

**P.R. Government College
(Autonomous)
Kakinada**



(Affiliated to Adikavi Nannaya University)

Department of Chemistry

B. Voc (Food Technology)

Under NSQF Scheme

Board of



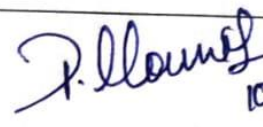
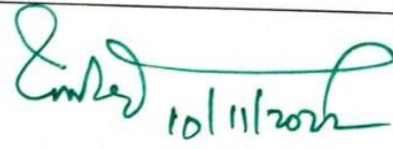

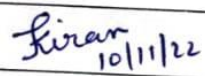
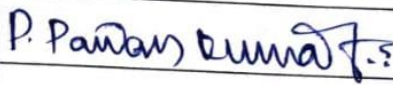
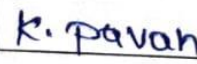
studies2022-23

**Signatures of the members who attended the
Board of studies in B. Voc (Food Technology)**

Date:10/11/2022

Time: 3pm

Mode of conduct of meeting: Offline

Name of themember	Designation	Signature
Dr. B.Lakshmi	Chairman, Board of Studies. Lecturer In Microbiology, 628102826 microbiologylakshmi@gmail.com	 10/11/22
Sri S. Sasikanth M. Tech (Food Technology)	University Nominee Asst. Professor (Contract), School Of Food Technology, JNTUK, Kakinada. sarangamsasikanth@gmail.com 8008175975	 10/11/2022
P.Mounika	Subject Expert Asst. Professor department of food technology ideal college of arts and science ,Kakinada	 10/11/2022
V. MallikarjunaSarma	Subject Expert Lecturer In Chemistry,ASD Womens Government Degree College,kkd, East Godavari District. 9676822550, 8341546804 v.mallikarjunasarma@gmail.com	 10/11/2022
K Goodu Mastanvali	Industrial nominee , Executive Quality,OLAM ARGO India limited mastan.8888@gmail.com 8121562196	 10/11/22
K Kiran	Member M.Tech Food technology	 10/11/22
P. Pavan Kumar Regd no: 5215726	Student Member II B.Voc Food Tech	
K.Pavan Sai Kumar Regd no: 5215706	Student Member II B.Voc Food Tech	

**ACTION PLAN/ BUDGET ESTIMATION BOS MEETING FOOD TECHNOLOGY
HELD ON 10-11-2022**

Department activities for the academic year 2022-2023.

Annexure I

**1. Organizing National/ State level seminars/Workshops/ Conferences/
Training Programmes etc., with topics and other details.
(Mandatory for each Department)**

- i) Staff development programme
- ii) Training in the food industry
- iii) Awareness on FOOD ADULTRATION
- iv) World food day Third week of October
- v) Food. fest
- vi) National Science Day – Last week of February
- vii) Guest lectures
- viii) National seminar in food technology.
- ix) World food week- First week of September
- x) Training in water analysis

2. Change of modules in the syllabus content.

Syllabus designed for first and second and final years as per university regulations.
CBCS introduced for final year w.e.f. 2022-23.

**3. Plan for utilization of funds for Autonomous/UGC/other grants
available for arranging guest lectures, faculty improvement
programmes, study tours, equipping laboratories, reference books &
other necessary teaching-learning material with ICT enabled teaching.**

I. Study visits to: Rs, 50,000

- 1. Gemini Oils Pvt. Ltd, Kakinada
- 2. Santhoshi Matha Oil Packaging Industries, Kakinada.

II.

- | | | |
|--|------------|------------|
| 1. Sophisticated version UV-Visible spectrophotometer- | 5.0 lakhs | |
| 2. Other equipment | | 1.50 lakhs |
| 3. Consumables | 1.98 lakhs | |

4. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds. (Mandatory for each Department)

i)	Adoption of village	Rs.	20,000
ii)	Food adulteration programmes	Rs.	10,000

5. Institution of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc., - Strategies to be recommended

6. Introduction of new Online programmes –PG/UG/Diploma and certificate courses.

Swayam online course

1. Food Nutrition
2. Food Preservation technology
3. Food Microbiology
4. Food Chemistry

7. Any other programme that enhances the learning capacity of students and their employable & knowledge skills.

Market and literature survey to identify the concepts of new products ,functional foods , convenience foods , existing Indian traditional foods.

8. Change in internal assessment exams for conducting I mid Semester by way of Project work/Assignment.

9. Suggest panel of examiners/paper setters & other experts/nominees for BOS deliberations.

Chemistry

- i) Dr. Srirangam, Lecturer in Food Technology, Layola college, Vijayawada.
- ii) Sri S. Sasikanth, JNTUK, Kakinada.
- iii) Dr. M. Srijaya, Associate Professor, Sai Institute of Higher learning, Puttaparti.

SEMISTER-I



Pithapur Rajah's Government College (Autonomous) Kakinada

Program & Semester
I B.Voc, FOOD
TECHNOLOGY: paper:1
Course:1

CourseCode	FOOD CHEMISTRY-I						
Teaching	Hours Allocated: 60 (Theory)			L 60	T 10	P 30	C 4+1
Pre-requisites:	Carbohydrates, Fats, Proteins						

Course Objectives:

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

To understand the changes that occurs in the different constituents during storage and ways and means to prevent it.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students will understand the basic concepts in food science and will get knowledge of the different food preparation methods
CO2	Students will understand the theory of carbohydrates
CO3	Understand and enlist properties of components of foods
CO4	Gains knowledge on the source for extraction of Fats&oils

Skill Development			Employability			Entrepreneurship	
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Syllabus:

UNIT-I:

Introduction and Water in foods: Introduction to chemistry of foods; composition and factors affecting food composition

Chemistry of water: Review of structure and properties of water; Concept of water activity and shelf of foods; Moisture sorption isotherms; determination of moisture.

Additional Input: free water, bound water.

UNIT-II:

Carbohydrates: Overview, Properties and classification; Monosaccharides, disaccharides and sweeteners; Sugars – types and properties; Polysaccharides: starch, cellulose, pectic substances, enzymes and its use in foods; Properties (gel formation and starch degradation, dextrinization, Browning reactions – Enzymatic & Non-enzymatic browning);

UNIT-III:

Proteins : Classification; Physical, chemical and functional properties of proteins and amino acids; Hydrolysis of proteins; Physical, chemical and nutritional changes of proteins during processing. Protein denaturation; Texturised proteins; Protein isolates; Protein hydrolysates;

UNIT-IV:

Oils and Fats : Classification, composition, Sources, physical and chemical properties, hydrolysis, hydrogenation, rancidity and flavor reversion, winterization, refining of oils, rendering, emulsions; Fat crystallization and application in foods; Quality determination of fats and fatty acids;

Referencebooks:

1. Campbell, M K and Farrell, S O-Biochemistry 5th edition-international student, 2006
2. Damodaran,S., Parkin , K L.,Fennema, O R., Fennema's Food Chemistry- 4thedition, CRC press Taylor and Francis Group, New York 2008.
3. Fennema, O R. -Food Chemistry 3rd edition, Marcel Dekker Inc, New York., 1996.
4. Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
5. Meyer, L H-Food Chemistry. CBS publishers & distributors, New Delhi. 2002

WebLinks:

1. <https://youtu.be/GID2sExkepW>
2. <https://youtu.be/16FtnBamrpE>
3. <https://youtu.be/wh05m9fFlsE>

Activities & Benchmarks Proposed (Table)

1. Assignments
2. Seminars
3. Group Discussion
4. Quiz

CO-PO Mapping:

(1:Slight [Low]; 2:Moderate[Medium]; 3:Substantial[High], 4:No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO 1	3	2	3	1	3	2	3	2	2	2	3	3	2
CO 2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO 3	3	3	3	3	3	2	2	2	2	2	3	3	2
CO 4	3	3	3	3	3	2	2	2	2	2	3	2	3
Avg	3	2.8	2.8	2.5	2.8	2	2	2	2	2	3	2.8	2.3

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I**

COURSE – 1: (FOOD CHEMISTRY-1)

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	1	1	15	Analysis\ remembering
2.	UNIT -II	2	2	30	Understanding
3.	UNIT -III	1	2	20	Understanding \remembering
4.	UNIT - IV	2	1	25	Applying \analysing
	Total	6	6	90	

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I
COURSE – 1: FOOD CHEMISTRY- I**

Time 2hrs.

Max marks-50M

PART-I

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

3x10=30M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II

SECTION-B

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-IV

PART-II

Answer any FOUR questions

4x5=20M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II
4. One question is to be set from unit-III
5. One question is to be set from unit-III
6. One question is to be set from unit-IV

**B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I
COURSE – 1: FOOD CHEMISTRY- I
QUESTION BANK**

**SECTION – A
ESSAY QUESTIONS (10M)**

UNIT – I

1. Write about food composition and factors effecting food composition
2. Write about moisture sorption isomerism
3. Write about free water and bound water

UNIT – II

- 1.Explain enzymatic and non enzymatic browning reaction
2. Define enzymes and uses in foods

UNIT III

1. Explain physical, chemical and nutritional changes of proteins during processing
2. Explain physical, chemical and functional properties of proteins and amino acids

UNIT IV

1. Explain the following
 - 1) Rancidity in oils and fats
 - 2) Hydrogenation
2. Explain quality determination of fats and fatty acids

SECTION –B

SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on concept of water activity
2. Importance of water during cooking
3. Determination of moisture in foods

UNIT II

1. Write a note on technique substances
2. Write a short note on dextrinization
3. write a note on gel formation

UNIT III

1. Write a note on protein denaturation
2. Write a note on protein hydroxylation
3. Write a short note on texturized proteins

UNIT IV

1. Define and classify oils and fats
2. Write a note on hydrolysis of oils and fats
3. Write a short note on flavor reversion
4. Write about the applications of oils and fats in food

Co-Curricular Activities:

a) Mandatory *Lab/field training of students by teacher:(lab:10+field:05):*

1. **For Teacher:** Training of students by teacher in laboratory and field for not less than 15 hours on the field techniques/skills of identification of carbohydrates, identification of proteins in a mixture.
2. **For Student:** Student shall visit a related industry/ laboratory in universities/research organizations/private sector facility and observe the techniques. Write their observations and submit a handwritten fieldwork/project work report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/project work
4. Suggested Format for Fieldwork/project work: *Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.*
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students' by related industrial experts.
2. Assignments, Seminars and Quiz (on related topics), collection of videos and other material.
3. Visits of facilities, firms, research organizations etc.
4. Invited lectures and presentations on related topics by field/industrial experts

**P.R.GOV.T.COLLEGE (A), KAKINADA CHOICE
BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)FIRST YEAR SEMESTER – I
COURSE – 1: FOOD CHEMISTRY- I**

PRACTICALS:

1. Qualitative tests for sugars - glucose, fructose, lactose, maltose and glucose.
2. Qualitative tests for proteins.
3. Qualitative tests for minerals
4. Demonstration Experiments.
5. Estimation of total nitrogen in foods (Micro or Macro Kjeldahl methods)
6. Lipid extraction
7. Standardization of Sodium Hydroxide by Oxalic acid.



Pithapuram Rajah's Government College (Autonomous) Kakinada

**Program & Semester
I B.Voc, FOOD
TECNOLOGY
Semester -I
Course-2**

**Course
Objectiv
es:**

CourseCode	FUNDAMENTALS OF FOOD TECHNOLOGY				
Teaching	Hours Allocated: 50 (Theory)	L 40	T 10	P 30	C 4+1
Pre-requisites:	Emerging trends in food technology				

To gains basic knowledge on fundamentals of food technology.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Gains knowledge on emerging trends in food technology
CO2	Gains knowledge on unit operation in food processing
CO3	Gains knowledge on thermal operations
CO4	Gains knowledge on fermentation and enzyme technology

Skill Development		Employability		Entrepreneurship	
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Syllabus:

UNIT-I:

Classification of Food : Definition of food, classification of foods- based on origin, pH, nutritive value, functions of food, Health food, ethnic food;

Emerging trends in food technology: Organic food – Advantages and limitations; Functional foods and Nutraceuticals; Fabricated foods, Convenience foods, Processed foods; Food fortification; super foods.

UNIT-II:

Unit operations in food processing technology:

Raw material handling : Cleaning; Sorting based on shape, size, color and weight; Grading; Various types of peeling; Size reduction of solids foods and liquid foods (emulsification and homogenization) and its effect on foods; Mixing and forming of foods-efficiency, principles and its applications;

UNIT-III:

Thermal operations: Blanching, pasteurization, Heat sterilization, Evaporation and distillation, Extrusion, Dehydration, Baking and roasting, Cooling and Freezing;

Post –processing operations: Coating or enrobing, Packaging, filling and sealing of containers

UNIT-IV:

Fermentation and enzyme technology – Theory, types of fermentations, effect on foods, Applications of enzymes in food processing; Theory of irradiation , Detection of irradiated foods – physical, chemical and biological methods; benefits of irradiation;

Referencebooks:

Brian E. Grimwood, Coconut Palm Products: Their Processing in Developing Countries, 1979.

Hui, Y H and Associate Editors; Hand Book of Food Products Manufacturing Vol I, Wiley- Interscience, New Jersey 2007.

Hui, Y H and Associate Editors; Hand Book of Food Products Manufacturing Vol II, Wiley- Interscience, New Jersey 2007.

Manay, N.S, Shadakshara swamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.

Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000

WebLinks:

<https://youtu.be/tBm2Bw1ESNU>

Activities & Benchmarks Proposed (Table)

- 1.Assignments
- 2.Seminars
- 3.Group Discussion
4. Quiz

CO-PO Mapping:

(1:Slight [Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlatio

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO 1	3	2	3	1	3	2	3	2	2	2	3	3	2
CO 2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO 3	3	3	3	3	3	2	2	2	2	2	3	3	2
CO 4	3	3	3	3	3	2	2	2	2	2	3	2	3
avg	3	2.8	2.8	2.5	2.8	2	2	2	2	2	3	2.8	2.3

CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I
COURSE – 2: FUNDAMENTALS OF FOOD TECHNOLOGY

Time 2hrs.

Max. Marks-50M

WEIGHTAGE TO CONTENT

S.NO	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	1	2	20	Application and understanding
2.	UNIT -II	2	1	25	Analysing and evaluation
3.	UNIT -III	1	2	20	Understanding and remembering
4.	UNIT -IV	2	1	20	Applying
	Total	6	6	90	

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I
COURSE – 2: FUNDAMENTALS OF FOOD TECHNOLOGY**

Time 2hrs.

Max. Marks-50M

PART-I

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

3x10=30M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II

SECTION-B

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-IV

PART-II

Answer any FOUR questions. Each Question carries 5 Marks. 4x5=20M

1. One question is to be set from unit-I
2. One question is to be set from unit-I
3. One question is to be set from unit-II
4. One question is to be set from unit-III
5. One question is to be set from unit-III
6. One question is to be set from unit-IV

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BASED CREDIT SYSTEM

B. VOC (FOOD TECHNOLOGY)

FIRST YEAR SEMESTER – I

COURSE – 2: FUNDAMENTALS OF FOOD TECHNOLOGY

QUESTION BANK

SECTION I

ESSAY QUESTIONS (10M)

1. Define food and classification of food based on origin, pH and nutritional values
2. Explain the following
 - i) organic food along with advantages and limitations
 - ii) Functional food and Nutraceuticals

UNIT II

1. Explain about raw material handling and cleaning, softening based on shape size, colour and weight
2. Explain about mixing, forming of food efficiency, principles and applications

UNIT III

1. Explain the following
 - i) Sterilization
 - ii) Evaporation and distillation
2. Explain about packing, filling and sealing of containers

UNIT IV

1. Define fermentation and types of fermentation and its effects on food
2. Define irradiated foods – physical, chemical and biological methods and benefits of irradiation.

SECTION B

SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on health food and ethnic food
2. Write a short note on fabricated foods
3. Write a short note on food fortification
4. Write a short note on superfoods

UNIT II

1. Write about size reduction of solid food and its effects on food
2. Write about size reduction of liquid food and its effects on food

3. Write a short note on types of peeling

UNIT III

1. Write a short note on pasteurization
2. Write a short note on baking and roasting
3. Write a short note on cooling and freezing
4. Write a short note on coating or enrobing

UNIT IV

1. Write about applications of enzymes in food processing.
2. Write a short note on detection of irradiation foods
3. Write a short note on benefits of irradiation foods

Co-Curricular Activities:

c) Mandatory Lab/field training of students by teacher:(lab:10+field:05):

6. **For Teacher:** Training of students by teacher in laboratory and field for not less than 15 hours on the field techniques/skills of identification of carbohydrates, identification of proteins in a mixture.
7. **For Student:** Student shall visit a related industry/ laboratory in universities/research organizations/private sector facility and observe the techniques. Write their observations and submit a handwritten fieldwork/project work report not exceeding 10 pages in the given format to the teacher.
8. Max marks for Fieldwork/project work Report: 05.
9. Suggested Format for Fieldwork/project work: *Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.*
10. Unit tests (IE).

d) Suggested Co-Curricular Activities

5. Training of students' by related industrial experts.
6. Assignments, Seminars and Quiz (on related topics), collection of videos and other material.
7. Visits of facilities, firms, research organizations etc.
8. Invited lectures and presentations on related topics by field/industrial experts

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – I
COURSE – 2: FUNDAMENTALS OF FOOD TECHNOLOGY
Practicals**

- 1.Preparation of Health foods
- 2.Preparation of Processed foods
- 3.Preparation of Fortified foods
- 4.Blancing of various foods
- 5.Preparation of fermented foods

SEMESTER - II



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
II B.Voc.,:paper:1
Course:3**

CourseCode	FOOD PACKAGING -I				
Teaching	Hours Allocated: 60 (Theory)				
Pre-requisites:	Packing materials	L 60	T 10	P 30	C 4+1

Course Objectives:

To learn and understand the packaging of various foods

To learn about various packaging materials

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students will gain the knowledge on basic concepts food packaging
CO2	Students will be able select the suitable packing material for specific packing material
CO3	Understand the modern concept of packaging technology
CO4	Gains knowledge testing of packaging materials

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction to food packaging : Definition, importance and scope of packaging, functions and requirements for effective packaging, packaging criteria, Classification of packaging- Primary, secondary and tertiary packaging, Flexible, rigid and Semi- rigid packaging.

Unit – II

Materials for food packaging : Paper, Glass, Tin, Aluminium: TFS, Polymer coated tin free steel cans, cellophane, plastics-LDPE, HDPE, LLDPE, Polypropylene, polystyrene, polyamide, polyester, polyvinyl chloride, and other packaging materials;

Advantages and Disadvantages of different packaging materials; Effect of packaging materials on food commodities; Role of ideal packaging materials; Selection criteria of packaging material for raw and processed foods;

Unit – III

Modern concepts of packaging technology - Aseptic packaging of foods : Carton system, Can, Bottle, Sachet and Pouch System, Cup systems, Vacuum, Gas and Shrink Packaging; Integrity testing of aseptic packages; Active and intelligent packaging system; Modified Atmosphere Packaging (MAP);

Unit – IV

Packaging testing: Identification of different packaging materials;

Quality testing of packaging materials: Paper & paper boards-thickness, bursting strength, grammage, puncture resistance, Cobbs test, tearing resistance. Flexible packaging materials (plastics)-yield, density, tensile strength, elongation, impact of resistance, WVTR, GTR, Overall Migration Rate, seal strength.

References :

1. Robertson, G, L., Food packaging Principles and practice, 3rd edition, CRC Press, 2013.
2. Sharma, H., Food packaging technology. Agrimoon.com
3. Cruess, W.V. Commercial Fruit & Vegetable Products. Allied Scientific Publishers, New Delhi. 2003
4. Davis, E.G. Evaluation of tin & plastic containers for foods. CBS Publishers, New Delhi. 2004
4. Sacharow, S., Griffin, R.C. Food Packaging. AVI Publishing Company, West Port, Connecticut. 2000

WebLinks:<https://youtu.be/tBm2Bw1ESNU>**Activities & Benchmarks Proposed (Table)**

1. Assignments
2. Seminars
3. Group Discussion
4. Quiz

CO-PO Mapping:

(1:Slight [Low]; 2:Moderate[Medium]; 3:Substantial[High], 4:No Correlation)

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CO 2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO 3	3	3	3	3	3	2	2	2	2	2	3	3	2
CO 4	3	3	3	3	3	2	2	2	2	2	3	2	3
Avg	3	2.8	2.8	2.5	2.8	2	2	2	2	2	3	2.8	2.3

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CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 3: FOOD PACKAGING –I

WEIGHTAGE TO CONTENT

Sl.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	1	1	15	Analysis\ remembering
2.	UNIT -II	2	2	30	Understanding
3.	UNIT -III	1	2	20	Understanding \remembering
4.	UNIT - IV	2	1	25	Applying \analysing
	Total	6	6	90	

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 3: FOOD PACKAGING - I**

Time :2hrs

Max marks-50M

PART-I

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

3x10=30M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II

SECTION-B

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-II
4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 3: FOOD PACKAGING –I
QUESTION BANK
SECTION A
EASSY QUESTIONS (10M)

UNIT I

1. Write about packaging criteria and classification of packaging
2. Define packaging and write about functions and requirements of effective packaging

UNIT II

1. Write about following materials of food packaging
 - i) Glass
 - ii) Paper
 - iii) Tin
2. Write about following materials of food packaging
 - i) Cellophane
 - ii) HDPE
 - iii) LLDPE
3. Write about following materials of food packaging
 - i) Polypropylene
 - ii) Polystyrene
 - iii) Polyamide

UNIT III

1. Define aseptic packaging of foods and write any 4 types of aseptic packaging.
2. Define packaging and write about active packaging system
3. Define intelligent packaging system

UNIT IV

1. Write about Identification of different packaging materials
2. Write about the following quality testing of packaging materials
 - i) paper and paper boards thickness
 - ii) bursting strength

SECTION B

SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on semi rigid packaging
2. Write a short note on importance and scope of packaging

UNIT II

1. Write about advantages and disadvantages of different packaging materials
2. Write about role of ideal packaging materials for foods

UNIT III

1. Write a short note on modified atmosphere packaging (MAP)
2. Write about integrity testing of aseptic packages

UNIT IV

1. Write a short note on tearing resistance and impact of resistance
2. Write a short note on overall migration rate
3. Write a note on tensile strength and seal strength.

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
▶ B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II

Practicals

- 1 Measurement of paper thickness.
- 2 Measurement of basic weight of paper and paper boards.
- 3 Measurement of bursting strength of paper and paper boards.
- 4 Visit any food packaging unit.



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
I B.Voc, FOOD
TECNOLOGY
Semester -II
Course-4**

Course Code	CEREAL AND GRAIN SCIENCE TECHNOLOGY				
Teaching	Hours Allocated: 60 (Theory)	L 60	T 10	P 30	C 4+1
Pre-requisites:	Rice and wheat structure, milling.				

Course Objectives:

To gains basic knowledge on cereal and grain technology

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	The students gain knowledge on rice structure
CO2	They will know the benefits of by products
CO3	Complete knowledge on milling and structure of wheat
CO4	Awareness on breakfast cereals

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit - I

Rice : Cereal grain structure, composition of rice, Processing- Milling, parboiling– Avorio process, conversion process, Malek process and Fernandez process and its advantages.

Unit - II

By products of cereals

starch, gluten, dextrose, dextrin, bran, broken grains, puffed rice, flakedrice, popped rice, hulls, rice pollards, bran oil, germ and germ oil, husk, straw.

Unit - III

Wheat: Classification of wheat, structure and composition, Harvesting and storage: Harvesting the grain, cleaning the grain and storage, wheat milling, wheat products: whole wheat flour, maida, semolina, macaroni products and its method of preparation: macaroni, spaghetti and vermicelli.

Unit - IV

Breakfast cereals: Definition, Nutritive value of breakfast cereals, and classification of breakfast cereals: uncooked breakfast cereals and ready to eat cereals: processing of ready –to-eat cereals and products (flaked cereals, puffed cereals, shredded products, granular products).

References:

1. David Dendy A.V, etal; Cereals and Cereal Products: Technology and Chemistry, - 2000
2. Manay, N.S, Shadakshara swamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
3. Potter, N.N. and Hotchkiss J. H. Food Science. CBS publishers and distributors.1996.
4. Sri Lakshmi, B. Food Science. New Age International Publishers, New Delhi, 2003.
5. Subbalakshmi, G and Udipi, S.A. Food processing and preservation. New Age International Publishers, New Delhi, 2001.

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 4: CEREAL AND GRAIN SCIENCE TECHNOLOGY

WEIGHTAGE TO CONTENT

S.NO	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	1	2	20	Application and understanding
2.	UNIT -II	2	1	25	Analysing and evaluation
3.	UNIT -III	1	2	20	Understanding and remembering
4.	UNIT -IV	2	1	20	applying
	Total	6	6	90	

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CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 4: CEREAL AND GRAIN SCIENCE TECHNOLOGY**

Time 2hrs.

Max. Marks-50M

PART-I

SECTION-A

Answer any THREE questions choosing at least ONE question from each section

3x10=30M

1. One question is to be set from unit-I
2. One question is to be set from unit-II
3. One question is to be set from unit-III

SECTION-B

4. One question is to be set from unit-III
5. One question is to be set from unit-IV
6. One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions. Each Question carries 5 Marks. 4x5=20M

1. One question is to be set from unit-I
2. One question is to be set from unit-I
3. One question is to be set from unit-II
4. One question is to be set from unit-III
5. One question is to be set from unit-III
6. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 4: CEREAL AND GRAIN SCIENCE TECHNOLOGY
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Explain the following
 1. Milling
 2. Advantages of milling
2. Explain the following
 1. Parboiling
 2. Advantages of Parboiled rice

UNIT II

1. Explain the following byproducts of cereals
 1. puffed rice
 - 2.germ oil
 - 3 .broken rice
 - 4.husk

UNIT III

1. Explain wheat milling and storage of wheat
2. Explain the classification .composition and structure of wheat

UNIT IV

1. Define breakfast cereals? classification of breakfast cereals
2. Define the following i. flaked cereal ii.puffed cereal iii. Granular products

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write about the Fernandez process
2. Write about the structure of Rice
3. Write a short note on composition of rice

UNIT II

1. Write a short note on starch and gluten
2. Write a short note on dextrose and dextrin

UNIT III

1. Explain any 2 wheat products
2. Explain the macaroni products

UNIT IV

1. Explain the nutritive values of cereals
2. Write a note on uncooked breakfast cereals

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
FIRST YEAR SEMESTER – II
COURSE – 4: CEREAL AND GRAIN SCIENCE TECHNOLOGY**

Projects on:

1. Market and literature survey to identify the concepts of new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.
2. Screening of product concept on the basis of techno-economic feasibility.
3. Visit to any confectionary and learn the manufacture of cake, biscuits, breads etc.

SEMESTER -III



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
II B.Voc, FOOD
TECNOLOGY
Semester -III
Course-5**

Course Code	Food chemistry-2				
Teaching	Hours Allocated: 60 (Theory)	L 60	T 10	P 30	C 4+1
Pre-requisites:	To bring awareness about the modern concepts of food packaging techniques.				

Course Objectives:

To gains basic knowledge on food chemistry

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Gains knowledge on importance of food pigments
CO2	Gains knowledge on flavour chemistry
CO3	Gains knowledge on enzymes in foods
CO4	Gains knowledge on colloids in foods

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit – I

Natural Food Pigments- Introduction, Chemistry, Properties, classification ; Food pigments(chlorophyll, carotenoids, anthocyanins and flavonoids, beet pigments, caramel; Changes during processing of pigments; Food colorants – Natural and synthetic;

Unit – II

Flavor chemistry: Chemistry of taste and aroma compounds; Natural flavors; Process flavors; Artificial flavors; Flavor enhancers; Flavor deterioration in foods; health and safety aspects of food flavours

Food additives: Food additives, definition, objectives, functional classification, natural and synthetic additives, health and safety aspects of food additives;

Unit – III

Enzymes in Foods: introduction, Classification, Factors influencing enzyme activity; Enzyme inhibitors in foods; Enzyme inactivation and control in foods; Enzymes in food processing; Enzymes in waste management;

Unit – IV

Colloids in foods: Types, Surface properties of foods –Surface tension, surface activity, and interfacial tension; Colloidal systems in Food – Sols, gels, emulsions and foams. Emulsifying agents – their uses in foods.

References :

1. Campbell, M K and Farrell, S O-Biochemistry 5th edition-international student, 2006
2. Damodaran,S., Parkin , K L.,Fennema, O R., Fennema's Food Chemistry- 4th edition, CRC press Taylor and Francis Group, New York 2008.
3. Fennema, O R. -Food Chemistry 3rd edition, Marcel Dekker Inc, New York., 1996.
4. Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
5. Meyer, L H-Food Chemistry. CBS publishers & distributors, New Delhi. 2002

WebLinks:

1. <https://youtu.be/jrMgCVQ5oBk>
2. <https://youtu.be/1lhZD6ilZsU>

Activities & Benchmarks Proposed (Table)

- 1.Assignments
- 2.Seminars
- 3.Group Discussion
4. Quiz

CO-PO Mapping:**1:Slight [Low]; 2:Moderate[Medium]; 3:Substantial[High], '4':No Correla**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO 1	3	2	3	1	3	2	3	2	2	2	3	3	2
CO 2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO 3	3	3	3	3	3	2	2	2	2	2	3	3	2
CO 4	3	3	3	3	3	2	2	2	2	2	3	2	3
Avg	3	2.8	2.8	2.5	2.8	2	2	2	2	2	3	2.8	2.3

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY) SECOND YEAR SEMESTER – III**

COURSE – 5: FOOD CHEMISTRY-2

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – III
COURSE – 5: FOOD CHEMISTRY-2

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

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**ADACHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)SECOND YEAR SEMESTER – III
COURSE – 5: FOOD CHEMISTRY-2QUESTION BANK
SECTION A EASSY QUESTIONS (10M)**

UNIT

- 1.Explain different types of natural food pigments
2. Explain the changes during the processing of food pigments.

UNIT II

3. Write an essay on natural flavors
4. Define food additives and explain the health and safety aspects of food additives
5. Write about the following
 - 1) Artificial flavors
 - 2) Flavor enhances

UNIT III

1. Define enzymes and explain the factors influencing enzyme activity
2. Explain the role of enzymes in food processing and waste management

UNIT IV

1. Explain different colloidal systems in food
2. Explain surface properties of food

**SECTION B
SHORT QUESTIONS (5M)**

UNIT 1

1. Write a short note on natural food colorants
2. Write a short note on synthetic food colorants
3. Write the properties of the natural food pigments

UNIT II

1. Write a short note on flavored deterioration in foods
2. Write the classification of food additives
3. Write a short note on chemistry of taste

UNIT III

1. Write a note on enzyme inhibitors in foods

2. Write about classification of enzymes

3. Write a note on enzyme inactivation and its control on foods

UNIT IV

1. What are emulsifying agents and their uses in foods

2. Write about different types of colloids in foods.

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – III
COURSE – 5: FOOD CHEMISTRY-2**

Practicals

- 1.Preparation of flavor added food
- 2.Preparation of Colour added food.
- 3.Estimation of reducing sugars by dns method.
- 4.Estimation of reducing sugars by Fehling method
- 5.Estimation of starch content by Iodine Colorimetry.



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
II B.Voc, FOOD
TECNOLOGY
Semester -III
Course-6**

CourseCode	Bakery and Confectionary				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:	To know the principles of behind various bakery food products				

Course Objectives:

Students will understand the basic terms and concepts related to bakery and confectionary products.

Learn the role of different ingredients in bakery products.

To know the manufacturing details of bakery and confectionary products

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Start his own bakery unit and sell his products
CO2	The student can prepare chocolates
CO3	They will able to choose equipment for baking of foods
CO4	Gains knowledge complete baking

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction to bakery and confectionery industry: Importance of bakery and confectionery in food industry - Important cereals used in bakery and confectionery - Flour for the bakery products - Types of flours - Qualities of flour for the production of bakery items - Availability of starch in different grains;

Unit – II

Primary processing equipments used in Bakery and Confectionery – Chakki, Flour Mill, mixer, moulding machine, balance, packing machines, measuring glass, moulds, knives, extruder, oven ; Dough development, Rheological testing of dough-principles of Farinograph, Mixograph, Extensograph, Amylograph / Rapid Visco Analyzer, Falling

number, Hosney's dough stickiness tester; Present trends in bakery

Unit – III

Bread and cake - Principle involved in production of Bread - Principle involved in production of Cake - Different types of Bread and cakes and their applications - Ingredients used in its production of Bread ; Ingredients used in its production of Cake.

Biscuits and Cookies - Principle involved in biscuits production - Principle involved in cookies production. Different types of biscuits and cookies and their uses. Ingredients used in biscuits production and Ingredients used in cookies production

Unit – IV

Principles of confectionary production - Characteristics of confectionary products- Types of confectionary products - Ingredients used in confectionary products ; Chocolate Processing - Boiled Sweets - Gelatin Sweets - Crystallized confectionery Present trends in confectionery

References:

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

WebLinks:

3. <https://youtu.be/jrMgCVQ5oBk>
4. <https://youtu.be/1hZD6ilZsU>

Activities & Benchmarks Proposed (Table)

1. Assignments
2. Seminars
3. Group Discussion
4. Quiz

CO-PO Mapping:

(1:Slight [Low]; 2:Moderate[Medium]; 3:Substantial[High], '4':No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3
CO 1	3	2	3	1	3	2	3	2	2	2	3	3	2
CO 2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO 3	3	3	3	3	3	2	2	2	2	2	3	3	2
CO 4	3	3	3	3	3	2	2	2	2	2	3	2	3
Avg	3	2.8	2.8	2.5	2.8	2	2	2	2	2	3	2.8	2.3

**P.R.GOV.T.COLLEGE (A),
KAKINADACHOICE BASED
CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – III
COURSE – 6: BAKERY AND CONFECTIONARY**

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT - III	2	2	30	Understanding and remembering
4.	UNIT - IV	2	2	30	applying
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
SECOND YEAR SEMESTER – III
COURSE- 6: BAKERY AND CONFECTIONERY

Time 2hrs.

Max. Marks-50M

SECTION-A

Answer the following questions. Each Question carries 10 Marks 3x10=30 M

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-III
3. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions. Each Question carries 5 Marks. 4x5=20M

4. One question is to be set from unit-I
5. One question is to be set from unit-II
6. One question is to be set from unit-II
7. One question is to be set from unit-III
8. One question is to be set from unit-III
9. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
SECOND YEAR SEMESTER – III
COURSE- 6: BAKERY AND CONFECTIONERY
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Explain the importance of bakery and confectionary in food industry
2. Explain the different types of flours and quality of flours for the production of bakery item

UNIT II

1. Explain the following principles
 - 1) Farinograph 2) Mixograph 3) Extensograph 4) Amylograph
2. Explain different types of primary processing equipments in bakery and confectionary

UNIT III

1. Explain different types of breads and cakes and their uses
2. Explain different types of biscuits and cookies and their uses
3. Write different types of ingredients used in production of bread and cake
4. Write different types of ingredients used in production of biscuits and cookies

UNIT IV

1. Write briefly about different types of ingredients used in confectionary products
2. Explain the processing of chocolate

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Explain the important cereals used in bakery and confectionary
2. Write a note on the availability of starch in different grains

UNIT II

1. Write a short note on Rheological testing of dough
2. Write a note on falling number and Hosney's dough stickiness tester

UNIT III

1. Explain the principal involved in production of bread and cake
2. Explain the principal involved in production of biscuits and cookies

UNIT IV

1. Write the characteristics of confectionary products
2. Write a note on different types of confectionary products
3. Write a note on gelatin sweets

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
SECOND YEAR SEMESTER – III
COURSE- 6: BAKERY AND CONFECTIONERY

Project on

1. Packaging, labeling and shelf-life studies.
2. Texture evaluation of various food samples- cookies/ biscuits/ snack foods

SEMESTER - IV



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
II B.Voc, FOOD
TECNOLOGY
Semester -IV
Course-7**

CourseCode	Food Packaging -II				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:	To know the effect of packaging on different processed foods.				

Complete knowledge on packaging of various foods

Course Objectives:

- Complete knowledge on packaging of various foods.
- Levels of packaging and materials used for packing.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Understand the need of packaging food
CO2	Logistics in packaging of fresh foods
CO3	Selection of packaging material for beverages
CO4	Understand sustainability of waste management

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Need of Packaging food: Logistics - Merchandising Outlets - Handling - Transportation - Packaging machinery - Technology upgradation - Public distribution - Cost effective packaging - Packaging requirements - Levels of Packaging ;Packaging functions ;package environment

Unit – II

Packaging of fruits and vegetables – Meat, fish and poultry – Bakery and confectionary products – Protein rich foods

Packaging of Edible starches and starch products – Oils and Fats – Food grains and food grain products – Sugar and Honey - stimulant foods – Alcoholic drinks and carbonated beverages – Spices and Condiments

Unit – III

Packaging of flesh foods and sea foods – Vacuum and MAP packaging; Packaging of milk: packaging requirements, materials and packaging techniques; Packages of beverages – water, carbonated soft drinks, coffee, tea, juices, beer and wine;

Unit – IV

Food packaging and sustainability – hierarchy of waste management, source reduction, disposal and recycling, composting, thermal treatment, landfill;

References:

1. Robertson, G, L., Food packaging Principles and practice, 3rd edition, CRC Press, 2013.
1. Sharma, H., Food packaging technology. Agrimoon.com
2. Cruess, W.V. Commercial Fruit & Vegetable Products. Allied Scientific Publishers, New Delhi. 2003
3. Davis, E.G. Evaluation of tin & plastic containers for foods. CBS Publishers, New Delhi. 2004
4. Gopal T.K.S. Seafood packaging, CIFT, Matsyapuri Cochin, 2007
5. Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000.
6. Sacharow, S., Griffin, R.C. Food Packaging. AVI Publishing Company, West Port, Connecticut. 2000

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
SECOND YEAR SEMESTER – IV
Course - 7: FOOD PACKAGING – II

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
SECOND YEAR SEMESTER – IV
Course - 7: FOOD PACKAGING – II

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA

CHOICE BASED CREDIT SYSTEM

B.Voc (Food Technology)

SECOND YEAR SEMESTER – IV

Course - 7: FOOD PACKAGING – II

QUESTION BANK

SECTION A

ESSAY QUESTIONS (10M)

UNIT 1

1. Explain the following in food packaging
 - 1) Handling
 - 2) Transportation
2. Explain different levels of packaging
3. Write an essay on
 - 1) Packaging requirements
 - 2) Packaging function

UNIT II

1. Write an essay on packaging of fruits and vegetables
2. Write an essay Edible starches and starch products

UNIT III

1. Explain the following
 - 1) Vacuum packaging
 - 2) MAP packaging
2. Explain the packaging of water and carbonated soft drinks
3. Explain the packaging of coffee and tea

UNIT IV

1. Explain briefly about source reduction and recycling of food packaging
2. Explain composting, thermal treatment in food packaging

SECTION B

SHORT QUESTIONS (5M)

UNIT I

1. Write a note on transportation
2. Write a shot note on packaging machinery

UNIT II

1. Write about the packing of sugar and honey

2. Write a note on packing of stimulant foods
3. Write a note on packaging of food grains

UNIT III

1. What are the packaging requirements for packaging of milk products
2. Write a note on packaging materials for packaging of milk products
3. Write a note on packaging of beer and wine

UNIT IV

1. Write a note on hierarchy of waste management
2. Write a note on composting



**P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology) SECOND YEAR SEMESTER – IV
Course - 7: FOOD PACKAGING – II**

PRACTICALS

Chemical and Microbiological Analysis of Milk and Milk Products

1. Hydrogen Peroxide
2. Hypochlorites
3. Formaldehyde (Honnies Test)
4. Boric Acid and Borates
5. Maltodextrins
6. Urea
7. Neutralizers
8. Starch
9. Sugar
10. Salt Mineral Oil

Other Tests:

1. Determination of milk fat (Gerber Method)
2. Testing Fat in Homogenized milk
3. Microscopic observation of fat globules size
4. Determination of SNF (Volumetric Method)
5. Determination of Total Solids
6. Phosphatase Test
7. Determination of Ash content in milk
8. Determination of Protein in milk

CourseCode	DAIRY TECHNOLOGY				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:	To be innovative in exploring various traditional and non traditional milk products				

Course Objectives:

To know the importance of milk as an agricultural commodity.

Students will learn Concept of dairy byproducts manufacturing.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Students will learn about making of indigenous dairy products.
CO2	Manufacturing of different types of ice creams and frozen deserts along with quality testing
CO3	Students will learn about various equipments present in advanced dairy
CO4	Various new dairy food packaging material available in market introduced

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction : Definition, different sources of milk and their composition, factors affecting composition of milk. Physico-chemical properties of milk constituents. Microbiology of milk, Collection and transportation of milk. Grading of milk.

Unit – II

Types of processed milk : Pasteurized milk, Sterilized milk, Homogenized milk, Flavored milk, frozen concentrated milk, Fermented milk, Reconstituted milk, Recombined milk, Toned and double toned milk, Vitaminised/ Irradiated milk, milk powder.

Unit – III

Butter, cream, cheese, Ice cream and condensed milk : Definition, classification,

composition and nutritive value, method of manufacture, packaging and storage, defects- causes & prevention, and its uses;

Unit – IV

Indigenous Dairy Products :Fat rich products- Ghee, Malai. Concentrated Products- Khoa, Rabri and Basundi. Coagulated Products- Chhana and Paneer. Fermented Products- Dahi , Chakka, Shrikhand and Lassi. Frozen Products- Kulfi. Sweet dairy products - Gulab Jamun and Rasagulla.

References :

1. Godbole, N.N; Milk – The Most Perfect Food ; Biotechnology books, 2007
2. Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
3. Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000.
4. Spreer E and Mixa, A; Milk and Dairy Product Technology; Marcel Dekker, 2005
5. Srilakshmi, B. Food Science (3rd edition), New Age International (P) Limited Publishers, New Delhi, 2003.
6. Sukumar De; Outlines of dairy technology; Oxford University Press; 2001
7. Walstra A, Geurts T.J and Noomen, A; Dairy Technology – Principles of milk and Properties and Processes; Marcel Dekker, 2005

**P.R.GOV.T.COLLEGE (A),
KAKINADA
CHOICE BASED CREDIT SYSTEM**

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – IV
COURSE – 8: DAIRY TECHNOLOGY**

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – IV
COURSE – 8: DAIRY TECHNOLOGY
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Define milk and write different sources of milk along with their composition
2. Explain Physico and chemical properties of milk constituents

UNIT II

1. Explain the following
 - 1) pasteurized milk
 - 2) flavored milk
 - 3) homogenized milk
2. Explain the following
 - 1) irradiated milk
 - 2) toned and double toned milk
 - 3) recombined milk

UNIT III

1. Write an essay on classification and composition of milk products
2. Explain the method of manufacture of milk products

UNIT IV

1. Write an essay on fat rich products
2. Write an essay on fermented products

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write about factors affecting composition of milk
2. Write a short note on microbiology of milk
3. Write a short note on grading of milk
4. Write a short note on collection and transportation of milk

UNIT II

1. Write a short note on milk powder
2. Write a short note on fermented milk
3. Write a short note on reconstituted milk

UNIT III

1. Write a short note on packaging and storage of milk products
2. Write about defects and causes of milk products
3. Write a short note on nutritional value of milk products

UNIT IV

1. Write a short note on sweet diary products
2. Write a short note on concentrated diary products
3. Write a short note on frozen diary products
4. Write a short note on coagulated diary products

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
SECOND YEAR SEMESTER – IV
COURSE – 8: DAIRY TECHNOLOGY**

PRACTICALS:

Testing of Milk Powder

Moisture Content by IMA

Moisture Content by drying method

Titration Acidity

Rosolic Acid Test

Scorched Particles

Ash Content

Insolubility Index Fat Percent (WMP)

Fat percent (SMP)

Bulk Density

Testing of Paneer:

Determination of Moisture

Determination of Fat

Determination of Acidity

SEMESTER - V

INDUSTRIAL INTERNSHIP FOR THE ENTIRE V SEMESTER

SEMESTER - VI



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
III B.Voc, FOOD
TECNOLOGY
Semester -VI
Course-9**

Course Code	FOOD MICROBIOLOGY			
Teaching	Hours Allocated: 60 (Theory)			
	L	T	P	C
	50	10	30	4+1
Pre-requisites:	Prevention of micro organisms in food			

Course Objectives:

Acquire an elementary knowledge about micro organisms.

To know the effects of microbial spoilage of foods and its prevention methods

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Illustrate the role of microorganisms in food safety
CO2	Compare various physical and chemical methods used in the control of microorganisms
CO3	Gains knowledge on microbial spoilage
CO4	Method and preservation of food preservation

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction : Historical development of food microbiology. Scope of food microbiology; Morphology, general characteristics and classification of bacteria, fungi and algae. Viruses: structure and replication with particular reference to food borne viruses. Primary sources of microorganisms in food.

Unit – II

Factors affecting the growth and survival of micro-organisms in foods: Microbial growth; Intrinsic factors (Nutrient content, pH and buffering activity, Redox potential, Antimicrobial barriers and constituents, Water activity); Extrinsic factors (Relative

humidity, Temperature, Gaseous atmosphere); Implicit factors; Predictive food microbiology;

Heat resistance of micro-organisms: Determination of heat resistance (Thermal Death Time), TDT curve, 12D concept;

Unit – III

Microbial spoilage of food : Causes of food spoilage; Microbial contamination of water; Spoilage of different group of foods - Milk and milk products; Cereals and cereal products; Fruits, vegetables and their products; Meat and meat products; Fish and fish products; Poultry and eggs; Canned foods.

Unit – IV

Methods and principles of food preservation: Physical: Low temperature; High temperature (pasteurization, canning); Irradiation (UV, microwave, ionization); Drying; High pressure processing

Chemical preservatives and natural antimicrobial compounds; Biobased preservation systems: LAB and bacteriocins;

References :

1. Frazier, W.C. Food Microbiology. 4th edition. Mc Graw Hill. New York, 2008
2. Khetarpaul, N. Food microbiology, Daya publishing house, New Delhi, 2009
3. Narayanan, L.M. and Mani, L. Microbiology. Saras Publications, Nagercoil.
4. Pelzar, H.J. and Rober, D. Microbiology 5th edition Mc Graw Hill. New York, 2009
5. Prescott, L.M., Harley, J.P. and Klein, D.A. Microbiology. 4th edition McGraw-Hill, New York. 1999;

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 9: FOOD MICROBIOLOGY

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

**P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 9: FOOD MICROBIOLOGY**

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

One question is to be set from unit-I

5. One question is to be set from unit-I
6. One question is to be set from unit-II
7. One question is to be set from unit-II
8. One question is to be set from unit-III
9. One question is to be set from unit-III
10. One question is to be set from unit-IV
11. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 9: FOOD MICROBIOLOGY
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Define food microbiology and write the scope of food microbiology
2. Write an essay on general characteristics and classification of bacteria , fungi and algae

UNIT II

1. Write an essay on intrinsic factors of microbial growth
2. Write an essay on extrinsic factors of microbial growth

UNIT III

1. Write an essay on causes and microbial spoilage of milk and milk products
2. Write an essay on microbial spoilage of meat , fish and poultry

UNIT IV

- 1 Write the following physical methods of food preservation
 - 1) High temperature
 - 2) irradiation
- 2 Write the following chemical methods of food preservation
 - 1) Anti microbial compounds
 - 2) biobased preservations

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on primary sources of microorganisms in food
2. Write a short note on morphology of fungi and algae
3. Write structure and replication of food born virus

UNIT II

1. Write a short note on microbial growth
2. Write a short note on predictive food microbiology
3. Write a note on determination of heat resistance

UNIT III

1. Write a short note on microbial contamination of water
2. Write a short note on spoilage of cereals
3. Write a short note on spoilage of canned foods

UNIT IV

1. Write a short note on high pressure processing
2. Write a short note on low temperature preservations
3. Write a short note on LAB and bacteriocins

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 9: FOOD MICROBIOLOGY

Practicals

- | | |
|--|---|
| 1. Laboratory safety and sterilization techniques | 4 |
| 2. Microscopic methods in the identification of microorganisms | 4 |
| 3. Preparation of culture media – nutrient broth and nutrient agar | 4 |
| 4. Staining techniques – <u>grams'</u> and differential. | |
| 5. Isolation of yeast from starchy food sample. | |
| 6. Quantitative analysis of milk by standard plate count method | |



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
III B.Voc, FOOD
TECNOLOGY
Semester -VI
Course-10**

CourseCode	PULSES AND OIL SEED TECHNOLOGY						
Teaching	Hours Allocated: 60 (Theory)			L	T	P	C
				50	10	30	4+1
Pre-requisites:							

Course Objectives:

Students will acquire knowledge about various pulses and oil seed processing method
To know the processing involved in packaging

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Gains knowledge on pulse based food products
CO2	Gains knowledge on production and processing of oil
CO3	Gains knowledge on fat characterization
CO4	Emerging technologies for pulse processing

Skill Development		Employability		Entrepreneurship	
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Syllabus:

Unit – I

Pulse-based food products : Composition and nutritional value of Pulses - Common forms -Green beans, Dry pulses, Canned pulses; Sprouted pulses, traditional fermented products; Developments in pulse products : Quick-cook dehydrated pulses, Extruded pulse products, Snack based products; Value-added pulse based products – roasted pulses, gluten-free products, pulse noodles;

Unit – II

Production and Processing of oil : Crops of oil seeds - Steps involved in oil processing- pressing, methods of oil extraction from oil seeds, degumming, oil refining, hydrogenation, winterization, deodorizing, bleaching, tempering; Major and minor oil seeds, sources, examples, hydrogenated vegetable oils.

Unit – III

Fat Characterization : Functional properties of fats; Importance of fat analysis, refractive index, melting point, solid fat index, cold test, smoke, flash and fire points, iodine value, saponification number, acid value and free fatty acids, polar components in frying fats, lipid oxidation, peroxide value, Thiobarbituric acid test, Schaal Oven test, active oxygen method.

Unit – IV

Products made from fats and oils: Butter, Margarine, Shortenings and Frying oils, Mayonnaise and salad dressings; Fat substitutes;

Emerging technologies for pulse processing : Dielectric heating, Pulse electric field treatment, High-pressure processing; Applications;

References :

1. Manay, N.S, Shadakshara swamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
2. Meyer, L H-Food Chemistry. CBS publishers & distributors, New Delhi. 2002
4. Nielsen, S.S. Introduction to the chemical analysis of foods. Jones and Bartlett Publishers, Boston, London. 2003
6. Fereidoon Shahidi, Functional properties of proteins and lipids
7. Clyde, E. Stauffer, Fats and oils
7. Tiwari, B, K., et al., Pulse foods processing, quality and Nutraceuticals applications, Elsevier publications, (2011).

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 10: PULSES & OIL SEED TECHNOLOGY

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 10: PULSES & OIL SEED TECHNOLOGY

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 10: PULSES & OIL SEED TECHNOLOGY
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Write about the following pulse based food products
 - 1) Dry pulses
 - 2) sprouted pulses
 - 3) green beans
2. Write about the following
 - 1) roasted pulses
 - 2) pulse noodles
 - 3) gluten free products

UNIT II

1. Write an essay on steps involved in oil processing
2. Write an essay on oil extraction from oil seeds

UNIT III

1. Write the following
 - 1) Schaal oven test
 - 2) Thiobarbituric acid test
2. Write an essay on functional properties and importance of fat

UNIT IV

1. Write an essay on pulse electric field and its applications.
2. Write an essay on any 3 products made from oils and fats

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on dielectric heating
2. Write a short note on pulse electric field treatment
3. Write a short note on quick cook dehydrated pulses

UNIT II

1. Write a short note on winterization
2. Write a short note on major and minor oil seeds
3. Write a short note on margarine

UNIT III

1. Write a short note on active oxygen method
2. Write a short note on saponification number
3. Write a short note on iodine value

UNIT IV

1. Write a short note on mayonnaise and salad dressing
2. Write a short note on fat substituent.
3. Write a short note on Dielectric heating.

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CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 10: PULSES & OIL SEED TECHNOLOGY

Practicals

1. Saponification value of oil	6
2. Acid value of oil	6
3. Iodine value of oil	6
4. Estimation of total fat content in oil	6
5. Estimation of glycerides in the given oil.	6



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
III B.Voc, FOOD
TECNOLOGY
Semester -VI
Course-11**

CourseCode	POST HARVEST MANAGEMENT OF FRUIT AND VEGETABLES				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:	Harvesting of fruits and vegetables				

Course Objectives:

To know about the processing methods of fruits from the time of harvesting to occurrence of a by-product.

To know the preparation of various processed foods made with fruits and vegetables.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	To understand the basics of post harvest management of fruits and vegetables
CO2	Gains knowledge on quality storage of fruits and vegetables
CO3	Gains knowledge on canning of fruits and vegetables
CO4	Gains knowledge on processing of vegetables

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction : Ripening and quality of fruits, harvesting and transportation, Chemical composition, post harvest changes, cold storage of fruits, selection and preparation of fruits for processing, deskinning, enzyme inactivation, Packaging.

Unit – II

Quality Storage of Fruits and Vegetables: Natural, Ventilated and controlled atmosphere storage, Low temperature storage, Fruit & Vegetable processing plant

layout and processing line, Fruit &Vegetable product quality standards & quality control measures.

Unit – III

Canning of fruits and vegetables: basic requirements, process, machinery, operation. Effect on food. Drying/Dehydration of fruits and vegetables: types, process, machinery, operation, Problems related to storage of dehydrated products

Unit – IV

Definitions, formulation and preparation of fruit juices, Jams, jelly, pickles, tomato products (sauce), potato chips: principle, processing techniques.

Processing of vegetables: Processing of okra (ladies finger), potatoes, onions, carrots, green peas, procuring, transportation, storage, processing, packaging and ware housing.

References :

1. Siddappa and Bhatia, Fruits and Vegetable Processing Technology
2. Lea, R. A. W, Fruit juice processing and packaging
3. Hui, Y. H. Processing of fruits
4. Cash J. N. Processing of vegetables
5. Jongen, W. Fruit and vegetable processing

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CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 11: POST HARVEST MANAGEMENT OF FRUIT & VEGETABLES

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 11:POST HARVEST MANAGEMENT OF FRUIT & VEGETABLES

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 11:POST HARVEST MANAGEMENT OF FRUIT & VEGETABLES
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Write an essay on harvesting and transportation of foods
2. Write an essay on selection and preparation of fruits for processing and packaging

UNIT II

1. Write about the following
1) ventilated and control atmosphere storage
2) Low temperature storage
2. Write about the product quality standards of fruits and vegetables and its quality control measures

UNIT III

1. Write an essay on process , machinery , operation of fruits and vegetables
2. Write an essay on types ,process , machinery of dehydration fruits and vegetables

UNIT IV

1. Write an essay on formulation and preparation of fruit juices , jams, pickles
2. Write about processing and storage of okra, green peas and onions

SECTION B

SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on post harvest changes
2. Write a short note on enzyme inactivation
3. Write a short note on cold storage of fruits

UNIT II

1. Write a short note on natural storage
2. Write a short note on plant layout
3. Write a short note on processing lane

UNIT III

1. Write a short note on canning of fruits and vegetables
2. Write about problems related to storage of dehydrated products

UNIT IV

1. Write a short note on ware housing
2. Write a short note on transportation of vegetables
3. Write a short note on procuring

P.R.GOV.T.COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B. VOC (FOOD TECHNOLOGY)
THIRD YEAR SEMESTER – VI
COURSE – 11: POST HARVEST MANAGEMENT OF FRUIT & VEGETABLES

Practicals

1. Processing of mango squash and mango pickle.
2. Processing of pineapple jam.
3. Manufacture of tomato puree.
4. Manufacture of lemon pickle and lemon juice.
5. Manufacture of tomato ketchup and tomato sauce.
6. Manufacture of tuti fruity.



Pithapur Rajah's Government College(Autonomous) Kakinada

**Program &Semester
III B.Voc, FOOD
TECNOLOGY
Semester - VI
Course-12**

CourseCode	FOOD QUALITY AND SENSORY EVALUATION				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:	Sensory evaluation				

Course Objectives:

Students will understand the basic terms in food quality and sensory evaluation

To understand the odour, texture and colour

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	To understand basics of food quality
CO2	To understand food quality objectives
CO3	To understand the importance of odour and texture in foods
CO4	To know the importance of colour

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Food quality – definition and its need in food industry - Quality attributes - Classification of quality attributes.

Quality assessment of Food materials i.e, meat, poultry, egg and processed food products - Sensory evaluation – introduction, panel screening, selection methods, Interaction and thresholds, Statistical quality control.

Unit – II

Food quality objectives, importance and functions of quality control - Methods of Quality control - concepts of Rheology - Quality assessment of food materials i.e, fruits, Vegetables, cereals and dairy products/milk and milk products

Sensory and instrumental analysis in quality control. Consumer measurements: Factors

influencing acceptance and preference, objectives of consumer preference studies, information obtained from consumer study.

Unit – III

Odour : Introduction, definition and importance of odour and flavor - Odour classification, chemical specificity of odour - Odour measurement using different techniques – primitive to recent techniques. Merits and demerits of each method. Olfactory abnormalities;

Texture- classification; Texture measurement – basic rheological models, forces involved in texture measurement;

Unit – IV

Introduction and importance of colour: Dimensions of colour and attributes of colour, appearance factors, gloss etc.; Perception of colour;

Colour abnormalities; Measurement of colour; Munsell colour system, CIE colour system, Hunter colour system, UV – Visible Spectrophotometry and Colorimetry etc.

Sensation of Taste: Chemical dimensions of basic tastes- sweet, salt, sour, bitter and umami; Factors affecting taste quality, reaction time, taste modification, absolute and recognition threshold Taste abnormalities; Taste measurement;

References :

1. Fellows, P. J., Food processing Technology principles and practice, 2nd edition, Wood head publishing, England, 2000.
2. Dincer, I. Heat Transfer Food Cooling Applications. Taylor and Francis Publishers, USA. 1997
3. Heldman, D. R. and Lund, D.B. Handbook of Food Engineering 2nd edition. CRC press, Newyork. 2007.
4. Singh, R.P. Introduction to Food Engineering 3rd edition. Academic Press, London. 2004.
5. Saravacos, G D and Kostaropoulos A E. Handbook of Food Processing Equipment. 2006. Brijbasi Art Press Ltd, New Delhi.

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 12: FOOD QUALITY AND SENSORY EVALUATION
WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 12: FOOD QUALITY AND SENSORY EVALUATION

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 12: FOOD QUALITY AND SENSORY EVALUATION
QUESTION BANK
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Write an essay on quality assessment of meat
2. Write an essay on quality assessment of egg
3. Write about classification of quality attributes in food quality control

UNIT II

1. Write an essay on importance and functions of quality control
2. Write an essay on quality assessment of fruits and vegetables
3. Write an essay on quality assessment of milk and milk products

UNIT III

1. Definition and importance of odour and flavor
2. Write an essay on measurement of odour and measurement in different techniques
3. Write about texture classification and forces involved in texture measurement

UNIT IV

1. Explain Munsell colour system and CIE colour system
2. Explain factors effecting quality of taste

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Define food quality and need in food industry
2. Write about the role of food quality in food industry
3. Write a short note on panel screening

UNIT II

1. Write a note on food quality objectives
2. Write a note on concept of Rheology
3. Write a note on objectives of consumer

UNIT III

1. Write a note on chemical specificity of odour
2. Write a note on olfactory abnormalities
3. Write a note on odour classification

UNIT IV

1. Write a note on factors effecting appearance of colours
2. Write a note on hunter colour system
3. Write a note on taste abnormalities
4. Write a note on colour abnormalities

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 12: FOOD QUALITY AND SENSORY EVALUATION

Practicals

1. Selection and training of sensory panel
2. Numerical scoring test
3. Ranking test
4. Descriptive test
5. Detection and threshold tests
6. Estimation of colour and texture relationship between objective and subjective methods.



Pithapur Rajah's Government College (Autonomous) Kakinada

**Program & Semester
III B.Voc, FOOD
TECNOLOGY
Semester - VI
Course-13**

CourseCode	FOOD PRESERVATION TECHNOLOGY				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:					

Course Objectives:

- To enable the students to acquire knowledge on different preservation techniques used to enhance the shelf span of food product.
- To study the different mode of spoilage in foods and minimize the contamination by different preservation technology.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	To understand the basics of food processing
CO2	Gains knowledge on technologies of food preservation
sCO3	Gains knowledge on importance of temperature in food preserving
CO4	Gains knowledge on fermentation technology

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Introduction to Food Processing and Preservation: Definition, Objectives, scope of food processing industries, Introduction to Different processes employed in food processing viz. Milling, Cooking, Boiling, Steaming, Braising, Stewing, Roasting, Frying, Grilling, Baking, Fermentation, Pickling, Refining;

Unit – II

Thermal Preservation Technology of foods : Introduction, historical perspectives, principles, classification – cooking, blanching, pasteurization, sterilization;
Food Preservation by Moisture control: Drying and Dehydration - Definition, drying as a means of preservation, differences between solar drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal

drying curve, names and types of driers used in the food industry;

Unit – III

Preservation of foods by high-temperature technology: Evaporation, extrusion cooking, infrared, microwave, ohmic heating, dehydration and drying; effect of thermal processing on foods.

Preservation of foods by low-temperature technology: Introduction, methods of freezing – air, plate, liquid-immersion and cryogenic freezing; quality and stability of frozen foods – defects, common storage temperatures, prediction of storage life of frozen foods;

Unit – IV

Food Preservation by Irradiation technology: Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry, concept of cold sterilization.

Fermentation technology: Curing and Pickling; Smoking Chemical preservatives- (Objectives, principles, types of preservatives, Different types of chemical preservatives, Safety in use and certification levels, adverse affects. Preservation by high osmotic pressure (Pickling, salting, curing – principles)

References :

1. Subalakshmi, G and Udipi, S.A. Food processing and preservation. New Age International Publishers, New Delhi, 2001.
2. Potter, N.N. and Hotchkiss J. H. Food Science. CBS publishers and distributors. 1996.
3. Srivastava, R.PO and Kumar, S. Fruit and vegetable preservation, International Book distribution Company, Lucknow, 1994.
4. MC.Williams, M and Paine, H. Modern Food preservation. Surjeet Publications, Delhi, 1984.
5. Cruess, W.V. Commercial fruits and vegetable products, Anees Offset press, New Delhi.
6. Sahay K.M. & Singh K.K, Unit Operations of Agricultural Processing, Vikas Publication House, New Delhi.

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE – 13: FOOD PRESERVATION TECHNOLOGY

WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE – 13: FOOD PRESERVATION TECHNOLOGY

Time 2hrs.30min

Maxmarks-60

SECTION-A

Answer the following questions

4x10=40 M

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE – 13: FOOD PRESERVATION TECHNOLOGY
QUESTION BANK
SECTION A
ESSAY MARKS (10M)

UNIT I

1. Define food processing and preservation and write scope and objectives of food processing and preservation
2. Explain the following
 - 1) steaming
 - 2) braising
 - 3) stewing
 - 4) frying
3. Explain the following
 - 1) cooking
 - 2) milling
 - 3) boiling
 - 4) roasting

UNIT II

1. Explain principles of thermal preservation technology
2. Explain different types of thermal preservation of food technology
3. Explain drying , dehydration as a means of preservation

UNIT III

1. Explain evaporation, extrusion ,cooking in preservation of foods
2. Explain different types of preservations of foods by low temperature

UNIT IV

1. Write different types of ionizing radiations used in food irradiation
2. Write different types of chemical preservations

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on pickling
2. Write a short note on refining

3. Write a short note on fermentation

UNIT II

1. Write the difference between sun drying and dehydration
2. Write factors affecting the rate of drying
3. Write different driers in food industry

UNIT III

1. Write defects in quality and stability of frozen foods
2. Write the effects of thermal processing of food

UNIT IV

1. Write a short note on concept of cold sterilization
2. Write the uses of radiation processing in food industry
3. Write a short note on curing and pickling
4. Explain principles in salting and curing

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE – 13: FOOD PRESERVATION TECHNOLOGY

Practicals

1. Determination of adulterants in spices
2. Total soluble solids in fruits by physical method
3. pH and acidity of juices
4. Preparation of orange squash.
5. Preparation of guava jelly.
6. Preparation of mango pickle.
7. Qualitative tests for adulterants in milk.



Pithapur Rajah's Government College(Autonomous) Kakinada

**Program & Semester
III B.Voc, FOOD
TECNOLOGY
Semester - VI
Course-14**

CourseCode	TECHNOLOGY OF MEAT, FISH & POULTRY				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
		50	10	30	4+1
Pre-requisites:					

- **Course Objectives:**

- To provide an extensive description of meat, fish and poultry processing
- To introduce the latest technologies, manufacturing processes and tools for effective control of safety and quality during processing.

Course Outcomes:

On Completion of the course, the students will be able to-

CO1	Gains knowledge on meat processing
CO2	To understand fish processing
CO3	Gains knowledge on egg processing
CO4	Gains knowledge on poultry processing

Skill Development			Employability			Entrepreneurship	
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Syllabus:

Unit – I

Meat Processing: Chemical composition & structure of meat, Post-mortem changes in meat, tenderizing, curing; Dry heat and moist heat cooking methods of meat; quality Classification, Meat preservation- chilling, freezing, curing, salting, pickling, smoking and canning; storage of meat;

Unit – II

Fish Processing : Classification, Composition of fish, Preservation methods of fish during processing - Drying, salting and smoking, Chilling and freezing of fish, application of freezing system in fish processing- IQF method, Canning of fish and fish products, Packaging.

Unit – III

Egg Processing: Egg formation and structure, composition, Microbes in eggs. egg processing methods- Freezing, refrigeration, drying. Egg quality parameters: interior and exterior. Effect of thermal process on eggs; Egg foams; various egg products;

Unit – IV

Poultry Processing: Poultry composition, classification, slaughtering techniques, various cooking methods of poultry and its preservation;

References :

1. Manay, N.S, Shadakshara swamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
2. Potter, N. N, Hotchkiss, J. H. Food Science. CBS Publishers, New Delhi. 2000.
3. Subalakshmi, G and Udipi, S.A. Food processing and preservation. New Age International Publishers, New Delhi, 2001.
4. Srilakshmi, B. Food Science. New Age International Publishers, New Delhi, 2003
5. Warriss P. D, Meat Science: An Introductory Text, Cambridge university press – 2010

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc(Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 14: TECHNOLOGY OF MEAT, FISH & POULTRY
WEIGHTAGE TO CONTENT

S.No.	Course Content	Essay (10M)	Short (5M)	Total marks	Remarks as per Blooms Taxonomy
1.	UNIT -I	2	2	30	Application and remembering
2.	UNIT -II	2	2	30	Analysing and evaluation
3.	UNIT -III	2	2	30	Understanding and remembering
4.	UNIT -IV	2	2	30	applying
	Total	8	8	120	

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc (Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 14: TECHNOLOGY OF MEAT, FISH & POULTRY

Time 2hrs.30min

Maxmarks-60

SECTION-A

4x10=40 M

Answer the following questions

1. One question is to be set from unit-I
Or
One question is to be set from unit-I
2. One question is to be set from unit-II
Or
One question is to be set from unit-II
3. One question is to be set from unit-III
Or
One question is to be set from unit-III
4. One question is to be set from unit-IV
Or
One question is to be set from unit-IV

SECTION-B

Answer any FOUR questions

4x5=20M

5. One question is to be set from unit-I
6. One question is to be set from unit-I
7. One question is to be set from unit-II
8. One question is to be set from unit-II
9. One question is to be set from unit-III
10. One question is to be set from unit-III
11. One question is to be set from unit-IV
12. One question is to be set from unit-IV

P.R.GOVERNMENT COLLEGE (A), KAKINADA
CHOICE BASED CREDIT SYSTEM
B.Voc(Food Technology)
FINAL YEAR - VI SEMESTER
COURSE- 14: TECHNOLOGY OF MEAT, FISH & POULTRY
SECTION A
ESSAY QUESTIONS (10M)

UNIT I

1. Explain different types of preservations of meat
2. Explain post mortem changes in meat

UNIT II

1. Explain different types of preservation of fish
2. Explain different classification , composition of fish

UNIT III

1. Explain different types of egg processing methods
2. Explain quality parameters of egg

UNIT IV

1. Explain cooking methods of poultry
2. Explain slaughtering techniques in poultry

SECTION B
SHORT QUESTIONS (5M)

UNIT I

1. Write a short note on dry heat cooking method of meat
2. Write a short note on moist heat cooking method of meat
3. Write a short note on storage of meat

UNIT II

1. Write a short note on packaging of fish products
2. Write a short note on IQF method

UNIT III

1. Write about effects of thermal process on egg
2. Write a short note on composition of eggs

UNIT IV

1. Write a short note on composition of poultry
2. Write a short note on classification of poultry

**P.R.GOVERNMENT COLLEGE (A),
KAKINADACHOICE BASED CREDIT
SYSTEM**

**B.Voc(Food
Technology)
FINAL YEAR - VI
SEMESTER**

COURSE- 14: TECHNOLOGY OF MEAT, FISH & POULTRY

Practicals

1. Evaluation of eggs for quality parameters (market eggs, branded eggs)
2. Internal & External quality of egg
3. Proximate composition of Meat & Fish.
4. Determination of Nitrite
5. Alternate method for Determination of Nitrite
6. Determination of Nitrite in Processed meat and meat products / fish and fish products like Ready to eat / ready to cooked products
7. Determination of Total Phosphorous
8. Test for presence of Polyphosphates
9. Determination of Glucono-delta-lactone
10. Additional tests
11. Total Fat
12. Total Protein