



UNIVERSITY OF CALICUT

Abstract

General and Academic - B.Voc Programme in Food Processing under modified B.Voc Regulations 2014 - Scheme and Syllabus - Approved - Implemented w.e.f 2018 Admissions - Orders issued.

G & A - IV - J

U.O.No. 7691/2019/Admn

Dated, Calicut University.P.O, 13.06.2019

*Read:-*1. U.O.No. 7404/2018/Admn dated 19.06.2018

2. Item No.1 in the minutes of the B.Voc Regulations Committee held on 13.09.2018
3. Request from the Convenor, B.Voc Regulations Committee dated 06.10.2018
4. Item No.I in the minutes of the meeting of the Board of Studies in Food Technology held on 23.10.2018
5. Item No.I.3 in the Minutes of Faculty of Science held on 05.12.2018
6. Item No.II.F in the Minutes of Academic Council held on 18.12.2018
7. Corrected syllabus forwarded by the Principal,Vimala College, Thrissur
8. Remarks of the Chairperson, Board of Studies in Food Technology dated 08.05.2019
9. Remaks of the Dean, Faculty of Science dated 27.05.2019.

ORDER

The modified B.Voc Regulations has been implemented vide paper read as (1) and vide paper read as (2), the B.Voc Regulations Committee decided to place the syllabi of new B.Voc Programmes which are sanctioned by UGC, in various colleges under University of Calicut, before various Boards of Studies for approval.

The Convenor, B.Voc Regulations Committee vide paper read as (3), pointed out that UGC has directed to start the newly sanctioned programmes without delay and hence requested to initiate urgent steps to approve the syllabi of newly sanctioned B.Voc Programmes at various colleges with a suggestion to submit the syllabi to the Chairmen of Boards of Studies concerned with a request to approve the syllabi in circulation with other Board members (as provided under CUFS 1976) and the same has been approved by Vice Chancellor. Consequently the syllabus of B.Voc Programme in Food Technology (Food Processing and Safety Management) was forwarded to the Chairman, Board of Studies in Food Technology.

The Board of Studies in Food Technology vide paper read as (4) suggested to make some corrections in the syllabus of B.Voc Programme in Food Technology submitted by the College concerned and the Faculty of Science vide paper read as (5) and the Academic Council vide paper read as (6) approved the suggestion of the Board.

The Principal Vimala College, Thrissur vide paper read as (7) has forwarded the corrected syllabus of B.Voc Programme in Food Technology after making changes suggested by the Board and approved by

the Academic Council and the same was forwarded to Chairman, Board of Studies in Food Technology for remarks.

The Chairman, Board of Studies in Food Technology vide paper read as (8) has approved the syllabus of B.Voc Programme in Food Processing and the Dean, Faculty of Science has also approved the same vide paper read as (9).

Sanction has therefore been accorded for implementing the Scheme and Syllabus of B.Voc Programme in Food Processing under modified B.Voc Regulations 2014, in the University w.e.f 2018 admissions, subject to ratification of Academic Council.

Orders are issued accordingly.(Syllabus is herewith appended)

Biju George K

Assistant Registrar

To

Principals of the Colleges offering BVoc Programme in Food Processing

Copy to: PS TO VC/PA to R/PA TO CE/JCE VII/JCE 1/GA I F/Library/SF/DF/FC

Forwarded / By Order

Section Officer

UNIVERSITY OF CALICUT



Curriculum and Syllabus

For

**B.Voc Programme
in
Food Processing**

(w.e.f. 2018 Admission)

REGULATIONS FOR DEGREE OF

Bachelor of Vocation (B.Voc) In

FOOD PROCESSING

Academic Year 2018-19 Onwards

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 examinations 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

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 internship.

Course

The B.Voc Programme is designed to bridge the potential skill gap identified. The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components.

General Education Components

- The general education component provides emphasis to Communication skill, Presentation skill, 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).

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%

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- 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. Food Processing 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.

Rejoining the course

- Rejoining 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 that time.
- B. Voc governing council will take the decision regarding the re joining.

College Transfer

College transfer is not allowed in any circumstances.

B.Voc degree is recognized at par with other U.G Programme approved by University of Calicut.

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 Food Processing is 10+2 Science 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.

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- Grace Marks may be awarded to a student for 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 as 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. 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.

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 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 7 point scale is as below:

To find semester Grade Point Average (SGPA)

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

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

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 (i.e., 20 marks), including lab and excluding internship and project are from internal examinations.

Internal assessment shall be conducted throughout the semester. It shall be based on internal examinations, assignments (such as home work, problem solving, group discussions, quiz, literature survey, seminar, team project, software exercises, etc.) as decided by the faculty handling the course, and regularity in the class. Assignments of every semester shall preferably be submitted in Assignment Book, which is a bound book similar to laboratory record.

The mark distribution to award internal continuous assessment marks for theory subject should be as follows:

Assessment	Mark
Test papers (minimum two, best two out of three is preferred)	10
Assignments (minimum two) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.	5
Regularity in the class	5

The mark distribution to award internal continuous assessment marks for practical subject should be as follows:

Assessment	Marks
Evaluation in the lab and Rough Record	10
End-semester Test	4
Viva	1
Regularity	5

Note:

- No candidate will be permitted to attend the end-semester practical examination unless she produces certified record of the laboratory.
- Full credit for regularity in the class can be given only if the candidate has secured minimum 90% attendance in the subject. Attendance evaluation for each course is as follows

Attendance	Marks
90% and Above	5
85 to 89.9%	4
80 to 84.9%	3
76 to 79.9%	2
75 to 75.9 %	1

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 the 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 be sent to university, by the colleges concerned.

Internship and Project

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

- There will be 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 life time 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 consist of 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 for 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 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.

Duration of Semester-End examinations will be 3 hours. The pattern of questions for theory subjects shall be as follows:

Section	Total No of Questions	No. of Questions to be answered	Marks for each question	Total marks
A: Very Short/Objective answer questions	10	10	1	10
B: Short answer questions	12	8	2	16
C: Short Essays	9	6	4	24
D: Essays	4	2	15	30
Total				80

For practical:

Marks Distribution	Total marks
Theory	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

Indirect Grading System based on a 7 -point scale is used to evaluate the performance of students.

- Each course is evaluated by assigning marks with a letter grade (A+, A, B, C, D, E or F) to that course by the method of indirect grading.
- An aggregate of E grade with 40 % of marks (after external and internal put together) is required in each course for a pass (Except for project*) and also for awarding a degree/diploma.
- Appearance for Internal Assessment and End Semester Evaluation are compulsory and no grade shall be awarded to a candidate if she is absent for Internal Assessment / End Semester Evaluation or both.
- 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

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

- 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

$$\text{CGPA} = \frac{\text{Total credit points obtained in six semesters}}{\text{Total credits acquired (180)}}$$

- 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

Marks scored	Grade	Remarks
90 and Above	A+	Outstanding
80 to 89	A	Excellent
70 to 79	B	Very Good
60 to 69	C	Good
50 to 59	D	Satisfactory
40 to 49	E	Adequate
Below 40	F	Failure

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 student
- 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)

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- 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 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	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				
GEC5QF13	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, Antinutritional 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, Nonclimacteric fruits, Changes during
ripening.
6. Sugar , Fat and Fatty acid Classification

UNIT II :Composition and Nutritive 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, Nutraceuticals, 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; their measurement and evaluation; Sensory vis-à-vis instrumental methods for testing quality.
2. Concepts of quality management - Objectives, importance and functions of quality control, Quality management systems in India, Sampling procedures and plans, Food Safety and Standards Act, 2006, Domestic regulations, Global Food safety Initiative, Various organizations dealing with inspection, traceability and authentication, certification and quality assurance - PFA, FPO, MMPO, MPO, AGMARK, BIS; Labeling issues, International food standards. Hazard analysis Critical Control Point: Definition, principles, product standards and product control – HACCP, Guidelines for the application of HACCP system.
3. Food Quality Laws and Regulations - Quality assurance, Total Quality Management, GMP/GHP, GLP, GAP, Sanitary and hygienic practices, HACCP, Quality manuals, documentation and audits; Indian & International quality systems and standards like ISO and Food Codex, Export import policy, export documentation, Laboratory quality procedures and assessment of laboratory performance, Applications in different food industries, Food adulteration and food safety.

UNIT IV:Food Laws and Standards (10 Hours)

1. Introduction and need of food laws. Indian food regulations –FSSAI 2006 – export and import laws and regulations – International food laws- CAC – WTO implications - national and international agencies for implementation
2. Mandatory food laws; The food safety and standards Act 2006, 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, Baked Snack Manufacture, Rheology in Pasta Manufacturing.
2. Basic Principles of Texture Measurement, Phase Transitions of Starch & Gluten Polymers; Role of Phase Transitions in Dough Rheology & Finished Product Texture.

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: 6

Number of Credits: 5

Number of Contact Hours:90

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; fruit cake, marble 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; patty cases, Choux pastry,

Chocolate eclair; Short crust pastry : Lemon curd tart; jam tart.

Icing : Fondant; American frosting; Butter cream icing; Royal icing; marzipan; marshmallow; lemon meringue; fudge; glace icing.

Toffees : Milk toffee; chocolate

Pastry: Pineapple pastry, chocolate pastry.

Cakes & Gauteaux: Queen cakes; fruit cake; birthday cake; 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 - Patisa, Shakarpare, Halwa, Laddo, Peda. Milk - Kheer, Rabri; Nuts - Barfi,

Chikki.

FOOD SCIENCE (PRACTICALS)

Course Code: SDC1FS04(P)

Contact Hours per Week: 6

Number of Credits: 5

Number of Contact Hours: 90

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.
6. Qualitative test for Protein – Ninhydrine reaction, Xanthoproteic test, Biuret test
7. Estimation of Gluten - Determination of Water absorption power. 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. Samuel 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, Rozgar Yojana 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

2. Preparation of invoices and debit/credit memos.
3. 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), sequestrants, 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 nutraceuticals.
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,

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- 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: 6

Number of Credits: 5

Number of Contact Hours: 90

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 Acidity (Titrable Acidity) of Milk, butter and curd.
3. Determination of ash, total solids, fat and SNF content in milk.

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4. Clot on boiling test for milk.
 5. Determination of specific gravity of milk.
 6. Detection of Addition of Starch in Milk.
 7. 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:

- To 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 III :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 IV :Biodiversity and its Conservation(10 Hours)

IntroductiDefinition: 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-spots 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 V :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 VI: 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 VII: 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), Encyclopaedia 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.

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2. Carbohydrates – Functions, sources, requirement, effects of deficiency. . fibers - Definition, classification, sources, role of fiber in human nutrition
 3. Protein - Functions, sources, requirement, essential amino acids, determination of nutritional quality of proteins.
 4. Fats and Lipids – Functions, sources, role of essential fatty acids, Health concerns in lipid nutrition-obesity, hypertension, atherosclerosis, requirements and effects of deficiency.
 5. Vitamins – Classification, sources, requirement, deficiency of Vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid.
 6. 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, Bangalore 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,

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- 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 VI : 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

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- 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 bed 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 units.

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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: 6

Number of Credits: 5

Number of Contact Hours: 90

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 solid.
2. Estimation of tannin
3. Evaluation of pectin content.
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
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: 6

Number of Credits: 5

Number of Contact Hours: 90

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 of Educational Research, 4th edition, Vikas publishing 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 VI :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.

References:

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 VI :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: 6

Number of Credits: 5

Number of Contact Hours: 90

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, denaturation, 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, xanthonenes, betalains, Effect of processing and storage on pigments, physical and chemical properties
2. Flavours - Flavour compounds in foods - terpenoids, flavanoids, and sulphur 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; Instrumental measurements and sensory parameters.

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(12 Hours)

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, Organisation Chart-Organisation manual-
2. Departmentation, Committees Authority- Delegation 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-Meaning- Styles
2. Managerial Grid by Blake and Mounon - Likert s Four level model- Coordination-Meaning 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 and safety.

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)

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)

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)

Surimi - Process, traditional and modern production lines, qualityof surimi products. Fish protein concentrates (FPC), fish protein extracts (FPE). Meatproducts: 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: 6

Number of Credits: 5

Number of Contact Hours: 90

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

Objectives:

- To study about different meat products

Course Outline

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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, Springer publishing

PRODUCT DEVELOPMENT, QUANTITY FOOD PREPARATION AND SALE (PRACTICAL)

Course Code: SDC5QF20(P)

Contact Hours per Week: 6

Number of Credits: 5

Number of Contact Hours: 90

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