentage of marks, CGPA (corrected to two decimal places) and the overall letter grade of a student for the entire Programme. The final grade/mark card shall also include the grade points and letter grade of general and skill components. This is to be done in a seven point indirect scale.

7 REVALUATION

In the new system of grading, revaluation is permissible. The prevailing rules for revaluation are applicable. Students can apply for photocopies of answer scripts of external examinations. Applications for photocopies/scrutiny/revaluation should be submitted within 10 days of publication of results. The fee for this shall be as decided by the university.

8 COURSE IMPROVEMENT

A maximum of two courses can be improved in each semester. Improvement of a particular semester can be done only once. The student shall avail the improvement chance in the succeeding year after the successful completion of the semester concerned. The internal marks already obtained will be carried forward to determine the grades/marks in the improvement examination. If the candidate fails to appear for the improvement examination after registration, or if there is no change in the results of the improvement examination appeared, the marks/grades obtained in the first appearance will be retained.

Improvement and supplementary examinations cannot be done simultaneously.

9 AWARD OF DEGREE

The successful completion of all the courses prescribed for the B.Voc. Food Processing Programme with E grade (40 %) shall be the minimum requirement for the award of B.Voc. Food Processing Programme degree.

10 GRIEVANCE REDRESSAL COMMITTEE

COLLEGE LEVEL

The College shall form a Grievance Redressal Committee in each department comprising of course teacher and one senior teacher as members and the Head of the department as Chairman. This committee shall address all grievances relating to the internal assessment grades of the students. There shall be a College Level Grievance Redressal Committee comprising of Student Advisor, two senior teachers and two staff council members (one shall be elected member) as members and principal as Chairman.

11 ANTI RAGGING CELL

Head of Institution shall take necessary steps to constitute anti-ragging committee and squad at the commencement of each academic year. The committee and the squad shall take effective steps as specified by the Honorable Supreme Court of India, to prevent ragging.

12 PROGRAM STRUCTURE

LEGEND	
Item	**Description**
C	Credits
E	External Component (%)
I	Internal Component (%)
L	Lecture Hours
P	Practical Hours
T	Total

NSQF Level	Skill Component Credits	General Education credits	Total Credits	Duration on	Exit Awards	Job Role/Reference ID
4	18	12	30	One Sem	Certificate	Baking Technician (FIC/Q5005) Mixing Technician (FIC/Q5004)
5	36	24	60	Two Sem	Diploma	Plant Baker (FIC/Q500 Dairy Food Processor (FIC/Q2001) Dairy Product Processor Supervisor (FIC/Q2007) Processed Food Entrepreneurs (FIC/Q9001) Food Product Packing Technician (FIC/Q7007)
6	72	48	120	Four Sem	Advanced Diploma	Food Microbiologist (FIC/Q7603) Quality Assurance Manger (FIC/Q7602)

						Food Regulatory Affair Manger (FIC/Q9002
7	108	72	180	Six sem	B.Voc Degree in Food Processing	Production Manger (FIC/Q9003) Food Quality Controller (Not Aligned) Entrepreneurs (Not Aligned)

Course Code	Title	Credits	T/P	Type
Semester I				
GEC1EG01	A01 Transactions: Essential English Language Skills	4	T	General
GEC1ML02 GEC1HD02	A07 Communication skills other than English (Malayalam /Hindi)	4	T	
GEC1FS03	Perspectives Of Food Science	4	T	
SDC1FQ01	Food Quality And Food Safety Management	4	T	Skill
SDC1BC02	Baking And Confectioneries	4	T	
SDC1BC03(P)	Baking And Confectioneries (Practical)	5	P	
SDC1FS04(P)	Food Science (P)	5	P	
Semester II				
GEC2EG04	A02 Ways With Words	4	T	General
GEC2ML05 GEC2HD05	A08 Literature in Languages other than English (Malayalam /Hindi)	4	T	
GEC2EP06	Entrepreneurship Management And Computer Application	4	T	
SDC2FA05	Food Additives And Adulteration	4	T	Skill
SDC2DP06	Dairy Products And Processing	4	T	
SDC2DP07(P)	Dairy Products And Processing (Practical)	5	P	
SDC2IN08(P)	Internship	5	P	
Semester III				
GEC3EG07	A03 Writing for Academic & Professional Success	4	T	General
GEC3ES08	Environmental Science	4	T	
GEC3PN09	Principles Of Nutrition	4	T	
SDC3FP09	Food Preservation	4	T	Skill
SDC3FT10	Fruits And Vegetable Processing Technology	4	T	
SDC3FT11(P)	Fruits And Vegetable Processing Technology(Practical)	5	P	
SDC3FP12(P)	Food Preservation And Beverages (Practical)	5	P	

Semester IV				
GEC4EG10	A04 Zeitgeist: Readings on Society and Culture	4	T	General
GEC4BW11	Byproduct Utilization And Waste Management	4	T	
GEC4RM12	Research Methodology	4	T	
SDC4FL13	Food Supply Chain ,Food Packaging And Labelling	4	T	Skill
SDC4FM14	Food Microbiology	4	T	
SDC4FM15 (P)	Food Microbiology (Practical)	5	P	
SDC4IN16 (P)	Internship(Project Report)	5	P	
Semester V				
GEC5FE13	Food Engineering	4	T	General
GEC5FC14	Food Chemistry	4	T	
GEC5BM15	Business Management	4	T	
SDC5FL17	Food Plant Designing And Layout	4	T	Skill
SDC5AP18	Animal Food Processing	4	T	
SDC5AP19 (P)	Animal Food Processing (Practical)	5	P	
SDC5QF20 (P)	Product Development, Quantity Food Preparation And Sale (Practical)	5	P	
Semester VI				
SDC6PT21(PR)	IN PLANT TRAINING (PROJECT)	30	P	Skill

Semester I

PERSPECTIVES OF FOOD SCIENCE

Course Code: GEC1FS03
Contact Hours per Week: 4T
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- Understand the nutritive composition of different food groups.
- Impart knowledge about the different methods of cooking

Course Outline

UNIT I : Composition and nutritive value of plant foods(30 hrs)

1. Introduction: - Introduction to food science. Nutrients and functions of food Different methods of cooking
2. Cereals: General Outline, Composition & Nutritive value, Structure of wheat and Rice Cereals and Millets: Wheat- structure and composition, types (hard, soft/ strong, weak). Process of malting, gelatinization of starch, types of browning. Rice- Composition of rice obtained by different dehusking methods, parboiling of rice- advantages and disadvantages. Millets Varieties, composition and uses of maize, sorghum, barley, rye, oats, triticale, pearl millet and finger millet.
3. Pulses & Legumes: Composition, Nutritive value, Anti nutritional factors Changes during cooking, Factors affecting cooking time, Germination, Changes during germination.
4. Nuts & Oilseeds: Composition, sources of proteins and oil, Processing of oil seeds - Soya bean, coconut, Protein isolates, Texturised vegetable protein.
5. Fruits & Vegetables: Composition, Classification, Nutritive value, Vegetable Cookery, Changes during cooking, Ripening, Climacteric, Noncliamaetric fruits, Changes during ripening.
6. Sugar , Fat and Fatty acid Classification

UNIT II :Composition and Nutiritive Value of Animal Foods(20 hrs)

1. Eggs: Structure, Composition, Nutritive value, Grading Changes during storage.
2. Fish: Composition, Nutritive value
3. Meat: Structure, Composition, Nutritive value

UNIT III :Health Foods(4hrs)

1. Health foods: Functional foods, Prebiotics, Probiotics, Neutraceuticals, Organic foods, GM foods, Novel foods
2. Spices: Definition, Classification, Chemical composition, use of spices
3. Plantation Crops

UNIT IV :Evaluation of Food(6 hrs)

1. Objective and Subjective evaluation

References:

1. N Shakuntalamanay and M Shadakshara Swamy (2001) Food Facts and Principles, 2nd Edition, New Age International Publishers.
2. Srilakshmi, B. (2015) Food Science, 6th edition, New Age International Publishers.
3. M Swaminathan (1999) Food science, Chemistry & Experimental Foods, 2nd Edition, The Bangalore Printing & Publishing Co. LTD.

FOOD QUALITY AND FOOD SAFETY MANAGEMNT

Course Code: SDC1FQ01
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- To learn about physical and chemical contaminants in foods.
- Study about food safety management and food laws

Course Outline

UNIT I :Sanitation and Health(15 Hours)

1. Definition, importance of sanitation, application of sanitation to food industry and food service establishments.
2. Purchasing and receiving safe food, food storage, sanitary procedures in food preparation, serving and displaying of food, special food operations.
3. Environmental Sanitation

Location and layout of premises, constructional details, sanitary requirements for equipments, guidelines for cleaning equipments, cleaning procedures, pest control, water supply, storage and waste disposal, environmental pollution.

UNIT II :Hygiene Practices in Food Industry(15 Hours)

1. Introduction, necessity, personnel hygiene, sanitary practices, management and sanitation- safety at work place.

2. Sanitation regulations and Standards- Introduction, regulatory agencies, control of food quality, local health authority. Food sanitation check lists.

UNIT III: Concept of Quality (20 Hours)

1. Quality attributes- physical, chemical, nutritional, microbial, and sensory
2. Concepts of quality management - Objectives, importance and functions of quality control, Quality assurance, Total Quality Management, Quality management systems in India, GMP/GHP, GLP, GAP
3. Quality manuals, documentation and audits, Export import policy, export documentation, Laboratory quality procedures and assessment of laboratory performance
4. Sampling procedures and plans, Global Food safety Initiative, Labeling issues
5. International food standards.- Codex Alimentarius, ISO and Hazard analysis Critical Control Point: Definition, principles, product standards and product control – HACCP, Guidelines for the application of HACCP system.

UNIT IV:Food Laws and Standards (10 Hours)

1. Introduction and need of food laws.
2. Mandatory food laws; The food safety and standards Act 2006,
   Indian food regulations –FSSAI 2006 – export and import laws and regulations –
   International food laws- CAC – WTO implications - national and international agencies for implementation
3. Recommended international code of hygiene for various products.

Reference:

1. Nollet and Toldra (2015), Hand Book of Food Analysis, 3rd Edition, CRC publishing Ltd.
2. Rangana S (2007), Hand Book of Analysis & Quality Control for Fruit & Vegetable Products, 2nd edition, Tata Mcgraw hill publishing.
3. Nielson S (2002), Introduction to the chemical analysis of foods, 2nd edition, CBS publishing.

BAKING AND CONFECTIONERIES

Course Code: SDC1BC02
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- To impart basic and applied technology of baking and confectionary and acquaint with the manufacturing technology of bakery and confectionary products.
- To have a basic idea about baking and confectionery manufacture and quality control.
- To know about the importance of each ingredient in the bakery and how it effects the overall product and its sensory and quality parameters.
- To be able to start a small scale bakery and confectionery unit

Course Outline

UNIT I:Introduction to Baking (5 Hours)

1. Introduction & scope of Bakery & Confectionery, Bakery terms. Organization chart of Bakery.
2. Wheat processing. Flours: Different types of flours available, constituents of flours, PH Value of flour, water absorption power of flour, gluten, diastatic capacity of flour, grade of flour.

UNIT II: Fundamental Dough Rheology(15 Hours)

1. Rheology: Concepts & Fundamentals, Dough Formation, Microstructure & Role of Main Ingredients, Rheology of Bread Dough, Cake Batter, , Rheology in Pasta Manufacturing.
2. Basic Principles of Texture Measurement, Phase Transitions of Starch & Gluten Polymers- ,gelatinization, Retro gradation, Dextrinisation of starch.

UNIT III:Bread Making (20 Hours)

1. Raw material required for bread making, role of flour, water, yeast, salt-sugar, milk and fats. Methods of bread making: straight dough method, delayed salt method, no time dough method, sponge and dough method. Baking temperatures for bread.
2. Characteristics of good bread: External characteristics - volume, symmetry of shape; Internal characteristics - colour, texture, aroma, clarity and elasticity. Bread improvers- improving

physical quality. Yeast – An elementary knowledge of Baker's yeast, the part it plays in the fermentation of dough and conditions influencing its working.

3. Effect of over and under fermentation and under proofing of dough and other fermented goods. Bread faults and their remedies, Preservatives used in bread. Bread diseases – Rope and mold-causes and prevention.

UNIT IV :Oven & Baking(15 Hours)

1. Knowledge and working of various types of oven. Baking temperatures for confectionery goods. Processing of cakes and biscuits- ingredients, development of batter, baking and packing, Spoilage in cakes and biscuits.
2. Pastry making, principles and various derivatives. Sugar boiled confectionery- crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, china balls, soft candy, lollypop, marshmallows, fudge, cream, caramel, toffee, lozenges, gumdrops, honeycomb candy.
3. Various types of icing – Royal, butter- soft, hard, ganache & fondant. Storage of confectionery products.

UNIT V:Bakery Layout(5 Hours)

1. The required approvals for setting up bakery – Government procedure and Bye-laws.
2. Selection of site, equipment, layout design, electricity, sources of water, quality control of raw materials and quality control of finished products and waste management.

References:

1. Zhou W, Hui YH (2014). Bakery Products Science and Technology, 2nd Edition, Wiley Blackwell Publishers.
2. Pyler E J and Gorton L A (2009). Baking Science & Technology, 4th Edition, Sosland Publications.
3. Stanley P, Cauvain, Linda S Young (2008). Baked Products: Science Technology and Practice, 1st Edition, John Wiley & Sons Publishers.

BAKING AND CONFECTIONERIES (PRACTICAL)

Course Code: SDC1BC03(P)
Contact Hours per Week:5
Number of Credits: 5
Number of Contact Hours:75

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

1. To develop professional and practical knowledge in bakery and confectionary and make them competent as an entrepreneur.
2. To improve the culinary skills of the students
3. It helps the students to gain not only theoretical but also practical knowledge **I.**

BAKERY:

Preparation of Bread rolls; Bread sticks & soft rolls; Buns

Cakes by different methods (e.g., sponge cake; Madiera cake; Genoise; fatless sponge; rock cake, marble cake, birthday cake, queen cake)

II. CONFECTIONERY

Biscuits & Cookies : Plain biscuits; piping biscuits; cherry knobs; salted biscuits; nut biscuits; coconut biscuits; macaroons; chocolate biscuits; marble biscuits

Flaky/Puff pastry- veg patties; chicken patties; cheese straws;, Choux pastry, Chocolate eclaire; Short crust pastry : Lemon curd tart; jam tart.

Icing : Fondant; American frosting; Butter cream icing; Royal icing; marzipan; marshmellow; lemon maringue; fudge; glace icing.

Toffees : Milk toffee; chocolate

Pastry: Pineapple pastry, chocolate pastry.

Cakes & Gauteaux; easter eggs; chocolate dippings; Dough nuts; Pudding: cold lemon soufle; chocolate mousse; charlottes royale; fruit trifle. Indian Sweets : Rasgulla, Rasmalai, Khoa - Gulab Jamun, Barfi, Mysore Pak, Ghewar Flour/Besan - Shakarpare, Halwa, Laddo, Peda. Milk - Kheer, Rabri; Nuts - Barfi, Chikki, Patisa

FOOD SCIENCE (PRACTICALS)

Course Code: SDC1FS04(P)
Contact Hours per Week: 5
Number of Credits: 5
Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To determine different chemical consequences

Course Outline

1. Determination of Moisture
2. Determination of Ash
3. Determination of Acidity & pH
4. Determination of T S S
5. Qualitative test for Carbohydrates – Molisch's test, Benedict's test, Iodine test, Selivanoff's test, Phenyl hydrazinje test.
6. Qualitative test for Protein – Ninhydrine reaction, Xanthoproteic test, Biuret test 7. Estimation of Gluten - Determination of Water absorption power, Dough raising. Qualitative analysis of gluten – Belshanke value. Sedimentation value of flour, Determination of amylase activity- falling number method
8. Detection of adulterants in foods such as milk, honey etc. 2. Estimation of SO2 in fruit products. 3. Estimation of purity of potassium metabisulphite 4. Qualitative determination of benzoic acid.
9. Preparation of any two recipes with different food groups and sensory evaluation Standardisation of any one novel recipe by each student

References

1. Kurt A R and Evers AD (2018), Kents Technology of Cereals, 5th Edition, Wood Head Publishing.
2. Dendy DAV and Bogdan J D (2001), Cereals and Cereal Products: Chemistry and Technology Aspen Publication.
3. Samual A M (2013), Chemistry and Technology of Cereal Food and Feed, 2nd Edition, AVI book publishers

Semester II

ENTREPRENEURSHIP MANAGEMENT AND COMPUTER APPLICATION

Course Code: GEC2EP06
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- Understand the nature of entrepreneurial activities
- To make students aware of the urgent needs for self employment
- To develop skills in project identification, preparation of project reports and its implementation.

Course Outline

UNIT I :Introduction to Entrepreneurship(10 Hours)

Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth. Types of entrepreneurs - Intrapreneurship, Women entrepreneurship, significance, problems, solutions to the problems

UNIT II :Entrepreneurial Development Programme(10 Hours)

Objectives, Steps, Need for training- target group- Contents of the training programme- Special Agencies for Entrepreneurial Development and Training-DIC.

UNIT III :Setting up of micro small and medium enterprises(10 Hours)

Setting up of micro small and medium enterprises, location significance, Green channel,

Bridge capital, Seed capital assistance, Margin money scheme, Sickness, Causes-Remedies

UNIT IV :Role of Institutions/Schemes in Entrepreneurial Development(10Hours)

SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, RozgarYojana Schemes.

UNIT V :Accounts and Costing(10 Hours)

1.Book Keeping, double entry, journal entry, simple cash book and types of accounts.

Purchase book, Purchase return book, Stores requisition, Sales book, Sales return book, Cash voucher/Credit voucher book

1. Preparation of invoices and debit/credit memos.
2. Introduction to ingredient costs, labour costs, overheads, gross profit, net profit, calculation of cost price, sales price and catalogue price.

UNIT V1 :Computer Applications In Food Industry(10 Hours)

1. Computer fundamentals – Information concepts and processing, elements of a computer processing system- Hardware, features and uses Input/Output devices; Software concepts – MS DOS, MS OFFICE (use).
2. Introduction to Windows. Introduction of computers for accounting records and controls. (TALLY software).

References:

1. Drucker P (2015), Innovation and Entrepreneurship, 1st Edition, Routledge Publishers.
2. Desai and Vasant (2011), Dynamics of entrepreneurial development and management. Himalaya Publishing House.

FOOD ADDITIVES AND ADULTERATION

Course Code: SDC2FA05
Contact Hours per Week: 4T
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

• To understand the importance of food additives in food processing technology also to study the merits and demerits of addition of food additives. **Course Outline**

UNIT I :Introduction to Food Additives(10 Hours)

1. Definition . Role of Food Additives in Food Processing, functions -Classification - Intentional & Unintentional Food Additives. Safety Evaluation of Food Additives, Beneficial and Toxic Effects. Food Additives - Generally Recognized As Safe (GRAS), Tolerance levels &Toxic levels in Foods.
2. Types of food additives (10 hrs)

Preservatives, antioxidants, colours and flavours (synthetic and natural), sequesterants, humectants, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents – uses and functions in formulations; indirect food additives.

UNIT II :Derived Food additives(10 Hours)

1. Proteins, starches and lipids as functional ingredient; isolation, modification, specifications, functional properties and applications in foods and as neutraceuticals.
2. Manufacturing and applications of fibres from food sources,fructooligosaccharides.

UNIT III:Food Additives as toxicants(15 Hours)

1. Artificial colours, preservatives, sweeteners; toxicants formed during food processing such as nitrosamines, maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons;
2. Risk of genetically modified food, food supplements, persistent organic pollutants, toxicity implications of nanotechnology in food.

UNIT IV :Flavour Technology(5 Hours)

1. Types of flavours, flavours generated during processing – reaction flavours, flavour composites, stability of flavours during food processing, analysis of flavours, extraction techniques of flavours, flavour emulsions; essential oils and oleoresins.

UNIT V :Food Adulteration(10 Hours)

Common Food adulterants and their tests: Milk, Vegetable oil, Spices, Tea, Pulses, Sugar, Honey

References:

1. Titus A M M (2013), The Chemistry of Food Additives and Preservatives, 1st Edition, Wiley-Blackwell Publishers.
2. Jim Smith and Lily Hong-Shum (2011), Food Additives Data Book, 2nd Edition, Wiley-Blackwell Publishers.
3. Deshpande S S (2002), Handbook of Food Toxicology, 1st Edition, Marcel Dekker Publishers.

DAIRY PRODUCTS AND PROCESSING

Course Code: SDC2DP06
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- To inculcate the knowledge regarding various dairy products and its processing techniques Efficiently
- To understand about the products that can be made from milk.
- To understand the processing and storage of dairy products.
- To know about the quality control measures applied in dairy industries.
- To have a basic idea about their processing and products which can be made at a small scale

Course Outline

UNIT I :Introduction (10 Hours)

1. Milk - Definition, sources, and composition of milk, factors effecting composition of milk, physiochemical properties of milk, grading of milk-definition and types of grades, collection and transportation of milk

UNIT II :Processing of market milk(15 hours)

1. Flowchart of milk processing, Reception, Different types of cooling systems. Clarification and filtration process, standardization- Pearson's square method, pasteurization-LTLT, HTST and UHT process- continuous pasteuriser, Sterilisation and Homogenisation, Cream separation- centrifugal cream separator, bactofugation.

UNIT III :Special milk(10 Hours)

1. Skim milk, evaporated milk, condensed milk, standardized milk, toned milk, double toned milk, flavoured milk, reconstituted milk.

UNIT IV :Indigenous and Fermented milk products(15 Hours)

1. Product description, methods for manufacture of butter, cheese, ice cream, khoa, channa, paneer, shrikhand, ghee. Spray drying system: dried milk- whole milk and skim milk powder. Instantization of milk.

UNIT V :In-Plant Cleaning system(10 Hours)

1. Introduction to Cleaning in- place (CIP) system - cleaning procedure, Cleaning efficiency, Methods of cleaning in food industry, cleaning solutions – Detergents, Sanitizers. SIP system of dairy plant, Personal hygiene in dairy plant

References:

1. Joshi V K (2015), Indigenous Fermented Foods of South Asia, 1st edition, CRC Press.

2. Alan H. V and Jane P S (2013), Milk and Milk Products: Technology, chemistry and microbiology, Springer Science & Business Media Publishers.

DAIRY PRODUCTS AND PROCESSING (PRACTICAL)

Course Code: SDC2DP07(P)

Contact Hours per Week: 5

Number of Credits: 5

Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

• To develop the skills in dairy product preparation and to familiarise with the dairy plant equipments.

• To gain knowledge about preparation of some dairy products .

Course Outline

1. Milk Testing - Platform Tests.

2. Determination of Acidiy (Titrable Acidity) of Milk, butter and curd.

3. Clot on boiling test for milk.
4. Determination of specific gravity of milk.
5. Detection of Addition of Starch in Milk.
6. Detection of salt content in butter - Mohr method 8. Estimation of moisture and free fatty acid contents in ghee
9. Preparation of Lassi.
10. Preparation of khoa.
11. Preparation of Basundi.
12. Preparation of chakka and shrikand.
13. Preparation of kalakand.
14. Preparation of cooking butter.
15. Preparation of ghee.
16. Preparation of flavoured milk.
17. Visit to milk product development centre.

INTERNSHIP

Course Code: SDC2IN08(P)
Number of Credits: 5

SEMESTER III

ENVIRONMENTAL SCIENCE

Course Code: GEC3ES08
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- As we aware, the world environmental problems, students should acquaint basic knowledge of environment and its components.
- To solve the environmental problems, it is necessary to develop and invent new advanced technologies to control environmental pollution

Course Outline

UNIT I :Multidisciplinary nature of environmental studies(15 Hours)

Definition, scope and importance, need for public awareness. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and overutilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT II :Ecosystems(10 Hours)

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem :- a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT III :Biodiversity and its Conservation(10 Hours)

Introduction - Definition: genetic, species and ecosystem diversity. Biogeographically classification of India. Value of biodiversity: consumptive use, productive use, social,

ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega- diversity nation Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV :Environmental Pollution(10 Hours)

Definition , Cause, effects and control measures of :- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

Unit V: Social Issues and the Environment(10 Hours)

From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case Studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit VI: Human Population and the Environment (5 Hours)

Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and Human health. Case Studies.

References:

1. Mike H (2015), Climates and Cultures, Sage Publications

2. Mark G (2014) Encyclopedia of Transportation Social Science and Policy. 1st Edition, Sage Publication.
3. John A M (2014), Encyclopedia of Environmental Change, 1st Edition, Sage Publication.

PRINCIPLES OF NUTRITION

Course Code: GEC3PN09
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To learn basic arithmetic, number sequences and simple mathematics.
- To get knowledge regarding important nutrients needed for our body
- Gain knowledge regarding functions and sources of these nutrients

Course Outline

UNIT I :Concept of Nutrition(10 Hours)

1. Definition of terms - Nutrition, under nutrition, malnutrition, symptoms and remedy, Health and nutritional status-adequate optimum and good nutrition Energy – Definition of calorie and Joule, Energy value of foods, Basal Metabolic Rate (BMR), factors affecting BMR.
2. Food Guide - Nutrients supplied by foods. Basic five food groups – Cereals, pulses, fruits and vegetables, milk and meat, fats and sugar

UNIT II :Nutrients and Health(40 Hours)

1. Water – Importance, distribution in body, function, sources, water balance, regulation and requirement, abnormalities in water balance. Carbohydrates – Functions, sources, requirement, effects of deficiency. . fibers - Definition, classification, sources, role of fiber in human nutrition

2. Protein - Functions, sources, requirement, essential amino acids, determination of nutritional quality of proteins.

3. Fats and Lipids – Functions, sources, role of essential fatty acids, Health concerns in lipid nutrition-obesity, hypertension, atherosclerosis, requirements and effects of deficiency.

4. Vitamins – Classification, sources, requirement, deficiency of Vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid.

5. Minerals – Functions, sources, deficiency of calcium, phosphorus, sodium, potassium, iron, iodine and fluorine.

UNIT III :Balanced Diet **(10 Hours)**

1. Meal planning, factors affecting meal planning, principles of meal planning. 2.Factors affecting RDA

References:

1. Mudambi S R and Rajagopal M V (1995), Fundamentals of Food & Nutrition, 5th Edition, New Age International Pvt Ltd.

2. Raheena B M (2009) A text book of foods, Nutrition and Dietetics, 3rd Edition, Sterling Publishers.
3. Swaminathan M (2012), Handbook of Food and Nutrition, Banglore Printing and Publishing.

FOOD PRESERVATION

Course Code: SDC3FP09
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To make students understand about the mechanism of spoilage and deterioration in foods.
- The basic food preservation principles
    - To understand the principles behind the various methods of food preservation

Course Outline

UNIT I :Food Spoilage **(5 Hours)**

Definition, types of spoilage - physical, enzymatic, chemical and biological spoilage. Mechanism of spoilage and its end products, shelf life determination

UNIT II :Preservation by using preservatives **(10 Hours)**

Food preservation: Definition, principles, importance of food preservation, traditional and modern methods of food preservation. Food additives – definition, types, Class I and Class II preservatives.

UNIT III : Preservation by use of high temperature **(10 Hours)**

Pasteurization: Definition, types, Sterilization, Canning - history and steps involved, spoilage encountered in canned foods, types of containers used for canning foods. Food irradiation – Principles, merits and demerits, effects of irradiation and photochemical methods.

UNIT IV :Preservation by use of low temperature **(15 Hours)**

Refrigeration - advantages and disadvantages, freezing: Types of freezing, common spoilages occurring during freezing, difference between refrigeration and freezing.

UNIT V :Preservation by removal of moisture **(15 Hours)**

1. Drying and dehydration - merits and demerits, factors affecting,
2. Different types of drying, Concentration: principles and types of concentrated foods.
3. Preservation by Fermentation

UNIT V1 : Recent Methods in Food Preservation **(5 Hours)**

1. Pulsed electric field processing, High Pressure Processing, Processing using Ultra Sound, Dielectric, Ohmic and Infrared Heat.

References:

1. Krammer A (1970), Quality Control in Food Industry. Vol. I, 3rd edition, AVI Publishers
2. Gould G W (2012), New Methods of food preservation, Springer Science & Business Media.
3. N Shakuntalamanay and M Shadakshara Swamy (2001) Food Facts and Principles, 2nd Edition, New Age International Publishers.
4. Srilakshmi B (2018), Food Science, 7th Edition, New Age International Publishers.
5. Subalakshmi G and Udipi S A (2006), Food processing and preservation, 1st Edition, New Age International Publishers.

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY

Course Code: SDC3FT10
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To acquaint with the proper handling technologies of fruits and vegetables to reduce post harvest losses.
- To acquaint with principles and methods of preservation of fruits and vegetables into various products..

Course Outline

UNIT I :Primary Processing of fruits(10 Hours)

1. Grading, sorting, cleaning, washing, peeling, slicing and blanching. Tomato products. 2. Dried fruits - Dehydration of fruits and vegetables using various drying technologies like sun drying, solar drying, osmotic, tunnel drying, fluidized fed drying, freeze drying.

UNIT II :Processing Juices(25 Hours)

1. Processing of juices: Processing of vegetable juice, Processing of fruit juice Manufacturing of fruit juices concentrates, puree and pastes.
2. Preparation of jam, jellies and marmalades. Pectin chemistry, Common preservatives used in juices, jam and jellies, defects in jams, jellies and pickles.

UNIT III :Preserved fruits(25 Hours)

1. Preparation of preserve and candied fruits, Pickling of fruits and vegetables. Waste management in fruits and vegetable processing unit

2. Re-packaging of Fresh fruits and vegetables. Storage techniques for fresh fruits and vegetables.
3. Canning of fruits and vegetables.

References:

1. Fennema R O (1975), Physical principles of food preservation, Marcel Dekker Inc
2. K. Sanjeev & Srivastava R.P (2016), Complete Technology Book on Processing Dehydration Canning and Preservation of Fruit & vegetables, 3rd Edition, NIIR Project Consultancy Services.

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (PRACTICAL)

Course Code: SDC3FT11(P)
Contact Hours per Week: 5
Number of Credits: 5
Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To determine different constituents in preserved food
- To gain practical knowledge about processing of fruits and vegetables

Course Outline

1. Determination of ascorbic acid, acidity, total soluble

4. Preparation and quality evaluation of fruit jam, fruit jelly, fruit marmalade;
5. Processing of tomato products; Ketchup
6. Preparation of dehydrated vegetables.
7. Estimation of salt in pickles soild.
2. Estimation of tannin 3. Evaluation of pectin content.
8. Lye peeling methods in fruits and vegetables
9. Adequacy of blanching
10. Determination of chemical preservatives- benzoic acid, KMS
11. Visit to commercial storage, and canning unit.

References:

1. Lal G, Siddapa GS & Tandon GL (2009) Preservation of Fruits and Vegetables, ICAR.
2. Verma L R and Joshi V K (2000), Post Harvest Technology of Fruits and Vegetables. Indus Publishing Company.

FOOD PRESERVATION AND BEVERAGES (PRACTICAL)

Course Code: SDC3FP12(P)
Contact Hours per Week: 5
Number of Credits: 5
Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To acquaint different methods of research
- To prepare different beverages

Course Outline

1. Preservation by high temperature
2. Preservation by low temperature
3. Preservation using dehydration
4. Estimation of purity of KMS
5. Qualitative determination of SO2
6. Qualitative estimation of Benzoic acid
7. Estimation of reducing sugar
8. Sensory evaluation Dehydration of fruits in sugar syrup
9. Drying Kinetics of vegetables using cabinet drier
10. Determination of moisture content
11. Estimation of alcoholic content Food Beverage Technology Practical
12. Chemical and microbiological analysis of raw water quality;
13. Preparation of common beverages
14. Preparation of regional fruit juices;
15. Preparation of whey-based beverages;
16. Preparation of crush, nectar, blended juice
17. Preparation of soy milk, fruit milkshakes, herbal beverages;
18. Visit to relevant processing units.

References:

1. Vijaya K (2011), Textbook on Food storage and preservation, Kalyani Publishers.
2. Srilakshmi B (2018), Food Science, 7th Edition, New Age International Publishers.
3. Fennema R O (1975), Physical principles of food preservation, Marcel Dekker Inc
4. K. Sanjeev & Srivastava R.P (2016), Complete Technology Book on Processing Dehydration Canning and Preservation of Fruit & vegetables, 3rd Edition, NIIR Project Consultancy Services
5. Desrosier (2006), Technology of Food preservation, 4th edition, CBS Publishers.

Semester IV

BYPRODUCT UTILIZATION AND WASTE MANAGEMENT

Course Code: GEC4BW11
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To identify types of wastes in food industry
- To gain knowledge in different effluent treatment methods
- To utilize the byproduct in the food industry

Course Outline

UNIT I :Introduction(10 Hours)

Types of waste and magnitude of waste generation in different food processing industries, concept, scope and importance of waste management and effluent treatment

UNIT II :Waste Characterization(10 Hours)

Temperature, pH, Oxygen demands (BOD, COD, TOD), fat, oil and grease content, metal content, forms of phosphorous and sulphur in waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues

UNIT III :Effluent Treatment(20 Hours)

Pretreatment of waste: sedimentation, coagulation, flocculation and floatation Secondary treatments: Biological oxidation trickling filters, activated sludge process), industrial wastewater treatment: characteristics of industrial wastewater, treatment levels

UNIT IV:Waste Utilization of agro Industries(10 Hours)

Characterization and utilization of byproducts from cereals (breweries), pulses, oilseeds, fruits & vegetables (wineries) and plantation crops (sugar industries).

UNIT V:Waste Utilization of animal and marine product industries(10 Hours)

Characterization and utilization of byproducts from dairy, eggs, meat, fish and poultry.

References:

1. Abbas K and Peter S (2013), The Economic Utilisation of Food CoProducts, Royal Society of Chemistry Publishing.
2. Martin A M (2012), Bioconversion of Waste Materials to Industrial Products, 2nd edition , Springer Science & Business Media Publishing.
3. Marcos V S (2007), Basic Principles of Wastewater Treatment, IWA Publishing.

RESEARCH METHODOLOGY

Course Code: GEC4RM12 Contact
Hours per Week: 4
Number of Credits: 4

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To understand the methodology of research its principles and techniques
- Developing and understanding research from a report writing

Course Outline

UNIT I :Fundamentals of Research(10 Hours)

Definition of research, objectives, characteristics and types – action research, applied research, exposit facto research, historical research, fundamental research

UNIT II :Defining Research Problem(5 Hours)

Definition and selection, necessity of defining the problem, technique involved in defining a problem.

UNIT III :Research design/Proposal(10 Hours)

Meaning and purpose of a research design or proposal, research problem definition, identification, statement of research problem, criteria for selection, definition of concepts (operational definition).Variables - types of variables, independent and dependent variables, control and intervening variables. Hypothesis and related literature –Meaning .

UNIT IV :Methods of Data Collection(10 Hours)

Collection of primary data – observation method, Interview method, collection of Data through questionnaires and schedules, other methods of data collection, collection of secondary data.

UNIT V : Research Tools (10 Hours)

Questionnaire, observation, interview schedule and other tools used

UNIT V1 : Sampling (5 Hours)

Sampling methods, merits and demerits of sampling

UNIT V11 :Research Report Writing (10 Hours)

Principle of research report, contents in a report

References:

1. Kothari C R and Gaurav G (2019) Research Methodology: Methods And Techniques, Fourth edition, New Age International Publishers
2. Best W J , Kahn V J and Jha A K (2016) Research in Education, 10th edition, Pearson Education
3. Koul L (2009) Methodology ofEducational Research, 4th edition, Vikaspublishing house pvt ltd., New Delhi

FOOD SUPPLY CHAIN MANAGEMENT, FOOD PACKAGING AND LABELLING

Course Code: SDC4FL13
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To provide knowledge about trends and development in food packaging technologies and materials.
- To familiarize with the different materials and methods used for packaging.
- To understand the technology behind packaging and packaging materials

Course Outline

UNIT I : Introduction to Packaging (10 Hours)

1. Definition, Functions of packaging – Containment, Protection, Preservation, Promotion, Convenience, Communication. Requirements of effective package,
2. Types of food packaging- primary, secondary and tertiary packaging.

UNIT II: Deteriorative Reactions and shelf life foods (10 Hours)

1. Introduction, deteriorative Reactions in food- factors affecting deterioration of foods- physical changes, biological changes, chemical changes. Shelf life of foods
2. Definition, intrinsic and extrinsic factors controlling the rate of reactions. Shelf life determination tests

UNIT III : Packaging Materials and their properties (10 Hours)

1. Rigid containers- Glass, Wooden boxes, metal cans- Aluminium and tin plate containers, Semi rigid containers- paperboard cartons, Flexible packaging- paper, plastic pouches- Low density polyethylene, High density polyethylene and

2. Polypropylene. Packaging materials for dairy products, bakery and confectionary, granular products, fruits and vegetables.

UNIT IV : Special Packaging (10 Hours)

1. Aseptic packaging, Active packaging, Intelligent packaging, Modified atmospheric packaging and controlled atmospheric packaging, Shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks.

UNIT V : Labelling and safety concerns in food pack (10 Hours)

1. Printing process, inks, adhesives, labelling, coding- bar codes, Food packaging closures of glass and plastic containers, Legislative and safety aspects of food packaging,
2. Machineries used in Food Packaging, Package testing-Thickness – Paper density - Basis weight – Grammage - Tensile Strength - Gas Transmission Rate (GTR) - Water Vapour Transmission Rate (WVTR).

UNIT V1 :Safety Management in food supply chain (10 Hours)

1. Food supply chain – introduction, scope, supplier management, pre assessment and review, change controls. Documentation and record keeping – supply documentation, auditing. Regulatory compliance – product testing – environmental monitoring- foreign material control – Inventory control.
2. Control of non - conforming products - recalls and market withdrawals – crisis management – food safety measures for the supply of different raw and processed products.

1. Robertson G L (2013) Food Packaging: Principles and Practice, Third Edition, CRC Press.
2. Kadoya T (1991), Food Packaging, 1st edition, Academic press.

FOOD MICROBIOLOGY

Course Code: SDC4FM14
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To make students understand the food and industrial microbiology and to make them aware about the importance of food quality control by avoiding pathogenic microbial attack.
- Identify ways to control microorganisms in foods.

Course Outline

UNIT I :Introduction to food microbiology(10 Hours)

1. History, current status, role of food microbiology, sources of micro organisms in food, changes caused by microorganisms - food fermentation, putrefaction, lipolysis. Growth and survival of microorganisms in foods, biological, chemical and physical changes caused by microorganisms, physical and chemical methods to control microorganisms.

UNIT II :Characteristics of microprograms(15 Hours)

1. Classification of microorganisms, nomenclature, morphology – yeast and moulds, bacterial cells, viruses. Important microbes in food, microbial growth characteristics – Microbial reproduction, nature of growth in food. Food hygiene and sanitation:

Contamination during handling and processing and its control; indicator organisms.

UNIT III :Factors in microbial growth(10 Hours)

1. Factors influencing microbial growth in food: Intrinsic and extrinsic factor -

   Hydrogen ion concentration, Moisture requirement, concept of water activity, temperature, oxidation reduction potential, inhibitory substances and biological structure. Principles of different food preservation methods.

UNIT IV :Spoilage in different food groups(10 Hours)

1. Food spoilage – Introduction, spoilage in cereals, vegetables and fruits, meat, eggs, poultry, fish, milk and milk products, canned foods, nuts and oil seeds, fats and oil seeds. Definition - food infection and food intoxication.

UNIT V :Beneficial uses of microorganisms(10 Hours)

1. Microorganisms used in food fermentation, mechanisms of nutrient transport, application in genetics, intestinal bacteria and probiotics, food bio preservatives of bacterial origin, food ingredients and enzymes of microbial origin. Economic importance of microorganisms.

UNIT V1 :Microbial Testing(5 Hours)

1. Water and Milk

References:

1. Bibek R and Bhunia A (2017) Fundamental Food Microbiology, CRC Press.
2. Adams M R and Moss M O (2018), Food Microbiology, New Age International Publishers

FOOD MICROBIOLOGY (PRACTICAL)

Course Code: SDC4FM15 (P)
Contact Hours per Week: 5 Number of Credits: 5

Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To analyze the chemical constituents in food and to understand the basic concepts of food microbiology.
- To introduce basics of food microbiology

Course Outline

1. Introduction to the Basic Microbiology Laboratory Practices and Equipments
2. Functioning and use of compound microscope

3. Cleaning and sterilization of glassware
4. Preparation and sterilization of nutrient broth.
5. Preparation of slant, stab and plates using nutrient agar.
6. Standard Plate Count Method
7. Staining techniques - simple staining, gram staining
8. Isolation of pure culture: Pourplate, Streak plate Microbial analysis of meats – Total plate count - Staphylococcus Microbial analysis of Milk – Total plate count, Yeast and Mold.
9. Microbial analysis of water – Coliforms

References:

1. Pelzar M J, Chan E C and Krieg N R (2001) Microbiology, 5th edition, McGraw Hill Education
2. Black J G (2001) Microbiology Principles & Applications, 4th Edition edition, John Wiley & Sons
3. Sullia S B and Santharam S (1998) General Microbiology, Science Publishers
4. Frazier W C and Westhoff D C (2017) Food Microbiology, Fifth edition, Mc Graw Hill Education
5. Banwart G J (1979) Basic Food Microbiology, Avi Publishing Co Inc.
6. Adams M R and Moss M O (2018), Food Microbiology, New Age International Publishers
7. Sharma K (2007) Manual of Microbiology, Ane Books India

INTERNSHIP (PROJECT REPORT)

Course Code: SDC4IN16 (P)

Number of Credits: 5 Course

Outline

1. HACCP – Evaluation of food establishment and submission of report.
2. Quality auditing – Audit plan preparation and conduct of audit in food processing establishments and submission of report.
3. Evaluation of other food safety management systems in any one of the food manufacturing/ packaging/Supply chain/ retail/other areas and submission of report.

Semester V

FOOD ENGINEERING

Course Code: GEC5QF13
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- To impart knowledge regarding the technological knowledge transfer essential to the cost-effective production and commercialization of food products and services.
- To impart knowledge regarding various thermal processing techniques

Course Outline

UNIT I : Unit Operations & Heat Transfer (10 Hours)

Unit operations and Heat transfer Mode of heat transfer – Conduction, Convection, radiation.

UNIT II : Heat Exchanger (20 Hours)

Classification, contact type heat exchange - Immersion, Non-contact type heat exchanger, Plate Heat exchanger, Scraped surface Heat exchanger, Tubular Heat exchanger, Double & Triple tube Heat exchanger, Shell & Tube Heat exchanger Pasteurization HTST, UHT, Pasteurizing equipments.

UNIT III : Refrigeration &Freezing (10 Hours)

Refrigeration Principle of refrigeration, Vapour compression refrigeration cycle
Freezing Principle of freezing & freezing rate Module IV Evaporation(10 hrs)
Principle, single effect evaporation, multiple effect evaporation, Types of evaporators - Horizontal tube, Vertical tube, Falling film evaporator, Raising film evaporator.

UNIT IV :Driers &Boilers(15 hours)

Driers Principle , constant rate & falling rate of period of drying, Types of driers - Drum drier, Cabinet drier, Tunnel drier, Spray drier, Fluidized bed drier Boiler Principle, working of water tube & fire tube boiler

UNIT V : Rheology (5 Hours)

Definition, Rheological characteristics of foods, viscosity, apparent viscosity Newtonian and Non Newtonian

References:

1. Sahay K M and Singh K K (2004) Unit operations of Agricultural processing , 2nd edition, Vikas Publishing House Pvt Ltd
2. Singh P R and Heldman D R (2009) Introduction to Food Engineering, 4th edition, Academic Press is an imprint of Elsevier
3. Macabe W L, Smith J C and Hariot P (1993) Unit Operations of Chemical Engineering, McGraw-Hill College

FOOD CHEMISTRY

Course Code: GEC5FC14
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks Objectives:

- To Impart knowledge regarding macronutrients

Course Outline

UNIT I :Carbohydrates, Proteins, fats & Enzymes (30 Hours)

1. Carbohydrates – Classification, Structure, browning reaction, changes during cooking Pectin – Composition & structure
2. Protein – Introduction to food proteins, classification, structure, physico chemical properties, denatuaration, reactions, protein determination, changes during cooking
3. Fats & Oils – Classification, saturated, unsaturated, polyunsaturated fatty acids physical and chemical properties, refining of fats and oils,-bleaching, deodorizing, hydroxylation, shortening, Products of fat - margarine, vanaspati, lard, tallow.
4. Enzymes – Classification, nomenclature, enzyme specificity, factors affecting enzyme activity, enzyme inhibition, role in food processing Water Introduction, physical and chemical properties of water, moisture in foods, hydrogen bonding, bound water

UNIT II : Pigments and flavours (20 Hours)

1. Pigments - Pigments in foods, chlorophyll, flavanoids, anthocyanin, anthoxanthins, quinines, xanthones, betalains, Effect of processing and storage on pigments, physical and chemical properties
2. Flavours - Flavour compounds in foods - terpenoids, flavanoids, and sulphu compounds, effect of processing and storage on flavours

UNIT III :Properties of foods (5 Hours)

1. Colloids – Properties, sols, gels, foam, emulsion and suspension

UNIT IV :Instrumentation (5 Hours)

1. Instrumentation - Instrumentation for food quality assurance; subjective and objective parameters.
2. Gas chromatography, Liquid chromatography, HPLC

References:

1. Fatih Y (2009) Advances in Food Biochemistry 1st edition, CRC Press, New York.
2. Damodaran S, Parkin K L and Fennema, O R. (2007) Fennema's Food Chemistry, 4th edition, CRC press, New York
3. Campbell M K and Farrell S O (2017), "Biochemistry", 9th edition, Cengage Learning Publishers, USA.
4. Shakuntalamanay N and Shadakshara Swamy M (2001) Food Facts and Principles, 2nd Edition, New Age International Publishers.
5. Meyer L H (2002) Food Chemistry, CBS publishers and Distributors, New Delhi.

BUSINESS MANAGEMENT

Course Code: GEC5BM15
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To familiarize the students with concepts and principles of Management

Course Outline

UNIT I: Management(12Hours)

1. Introduction, Meaning, nature and characteristics of Management - Scope and functional areas of management - Management as a science art or profession –

2. Management &Administration – Principles of management - Social responsibility of management.- Contributions of F. W. Taylor and Henry Fayol - Emergence of Japan as an industrial giant.

UNIT II: Planning(8 Hours)

Nature, importance and purpose of planning - Planning process, objectives - Types of plans MBO- Features-steps.

UNIT III: Organising and Staffing(12 Hours)

1. Nature and purpose of organisation, Principles of organisation - Types of organization, OrganisationChart-Organisation manual

2. Departmentation,CommitteesAuthority- Deligation of Authority- Responsibility and accountability- Centralisation Vs decentralisation of authority - Nature and importance of staffing - Process of selection & recruitment.

UNIT IV: Directing(16 Hours)

1. Meaning and nature of directing - Motivation- meaning - importance-Theories of Motivation (Maslow s,Herzberg, McGregor s, X & Y theory) Leadership-MeaningStyles

2. Managerial Grid by Blake and Mounton - Likert s Four level model- CoordinationMeaning and importance.

UNIT V: Controlling(12 Hours)

1. Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control-Control by Exception.

References:

1. Koontz C and Donnell H O (1974) Essentials of Management, McGraw-Hill publishers

2. Prasad L M (2011) Principles and practice of management, Sultan Chand & Sons

FOOD PLANT DESIGNING AND LAYOUT

Course Code: SDC5FL17
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To understand concepts of plant layout.
- To have knowledge on building, utilities in the plant.
- To know the importance of proper food plant design andsafety.

Course Outline

UNIT I :Introduction(15 Hours)

Definition, Basic concepts of plant layout and design with special reference to food process industries. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design.

UNIT II :Plant Location(15 Hours)

Definition, Basic concepts of plant layout and design with special reference to food process industries. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design

UNIT III :Plant Layout(15 Hours)

Preparation of a Plant Layout, Plant Layout problem, importance, objectives, classical types of layouts. Evaluation of layout. Advantages of good layout

UNIT IV :Plant Building(15 Hours)

Considerations in building design, type of factory buildings, choice of building construction, material for floors, foundation, walls, doors, windows, drains etc, ventilation, fly control, mold prevention and illumination in food processing industries

UNIT V :Plant Layout &Equipment Layout(15 Hours)

Considerations in building design, type of factory buildings, choice of building construction, material for floors, foundation, walls, doors, windows, drains etc, ventilation, fly control, mold prevention and illumination in food processing industries

References:

1. John H and Lelieveld H L M (2011) Hygienic Design of Food Factories, 1st edition, Woodhead Publishing
2. Clark J P, (2008) Practical Design, Construction and Operation of Food Facilities, 1st edition, Academic Press Publishers.
3. Maroulis Z B and Saravacos G D (2007) Food Plant Economics, CRC Press Publishers
4. Lopez-Gomez A and Barbosa-Canovas G V (2005) Food Plant Design, 1st edition, CRC Press Publishers.

ANIMAL FOOD PROCESSING

Course Code: SDC5AP18
Contact Hours per Week: 4
Number of Credits: 4
Number of Contact Hours: 60
Course Evaluation: Internal – 20 Marks + External – 80 Marks
Objectives:

- To understand need and importance of livestock, egg and poultry industry
- To study structure, composition and nutritional quality of animal products.

Course Outline

UNIT I:Fish(15 Hours)

Fish- Classification of fish (fresh water and marine), composition, spoilage of fish - microbiological, physiological, biochemical.

Meat - Definition of carcass, concept of red meat and white meat, composition of meat, marbling in meat, post mortem changes in meat - rigor mortis, tenderization of meat, ageing of meat.

Egg-composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality

UNIT II: Preservation of Fish(10 Hours)

Chilling, Freezing, curing, drying, salting - salting methods: brining, pickling, curing and canning of fish. Smoking - smoke production, smoke components, quality, safety and nutritive value of smoked fish, pre - smoking processes, smoking process control.

UNIT III:Meat Quality(15 Hours)

Meat quality- colour, flavour, texture, Water Holding Capacity (WHC), Emulsification capacity of meat. Tests for assessment of raw meat - TVN, FFA, PV, Nitrate and nitrite in cured meat.

Preservation of meat -Refrigeration and freezing, thermal processing - canning of meat, dehydration, meat curing.

UNIT IV:Egg(10 Hours)

-Composition and nutritive value. Factors affecting egg quality. Preservation of eggs - Refrigeration and freezing, thermal processing, dehydration, coating.

UNIT V:Fishery Products(10 Hours)

Fish Products Surimi - Process, traditional and modern production lines, quality of surimi products. Fish protein concentrates (FPC), fish protein extracts (FPE).

Meat products: Sausages - processing, RTE meat products.

Egg products– Egg powder, frozen egg pulp, designer eggs.

References:

1. Govindan T K (1985) Fish Processing Technology, Oxford & IBH publishing
2. Hui Y H (2001) Meat Science and Applications, 1st edition, CRC Press
3. Kerry J, Kerry J and Ledward D (2002) Meat Processing improving quality, 1st edition, CRC Press.
4. Pearson A M and Gillett T A (2012) Processed Meat, Spinger publishing

ANIMAL FOOD PROCESSING (PRACTICAL)

Course Code: SDC5AP19 (P)
Contact Hours per Week: 5
Number of Credits: 5
Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To study about different meat products

Course Outline

1. Slaughtering and dressing of meat animals
2. Study of post-mortem changes; meat cutting and handling
3. Evaluation of meat quality

4. Evaluation of quality of eggs – external and internal
5. Preparation of meat, egg and fish products
6. Visit to meat processing plants

References:

1. Govindan T K (1985) Fish Processing Technology, Oxford & IBH publishing
2. Hui Y H (2001) Meat Science and Applications, 1st edition, CRC Press
3. Kerry J, Kerry J and Ledward D (2002) Meat Processing improving quality, 1st edition, CRC Press.
4. Pearson A M and Gillett T A (2012) Processed Meat, Spinger publishing

PRODUCT DEVELOPMENT, QUANTITY FOOD PREPARATION AND SALE (PRACTICAL)

Course Code: SDC5QF20(P)
Contact Hours per Week: 5
Number of Credits: 5
Number of Contact Hours: 75

Course Evaluation: Internal – 20 Marks + External – 80 Marks

Objectives:

- To get an experience for Quantity cooking Practicals
- Standardization of 10 selected recipes used in food service Institutions and quantity food production of any two items and its sales.
- Plate Presentation with appropriate garnishes and accompaniments
- Buffet Presentation

Semester VI

In Plant Training (PROJECT)

Course Code: SDC6PT21 (PR)

Number of Credits: 30