SHIVAJI UNIVERSITY, KOLHAPUR

STRUCTUCTURE AND SYLLABUS OF DIPLOMA in FOOD PROCESSEING
Under Community College

DIPLOMA IN FOOD PROCESSING TECHNOLOGY

TITLE : **Diploma in Food Processing Technology**
Syllabus (Semester Pattern)
Under Faculty of Science

YEAR OF IMPLEMENTATION : Syllabus will be implemented from June 2015

DURATION : Diploma (One Year)

PATTERN OF EXAMINATION: Semester Pattern

- **Theory Examination** – At the end of each semester as per Shivaji University Rules
- **Practical Examination** – i) In the 1st semester of Diploma there will be internal assessment of practical record, related report submission and project reports at the end of semester.
  ii) In the second semester of Diploma, there will be external practical examination at the end of semester.

MEDIUM OF INSTRUCTION : English / Marathi

STRUCTURE OF COURSE : Diploma
Two Semesters per Year
Two General Papers per year / semester
Three Vocational Papers per Year / Semester
One Industry Visit/ Study Tour and on job training

SCHEME OF EXAMINATION

A) THEORY

- The theory examination shall be at the end of the each semester.
- All the general theory papers shall carry 40 marks and all vocational papers shall carry 100 marks (50 marks for theory and 50 marks for practical).
- All the general practical shall carry 10 marks and all vocational practical shall carry 50 marks
- Evaluation of the performance of the students in theory shall be on the basis of semester examination as mentioned above.
- Question paper will be set in the view of entire syllabus preferably covering each unit of the syllabus.
- **Nature of question paper for Theory examination** (Excluding Business Communication Paper) –
  i. There will be seven questions carrying equal marks.
  ii. Students will have to solve any five questions.
  Q. No. 1 : Short answer type question with internal choice (Two out of Three)
  Q. No. 2 to Q. No. 6 : Long answer type questions
  Q. No. 7 : Short Notes with internal choice (Two out of Three)

B) PRACTICAL

Evaluation of the performance of the students in practical shall be on the basis of semester examination (Internal assessment at the end of Semester I and external examination at the end of Semester II) as mentioned separately in each paper.

Standard of Passing:

As per the guidelines and rules for Diploma under Community College.

Structure of the Course

Semester – I

Sr. No	Paper No.	Title	Theory	Practical /Project	Marks (Total)	Distribution of Marks	
						Theory	Practical
1	I	Business Communication – I	Theory	Practical	50	40	10
2	II	Fundamentals of Food Science	Theory	Practical	50	40	10
3	III	Food Preservation	Theory	Practical	100	50	50
4	IV	Agro Processing Technology	Theory	Practical	100	50	50
5	V	Bakery & Confectionary Technology	Theory	Practical	100	50	50
6	VI	Industrial Visits (based on paper no. III,IV & V)		Practical	50	--	50

Semester – II

Sr. No	Paper No.	Title	Theory	Practical /Project	Marks (Total)	Distribution of Marks	
						Theory	Practical
1	VII	Business Communication – II	Theory	Practical	50	40	10
2	VIII	Fundamentals of Nutrition	Theory	Practical	50	40	10
3	IX	Milk and milk product processing	Theory	Practical	100	50	50
4	X	Food Quality control and Waste Management	Theory	Practical	100	50	50
5	XI	Food Microbiology & Food chemistry	Theory	Practical	100	50	50
6	XII	On Job Training (of 30 hrs in related industry)			50	--	50

Scheme of Teaching:

Semester – I

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	I	Business Communication - I	4	2	6
2	II	Fundamentals of Food Science	4	2	6
3	III	Food Preservation	4	4	8
4	IV	Agro Processing Technology	4	4	8
5	V	Bakery & Confectionary Technology	4	4	8
6	VI	Industrial Visit	-	-	-
		Total --	**20**	**16**	**36**

Semester – II

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	VII	Business Communication – II	4	2	6
2	VIII	Fundamentals of Nutrition	4	2	6
3	IX	Milk and milk product processing	4	4	8
4	X	Food Quality Control and Waste Management	4	4	8
5	XI	Food Microbiology & Food chemistry	4	4	8
6	XII	On Job Training	-	-	-
		Total-	**20**	**16**	**36**

Eligibility for Admission: 10 + 2 from any faculty or equivalent qualification in any related stream.

Eligibility for Faculty:
1) M. Sc./M.Tech. (Food Science and Technology/Food Science and Nutrition / Food Processing/Food Technology/Home-Science/Food Science and Quality Control with NET / SET)
2) M. A (English) with NET/SET for Business Communication

Eligibility for Laboratory Assistant:
B. Sc. / B. Tech. (Food Science and Nutrition / Food Processing/ Food Technology/Home-Science/ Food Science and Quality Control) / B.A. Home Science.

Staffing Pattern:

Teaching: 1 Full Time and 1 Part Time Lecturer for Food processing

1 CHB Lecturer for Business Communication

Lab Assistant: 1 Full time

CREDIT SYSTEM
DIPLOMA IN FOOD PROCESSING TECHNOLOGY

Subject wise credit assignment for Diploma in Food Processing Technology (Semester – I)

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	I	Business Communication - I	Theory & Practical	50	40	10	3	2
2	II	Fundamentals of Food Science	Theory & Practical	50	40	10	3	2
3	III	Food Preservation	Theory & Practical	100	50	50	3	3
4	IV	Agro Processing Technology	Theory & Practical	100	50	50	3	3
5	V	Bakery & Confectionary Technology	Theory & Practical	100	50	50	3	3
6	VI	Industrial Visit	Practical	50	---	50	---	2

Subject wise credit assignment for Diploma in Food Processing Technology (Semester – II)

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	VII	Business Communication – II	Theory & Practical	50	40	10	3	2
2	VIII	Fundamentals of Nutrition	Theory & Practical	50	40	10	3	2
3	IX	Milk and milk product processing	Theory & Practical	100	50	50	3	3
4	X	Food Quality Control and Waste Management	Theory & Practical	100	50	50	3	3
5	XI	Food Quality Control and Waste Management	Theory & Practical	100	50	50	3	3
6	XII	On Job Training	Practical	50	---	50	---	2

Evaluation system:

1. Standard of passing

The maximum credits for Diploma in Food Processing semester course (of two semesters) will be 30 X 2 = 60 credits. To pass in each paper students are required to obtain 4 grade points in each paper, it means 18 Marks for 50 Marks Theory / Practical papers, 14 for 40 Marks Theory papers and 04 marks for 10 Marks Practical papers.

2. Assessment of Project / Industrial visit /study tour /Internship Report

i) The Industrial visit/study tour/on-job training report must be submitted by the prescribed date usually two weeks before the end of academic session of the semester.

ii) It is desirable that the topics for Industrial visit/study tour/ on-job training report shall be assigned by the end of previous semester.

iii) The Industrial visit/study tour/ on-job training report and its presentation shall be evaluated by the coordinator of the course and concerned faculty**.**

3. Grade point for Theory/Practical/ Industrial visit /study tour / on-job training Report

- **Table –I: for 50 Marks Theory or Practical**

Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0	50	0.0 to 2.5	D	Unsatisfactory
1	50	2.6 to 5.0		
1.5	50	5.1 to 7.5		
2	50	7.6 to 10.0		
2.5	50	10.1 to 12.5		
3	50	12.6 to 15.0		
3.5	50	15.1 to 17.5		
4	50	17.6 to 20.0	C	Fair
4.5	50	20.1 to 22.5		
5	50	22.6 to 25.0	B	Satisfactory
5.5	50	25.1 to 27.5		
6	50	27.6 to 30.0	B^+	Good
6.5	50	30.1 to 32.5		
7	50	32.6 to 35.0	A	Very Good
7.5	50	35.1 to 37.5		
8	50	37.6 to 40.0	A^+	Excellent
8.5	50	40.1 to 42.5		
9	50	42.6 to 45.0	O	Outstanding
9.5	50	45.1 to 47.5		
10	50	47.6 to 50.0		

Table No-II: for 40 Marks Theory

Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0.00	40	0.0 to 2.0	D	Unsatisfactory
1	40	2.08 to 4.0		
1.5	40	4.08 to 6.0		
2	40	6.08 to 8.0		
2.5	40	8.08 to 10.0		
3	40	10.08 to 12.0		
3.5	40	12.08 to 14.0		
4	40	14.08 to 16.0	C	Fair
4.5	40	16.08 to 18.0		
5	40	18.08 to 20.0	B	Satisfactory
5.5	40	20.08 to 22.0		
6	40	22.08 to 24.0	B^+	Good
6.5	40	24.08 to 26.0		
7	40	26.08 to 28.0	A	Very Good
7.5	40	28.08 to 30.0		
8	40	30.08 to 32.0	A^+	Excellent
8.5	40	32.08 to 34.0		
9	40	34.08 to 36.0	O	Outstanding
9.5	40	36.08 to 38.0		
10	40	38.08 to 40.0		

Table No- III: for 10 Marks Practical

Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0.00	10	0.0 to 0.5	D	Unsatisfactory
1	10	0.52 to 1.0		
1.5	10	1.02 to 1.5		
2	10	1.52 to 2.0		
2.5	10	2.02 to 2.5		
3	10	2.52 to 3.0		
3.5	10	3.02 to 3.5		
4	10	3.52 to 4.0	C	Fair
4.5	10	4.02 to 4.5		
5	10	4.52 to 5.0	B	Satisfactory
5.5	10	5.02 to 5.5		
6	10	5.52 to 6.0	B^+	Good
6.5	10	6.02 to 6.5		
7	10	6.52 to 7.0	A	Very Good
7.5	10	7.02 to 7.5		
8	10	7.52 to 8.0	A^+	Excellent
8.5	10	8.02 to 8.5		
9	10	8.52 to 9.0	O	Outstanding
9.5	10	9.02 to 9.5		
10	10	9.52 to 10.0		

Calculation of SGPA and CGPA-

1. Semester Grade Point Average (SGPA) = $\frac{\Sigma \text{ (course credits in passed courses X earned grade points)}}{\Sigma \text{ (Course credits in registered courses)}}$

2. Cumulative Grade Point Average (CGPA) = $\frac{\Sigma \text{ (course credits in passed courses X earned grade points) of all Semesters}}{\Sigma \text{ (Course credits in registered courses) of all Semesters}}$

3. At the end of each year of B. Voc. Program, student will be placed in any one of the divisions as detailed below:

SGPA and CGPA Table

Grade Point	Grade	Description of performance
0.00 to 3.49	D	Unsatisfactory
3.5to 4.49	C	Fair
4.5 to 5.49	B	Satisfactory
5.5 to 5.99	B^+	Good
6.0 to 6.99	A	Very Good
7.o to 8.49	A^+	Excellent
8.5 to10.00	O	Outstanding

- Ist Class with distinction: CGPA > 7.0 and above
- Ist Class: CGPA > 6.0 and < 7.0
- IInd Class: CGPA > 5.0 and < 6.0
- Pass Class: CGPA > 4.0 and < 5.0
- Fail: CGPA < 4.0

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Diploma in Food Processing Technology

Semester I - Paper – I

Business Communication - I

Work Load - 6	Total Marks – 50
Theory – 4 Lectures / Week	Theory - 40 Marks
Practical – 2 Lectures/Week/Batch	Practical – 10 Marks

Unit 1: Use of English in Business Environment

Topics:

Business Vocabulary: Vocabulary for banking, marketing and for maintaining public relations

What is a sentence?

Elements of a sentence

Types of sentence: Simple, compound, complex

Unit 2: Writing a Letter of Application and CV/ Resume

Topics:

Structure of a letter of application for various posts

CV/ Resume and its essentials

Unit 3: Presenting Information/Data

Topics:

Presenting information/data using graphics like tables, pie charts, tree diagrams, bar diagrams, graphs, flow charts

Unit 4: Interview Technique

Topics:

Dos and don’ts of an interview

Preparing for an interview

Presenting documents

Language used in an interview

Practical: Based on the theory units 10 Marks.

Reference Books:

Sethi,Anjanee&BhavanaAdhikari.*Business Communication*. New Delhi: Tata McGraw Hill

Tickoo, Champa& Jaya Sasikumar.*Writing with a Purpose*. New York: OUP, 1979.

Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.

Herekar, Praksh. *Business Communication.* Pune: Mehta Publications, 2007.

Herekar, Praksh. *Principals of Business Communication.* Pune: Mehta Publications, 2003.

Rai, Urmila& S. M. Rai.*Business Communication.* Himalaya Publishing House, 2007.

Pradhan, N. S. *Business Communication.* Mumbai: Himalaya Publishing House, 2005.

Pardeshi, P. C. *Managerial Communication.* Pune: Nirali Prakashan, 2008.

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Diploma in Food Processing Technology

Semester I - Paper – II

Fundamentals of Food Science

Work Load - 6	Total Marks – 50
Theory – 4 Lectures / Week	Theory - 40 Marks
Practical – 2 Lectures/Week/Batch	Practical – 10 Marks

Objectives:

To enable students to

1) Understand the basic concept, functions, and classification of food.

Course content:

Unit I - **Introduction to food science**

- Concept of food, food science
- Objectives of food science
- Classification and Functions of food

Unit – II - **Cereals**

- Structure, composition and Importance of cereal grains
- Types of cereals used in cooking
- Cereal cookery- Gelatinization, Dextrinization and Identity of grain
- Processed cereals, millets and Ready-To- Eat cereals used in cooking

Unit – III - **Pulses and Legumes**

- Definition, composition and structure of pulses
- Cooking of Legumes and Factors Affecting cooking time of pulses and legumes
- Uses of legumes in cookery

Unit – IV - **Fruits and Vegetables Cookery**

- Classification of Fruits and vegetables
- Colour pigments in Fruits and vegetables
- Effect of heat, acids and alkali on Fruits and vegetables
- Changes during cooking and storage

Practical:

1) Weights and Measures of raw and cooked food.
2) Preparation of product by Gelatinization.
3) Preparation of product by Dextrinization
4) Preparation of product by Germinated pulses
5) Preparation of product by milled pulses
6) Preparation of product by green leafy vegetable
7) Preparation of product by roots and tuber
8) Preparation of product by fruits

References:

1) B. Shreelaksmi : ``Food Science'' (second edition), New Age International, New Delhi.
2) Swaminathan : ``Text book of Food Science'', Vol-1, BAPPCO, Banglore
3) Devendrakumar Bhatt & Priyanka Tomar : An Introduction to Food Science, Technology & Quality Management, Kalyani Publishers.
4) Sumati R. Mudambi : Fundamentals of Food & Nutrition wiley Eastern Ltd., New Delhi.
5) Philips T E, Modern Cooking for teaching and trade, Volit orient longman, Bombay

Scheme of Internal Practical Examination	**10 marks**
1) Submission of Record book	5 Marks
2) Viva-voce	5 Marks

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Semester I - Paper – III

Food Preservation

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objectives:

To enable student –

1) to acquire knowledge of food preservation and preservation technique.
2) to know the importance and basic principles of food preservation.

Course content:

Unit I - **Introduction to food preservation.**

- Concept, importance of food preservation.
- Principles of preservation
- Preservation techniques

Unit – II - **Preservation by drying**

- Concept, history
- Types of drying and dryers.
- Treatments prior to drying

Unit – III - **Preservation by use of high temperature.**

- Concept and importance
- Various methods used – Pasteurization, Boiling, Canning
- Effect of high temperature on food.

Unit – IV - **Preservation by Low Temperature**

- Concept, History
- Types of preservation methods by low temperature
- Different equipments used for preservation by low temperature
- Treatments prior to freezing

Practical:

1) Introduction to drying equipments
2) Preparation of food product by drying
   i) Onion flakes
   ii) Raw mango powder / Leafy vegetable powder
   iii) Papad and chips
3) Blanching of vegetables

4) Introduction to freezing equipments
5) Preservation by using chemical preservatives
   i) Tomato ketchup
   ii) Fruit squash
6) Preparation of product by using salt as preservative
7) Preparation of product by using sugar as preservative
8) Preparation of product by using oil as preservative

Scheme of practical examination

Internal practical examination		**50 marks**
i)	Preparation of one of the product from above	20 marks
ii)	Identification of equipments and its principle (any five)	10 marks
iii)	Submission of practical record book	10 marks
iv)	Viva – Voce	10 marks

References:

1) Prakash Triveni : Food Preservation, Aadi Publication, Delhi.
2) M. Shafiur Rahman : Hand Book of Food Preservation, Marcel Dekker Inc, New york.
3) McWillims and Paine : Modern Food Preservation, Surjeet Publication.
4) Fellows ,P. and Eills H. 1990 Food Processing Technology: Principles and Practicals, New York
5) NPCS Board, Modern Technology on Food Preservation
6) B. Sivasankar: Food Processing and Preservation

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Diploma in Food Processing Technology

Semester I - Paper – IV

Agro Processing Technology

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objectives:

To enable students –

1) To understand the processing techniques of agro products.

2) To know the use of agro processing equipments.

Course Content:

Unit I - **Agro processing industry.**

- Introduction to Agro processing industry.
- Scope and importance of Agro processed products.
- Processing equipments – Floor mill, mini grain mill pulverizers, Hammer mill, Floor separator, Dal mill, Packing and Sealing machine, Balance

Unit – II - **Cereal grain Processing**

- Different grains suitable for agro processing.
- Primary processing of major cereals
- Milling of cereals- Dry and Wet milling

Unit – III - **Pulses and Legumes processing**

- Principles of pulse milling
- Different methods of Dhal milling
- Milling of major legumes

Unit IV - **Oil seeds Processing**

- Properties and suitability of oil seeds for processing
- Methods of oilseed processing
- Terminologies in oil processing industry

Practicals:

1) Physical analysis of grains
2) Flour Analysis
3) Starch Estimation of wheat flour
4) Preparation of Cereal flour of different granule size
5) Preparation of Cereal flakes
6) Preparation of Puffed cereals

7) Preparation of Dal
8) Preparation of Pulse flour of different granule size
9) Preparation of soy milk
10) Preparation of Peanut butter

Scheme of practical examination

Internal practical examination		**50 marks**
i)	Preparation of one of the product from above	20 marks
ii)	Analysis of flour (Any one test)	10 marks
iii)	Submission of practical record book	10 marks
iv)	Viva – Voce	10 marks

Reference:

1) Kader A A: Post harvest technology of horticultural crops. 2nd edition, University of California
2) Salunkhe D K and Kadam S S: handbook of world food legumes, CRC Press, Florida
3) Niir Board : Modern Technology of Agro processing and Agricultural waste, National Institute of India Re 2000.
4) Salunkhe D K, Chavan J K, Adsule R N and Kadam S S : World oilseeds chemistry, technology and utilization. VNR, New York

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Diploma in Food Processing Technology

Semester I - Paper – V

Bakery & Confectionery Technology

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objective:

To enable students –

1) to develop skill in Bakery & Confectionery

Course content:

Unit – I - **Introduction to bakery and confectionery industry**

- Importance of bakery and confectionery in food industry
- Primary processing equipments used in Bakery and Confectionery- Flour Mill, mixer, moulding machine, balance, packing machines, measuring glass, moulds, knifes, extruder, oven

Unit II - **Bakery Products**

- Ingredients used in Bakery products
- Types and quality of flour
- Principle involved in bakery products
- Procedures of Different types of bakery products

Unit – III - **Introduction to confectionary products**

- Types of confectionary products
- Characteristics of confectionary products
- Ingredients used in confectionary products

Unit – IV - **Confectionary Products**

- Chocolate Processing
- Boiled Sweets
- Gelatine Sweets
- Crystallized confectionery

Practical:

1) Introduction to Bakery and Confectionery Equipments
2) Determination of Gluten content
3) Preparation of Bread
4) Preparation of Cake
5) Preparation of Biscuits
6) Preparation of Cookies

7) Preparation of Chocolate
8) Preparation of Boiled candy
9) Preparation of Toffee
10) Preparation of Fudge

Scheme of practical examination

Internal practical examination	**50 marks**
i) Preparation of one of the product from above	20 marks
ii) Determination of gluten content	10 marks
OR	
Identification of bakery and confectionery equipments and its principle (any five)	
iii) Submission of practical record book	10 marks
iv) Viva – Voce	10 marks

References:

1) John Kingslee: A professional text to bakery and confectionary, New Age International Publication.
2) NIIR Board: The complete technology book on bakery products
3) W.P. Edwards : Science of Bakery Products.
4) Emmanueal Obene : Chocolate science and Technology

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Semester I - Paper – VI

Industrial Visit

Total Marks- 50

Visit to Food Preservation, Agro Processing and Bakery & Confectionary Unit and submission of report of each visit.

Scheme of Internal Examination	**50 marks**
1) Submission of Report of three industrial visits	30 Marks (10 marks each)
2) Viva-voce	20 Marks

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Semester II - Paper – VII

Business Communication - II

Work Load - 6	Total Marks – 50
Theory – 4 Lectures / Week	Theory - 40 Marks
Practical – 2 Lectures/Week/Batch	Practical – 10 Marks

Unit 5: Group Discussion

Topics:

Preparing for a Group Discussion

Initiating a Discussion

Eliciting Opinions, Views, etc.

Expressing Agreement/ Disagreement

Making Suggestions; Accepting and Declining Suggestions

Summing up.

Unit 6: Business Correspondence

Topics:

Writing Memos, e-mails, complaints, inquiries, etc.

Inviting Quotations

Placing Orders, Tenders, etc.

Unit 7: English for Negotiation

Topics:

Business Negotiations

Agenda for Negotiation

Stages of Negotiation

Unit 8:English for Marketing

Topics:

Describing/ Explaining a Product/ Service

Promotion of a Product

Dealing/ bargaining with Customers

Marketing a Product/ Service: Using Pamphlets, Hoardings, Advertisement, Public Function/ Festival

Practical: Based on the theory units

Reference Books:

Herekar, Praksh. *Business Communication.* Pune: Mehta Publications, 2007.

Herekar, Praksh. *Principals of Business Communication.* Pune: Mehta Publications, 2003.

John, David. *Group Discussions*.New Delhi: Arihant Publications.

Kumar, Varinder. *Business Communication*. New Delhi: Kalyani Publishers, 2000.

Pardeshi, P. C. *Managerial Communication.* Pune: NiraliPrakashan, 2008.

Pradhan, N. S. *Business Communication.* Mumbai: Himalaya Publishing House, 2005

Rai, Urmila& S. M. Rai.*Business Communication.* Mumbai: Himalaya Publishing House, 2007.

Sethi, Anjanee&BhavanaAdhikari.*Business Communication*. New Delhi: Tata McGraw Hill.

Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.

Tickoo, Champa& Jaya Sasikumar.*Writing with a Purpose*. New York: OUP, 1979.

Whitehead, Jeoffrey & David H. Whitehead. *Business Correspondence*. Allahabad: Wheeler Publishing, 1996.

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Semester II - Paper – VIII

Fundamentals of Nutrition

Work Load – 6 Total Marks – 50

Theory – 4 Lectures / Week Theory- 40

Practical – 2 Lectures / Week Practical-10

Objectives:

To enable students –

1. to understand the concept of nutrients.
2. to study the role of various nutrients.

Course content:

Unit – I - **Introduction to Nutrition**
- Definition of nutrition, nutrients, RDA
- Classification of nutrients (Macro, Micro)

Unit – II - **Macro nutrients (Carbohydrates, Proteins, Fats)**
- Classification, Sources
- Functions, RDA
- Deficiency, excess

Unit – III - **Micro nutrients(Vitamins, Minerals)**
- Classification, Sources
- Functions, RDA
- Deficiency, excess

Unit – IV - **Water**
- Composition, Sources, Classification
- Functions, RDA
- Deficiency, excess

Practical:

1) Preparation of list of nutrient rich food sources (Carbohydrates, proteins, fats)
2) Calculation of nutritive value of foods
3) Preparation of high carbohydrate product from cereals with calculation of nutritive value
4) Preparation of high protein product from plant source with calculation of nutritive value
5) Preparation of high protein product from animal source with calculation of nutritive value
6) Preparation of high fat product with calculation of nutritive value
7) Preparation of low fat product with calculation of nutritive value
8) Preparation of high iron product with calculation of nutritive value
9) Preparation of high calcium product with calculation of nutritive value
10) Preparation of high vitamin B_1/ B_2/B_3 product with calculation of nutritive value

Scheme of External Practical Examination **10 marks**

1)	Submission of Record book	5 marks
2)	Viva – Voce	5 marks

References:

1) Shubhangini Joshi, Textbook of food and nutrition, Tata Macgrohill Publishing Co., New Delhi.
2) B. Shrilakshmi, Nutrition Science, New Age International Publishers
3) Muddambi S.R. and Rajgopal M. V., Fundamentals of Food and Nutrition, Wiley Eastern Ltd., New Delhi.
4) Nutritive Value of Indian Foods, NIN, Hyderabad.

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Semester II - Paper – IX

Milk and Milk Product Processing

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objectives:

To enable students –

1. to understand techniques in Milk and Milk Product processing
2. to study the working of equipments used in Milk and Milk Product Processing

Course content:

Unit – I - **Introduction to Milk and milk products**

- Definition, Production and Processing status of milk
- Physio-chemical properties
- Composition and Nutritive value

Unit – II - **Processing of milk**

- Pasteurisation
- Sterilization
- Dehydration

Unit – III - **Special Milks**

- Re-constituted or Re-hydrated milk
- Condensed milk, Toned milk and Flavoured milk
- UHT Milk

Unit – IV - **Milk Products**

- Dahi, Chakka, Shrikhand
- Butter, Butter Milk, Butter Oil, Lassi
- Channa, Paneer, Rasogolla
- Khoa and Basundi
- Ice-cream and Cheese

Practical:

1) Physical examination of milk
2) Platform tests of milk
3) Determination of Fat content of milk
4) Preparation of Flavoured milk
5) Preparation of Condensed milk
6) Preparation of Curds and Shrikhand
7) Preparation of Khoa
8) Preparation of Gulabjamun
9) Preparation of Paneer
10) Preparation of Rasgulla
11) Preparation of Ice-cream and Kulfi
12) Visit to Dairy unit/ milk processing unit

Scheme of practical examination

External practical examination	**50 marks**
i) Preparation of one of the product from above	20 marks
ii) Performance of Physical test/Platform test/Determination of fat content	10 marks
iii) Submission of practical record book and visit report	10 marks
iv) Viva – Voce	10 marks

Reference:

1) Dey S., 1994, Outlines of Dairy Technology, Oxford Univ. Press, New Delhi.
2) Rosenthal I., 1991, Milk and Milk Products, VCH, New York.
3) Robinson R. K., (2 vol. set), 1986, Modern Dairy Technology, Elsevier Applied Science, UK.
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Diploma in Food Processing Technology

Semester II - Paper – X

Food Quality Control and Waste Management

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objectives:

To enable students –

1. to understand concept of sampling and quality of the foods.
2. to study the working of equipments for quality control of food products.

Course Content:

Unit – I - **Introduction to Quality Control in the food industry**

- General concepts of quality and quality control
- Major quality control functions
- Sampling of Food
- Sample Selection and Sampling Plans
- Preparation and storage of Laboratory Samples
- Sampling Methods

Unit – II - **Standard tests for quality assessment**

- Physical Tests
- Chemical tests
- Microbiological tests
- Sensory analysis

Unit – III - **Waste Management in Food Industry**

- Types of waste generated: non-degradable & biodegradable wastes
- Methods of utilizing wastes to make value added products
- Waste storage and disposal methods
- Storage and disposal of liquid and gaseous waste- land-filling, burial, incineration, recycling, biological treatment of food industry wastes.
- Storage and disposal of liquid and gaseous waste

Unit - IV - **Food Laws and Standards**

- Existing food laws and standards in India
- Concept and application of ISO and HACCP

Practical:

1. Determination of Moisture content of food
2. Determination of Fat content of food
3. Determination of protein content of food
4. Determination of crude fiber content of food
5. Determination of ash content of food
6. Determination of Total Plate Count
7. Determination of Yeast and Mould Count
8. Sensory analysis of food products
9. Study of solid waste disposal methods
10. Study of liquid waste disposal methods
11. Visit to Quality Control Lab/ Waste disposal unit

Scheme of practical examination

External practical examination	**50 marks**
i) Determination of one from above	20 marks
ii) Sensory evaluation of any one food product	10 marks
iii) Submission of practical record book and visit report	10 marks
iv) Viva – Voce	10 marks

References:

1. Philip,A.C. Reconceptualizing quality. New Age International Publishers,Banglore. 2001.

2. Bhatia,R. and Ichhpujan,R.L. Quality assurance in Microbiology. CBS Publishers and Distributors, New Delhi. 2004.

3. Kher, C.P. Quality control for the food industry. ITC Publishers, Geneva. 2000.

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Diploma in Food Processing Technology

Semester II - Paper – XI

Food Microbiology & Food chemistry

Work Load - 8	Total Marks – 100
Theory – 4 Lectures / Week	Theory - 50 Marks
Practical – 4 Lectures/Week/Batch	Practical – 50 Marks

Objectives:

To enable students –

1. to understand techniques in. Food Microbiology
2. to study the procedures for isolation of micro organism & Food adulteration

Course content:

Unit – I	-	**Food microbiology:** Food as substrate for micro-organisms, General principles underlying spoilage of foods, spoilage of bread, spoilage of pickles
	-	**Microbial growth in food:** Microbial food, food poisoning and infections investigation of food borne outbreaks, prevention control.
	-	**Fermented food products:** Types, production and defect in Jilebi, Punjabi Warri, Dhokla, pickles, cheese.
Unit – II		
	-	**Foods microbiology and public health**: food poisoning, types of food poisonings, important features etc; bacterial agents of food borne illness, food poisoning by *Clostridium, Salmonella, E. coli, bacillus, staphylococcus* etc.; non-bacterial agents of food borne illness: poisonous algae, and fungi - a brief account.
	-	Food spoilage and microbes of milk, meats, fish and various plant products, spoilage of canned foods; Indicators microorganisms, methods of isolation and detection of microorganisms or their products in food; conventional methods;
Unit – III	-	**Introduction to Food chemistry**- definition, scope and importance; Composition and nutritive value of common foods, chemical properties of food constituents viz. water, carbohydrates, lipids, proteins, enzymes, vitamins, minerals, characteristics of food quality.

Unit – IV	-	**Food Additives and Food Adulteration** : Food additives: definition, types, Applications and safety for food additives, Adulteration of food: Definition, types, common adulterants in food and tests for their detection

Practical:

Foods microbiology

1) Isolation of Microbes From Food Samples
2) Effect of physicochemical factors on growth of microorganisms
3) Nutritional requirements of microorganisms
4) Isolation and characterization of microbes based on morphological and physiological characteristics
5) Evaluation of microbial quality of food and water sample

Food chemistry

1) Estimation of carbohydrate
2) Chemical analysis of foods-pH, moisture, fat and minerals
3) Quantitative estimation of protein
4) Iodine estimation
5) Estimation of sodium benzoate
6) Food adulteration tests
7) Estimation of Vitamin C
8) Vinegar sample analysis
9) Acidity of milk/lassi

Scheme of practical examination

External practical examination	**50 marks**
i) Performance of any one practical of food microbiology	15 marks
ii) Determination of pH/ Iodine/ Vitamin C/ adulteration tests	15 marks
iii) Submission of practical record book and visit report	10 marks
iv) Viva – Voce	10 marks

References:

Foods microbiology

1. The Technology of Food Preservation: 4th Edi. Norman N. Potter (1987) CBS Publi.
2. Milk and Milk Products: 4th Edi. Clasence Hanry. TMH Publications.
3. Food Processing: Biotechnological Applications (2000). S.S.Marwaha and Arora. Asiatech publications, New Delhi.
4. Food Microbiology: Frazier.
5. Food Microbiology: James De and De.
6. Dairy Technology : Sukumar De.
7. Food Science: 5th Edi, Norman N. Potter (1996). CBS
8. Aurand, L.W. and Woods, A.E. 1973. Food Chemistry. AVI, Westport.
9. Birch, G.G., Cameron, A.G. and Spencer, M. 1986. Food Science, 3rd Ed. PergamonPress, New York.

Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York

Food chemistry

1. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi
2. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
3. Bamji MS, Rao NA & Reddy V. 2003. *Textbook of Human Nutrition*.Oxford & IBH.
4. Belitz HD.1999. *Food Chemistry*. Springer Verlag.
5. DeMan JM. 1976. *Principles of Food Chemistry*. AVI.
6. Fennema OR.1996. *Food Chemistry*. Marcel Dekker.
7. Meyer LH. 1987. *Food Chemistry*. CBS.
8. Swaminathan M. 1974. *Essentials of Foods and Nutrition*. Vol. II. Ganesh & Co.
9. Joslyn, M.A. Ed. 1970. Methods in Food Analysis. Academic Press, New York.

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Semester II - Paper – XII

On Job Training

Total Marks – 50

On Job Training of 30 hrs in related Industry

Scheme of External Evaluation	**50 marks**
1) Submission of Training report	20 marks
2) Presentation of report	10 marks
2) Viva – Voce	20 marks