

## Department of Food Processing and Packaging

### Revised Syllabus of Diploma Programme (UG)

#### Preamble:

This syllabus is framed to accommodate the widening horizons of the discipline of diploma course in Food Analysis and Quality Assurance. They reflect the current changing needs of the students.

The course has been designed not only to impart theoretical fundamentals but also exhaustive practical training in chemical, biochemical and microbiological methods of food sampling/analysis and food preservation techniques besides an insight into food laws, framing of specifications, standards, statistical and instrumental methods in food Quality assurance.

#### Program Objectives of the Course:

1. To impart knowledge of food analysis and quality assurance.
2. To enable the students to understand food composition and its chemical, microbiological and sensory aspects.
3. To familiarize the students about the food analysis
4. To emphasize the importance of food safety, food quality, food laws and regulations
5. To develop skills required in various industries, food analytical labs and in the field of food,

#### Program Outcomes:

1. Students are able to understand food composition and its chemical, microbiological and sensory aspects.
2. Student will familiarize about the food analysis
3. Students are able to understand the importance of food safety, food quality, food laws and regulations
4. Student are able to develop skills required in various industries, food analytical labs and in the field of food,

#### Eligibility:

12<sup>th</sup> (Science passed).

**I Year Diploma Programme**

1. Title: Food Analysis and Quality Assurance
2. Year of Implementation: 2020
3. Duration: One Year
4. Pattern: Semester
5. Medium of Instruction: English
6. Contact hours: 7 hours/week
8. Structure of Course:

**Syllabus Structure (UG)**

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks	
1	I	CT I	DFPT 101	30	2	75	
		CL I	DFP L101	60	2	75	
	II	CT II	DFPT 202	30	2	75	
		CL II	DFP L202	60	2	75	
	Annual	CP I	DFPP101	30	1	50	
	<b>Total</b>				<b>210</b>	<b>9</b>	<b>350</b>
2	III	CT III	DFPT 303	30	2	75	
		CL III	DFP L303	60	2	75	
	IV	CT IV	DFPT 404	30	2	75	
		CL IV	DFP L404	60	2	75	
	Annual	CP II	DFPP202	30	1	50	
	Industrial and or Incubation and or Research and or Field Training				30	1	-
	<b>Total</b>				<b>240</b>	<b>10</b>	<b>350</b>
		V	CT V	DFPT 505	30	2	75
CLV			DFPL505	60	2	75	
VI		CT VI	DFPT 606	30	2	75	
		CL VI	DFPL606	60	2	75	
Annual		CP III	DFPP303	60	2	100	
Industrial and or Incubation and or Research and or Field Training				30	1	-	
<b>Total</b>				<b>270</b>	<b>11</b>	<b>400</b>	
<b>Total</b>				<b>720</b>	<b>30</b>	<b>1100</b>	

**Semester I**

**D FPT 101: FOOD CHEMICAL ANALYSIS**

**(Contact Hrs: 30 Credits: 2)**

**Learning Objectives:**

Students will be able to

1. Know role of carbohydrates, lipids, proteins in food structure.
2. know analytical methods for determination of food components

**Unit I:**

(15 Lectures)

- The role of carbohydrates in food structure, color, flavor, and texture
- The role of lipids in food structure, color, flavor, and texture
- The role of proteins in food structure, color, flavor, and texture
- The roles of enzymes in food production, processing, and quality attributes

**Unit II:**

(15 Lectures)

- Analytical methods of determination of basic food components: protein, saccharides, lipids, vitamins, water, minerals and trace elements,
- Sensory active compounds, anti-nutritive and natural toxic compounds, food additives and food contaminants.

**Learning Outcomes:**

After completion of the unit, Student is able to

1. Understand analytical methods for determination of food components.
2. Understand role of carbohydrates, lipids, proteins in food structure.

**Reference Books:**

1. **Food Chemistry**, Fennema, Owen R, 3rd Ed., Marcell Dekker, New York, 1996
2. **Enzymes in Food Technology**, Whitehurst and Law, CRC Press, Canada, 2002
3. **Food Enzymes**. Wong, Dominic W S., Chapman and Hall, New York, 1995
4. **Food Science**, 5th Ed. Potter, N.N. and Hotchkiss, J.H, Chapman & Hall, 1995
5. **Principles of Food Chemistry**, DeMan, J.M., AVI, New York, 1980

**DFP L101: CHEMICAL ANALYSIS AND SAFETY OF FOODS**

**(Contact Hrs: 60 Credits: 02)**

**Learning Objectives:**

Students will be able to

1. Know determination of moisture, total ash, vitamin A and C, in foods.

2. Know estimation of crude fibre, gluten content in foods
3. Know determination of iodine value, saponification value, carotene content, protein content in foods.
4. Know detection of adulteration in foods, determination of sugar concentration.

**List of Practical's (15)**

1. Determination of moisture by air oven method and vacuum.
2. Iodine value of fats and oils
3. Detection of adulteration in fats and oils.
4. Determination of protein in foods (Micro Kjeldhal method)
5. Estimation of gluten in foods.
6. Determination of total ash.
7. Determination of vitamin A.
8. Estimation of crude fibre in foods.
9. Saponification value and unsaponifiable matter of fats and oils.
10. Determination of unsaponifiable matter of fats and oils.
11. Determination of vitamin C in food.
12. Effect protein concentration in food structure development (Curd).
13. Effect of enzyme concentration in food processing.
14. Effect of types of carbohydrates in food colour and flavour development in confectionary products.
15. Preparation of Primary and Secondary solutions standard solution (molarity and normality solutions).

**Learning Outcomes:**

After completion of the unit, Student is able to

1. Understand determination of Moisture, total ash, vitamin A and C, benzoic acid, sorbic acid, sodium chloride in foods.
2. Understand estimation of turbidity in solution, non-enzymatic browning in foods, crude fibre, gluten content in foods
3. Understand determination of iodine value, saponification value, carotene content, chlorophyll content, protein content, nitrate and nitrite in foods.
4. Understand detection of adulteration in foods, determination of sugar concentration.

**Reference Books:**

1. **The Food Chemistry Laboratory:** A Manual for Experimental Foods Dietetics, and Food Scientists, Second Edition-Connie M. Weaver, James R.Daniel
2. **Food Chemistry:** A Laboratory Manual -Dennis D.Miller
3. **The chemical analysis of foods and food products,** Morris B. Jacobs III<sup>rd</sup> Edition, CBS Publishers and distributors New Delhi.

## Semester II

### D FPT 202: CHEMICAL SAFETY OF FOODS

(Contact Hrs: 30 Credits: 2)

#### Learning Objectives:

Students will be able to

1. Know detection of pesticides, veterinary drugs and environmental chemicals.
2. Know detection quantification and health hazards of direct contaminants and indirect contaminants.

#### Unit I:

(15 Lectures)

- Detection and quantification pesticides and veterinary drugs (carbamates, organochlorine and organosuplhur, organohalogens, nitrites, herbicides, hormones, antibiotics, steroids)
- Environmental chemicals in food - heavy metals, toxic residues, radioactive isotopes.

#### Unit II:

(15 Lectures)

- Detection, quantification and health hazards of processing contaminants:
- direct contaminants – acrylamide, PAHs, oxyhalides, and haloacetic acids, preservatives, flavor enhancers, color additives.
- Indirect contaminants- boiler water additives, peeling aids, defoaming agents, building and Equipments. Contaminates (lubricants, paint and coatings, contaminants during packaging) storage and transport: (cleaners, sanitizers and cross contaminants)

#### Learning Outcomes:

After completion of the unit, Student is able to

1. Know detection of pesticides, veterinary drugs and environmental chemicals.
2. Know detection quantification and health hazards of direct contaminants and indirect contaminants.

#### Reference Books:

1. **Food Additives**, 2nd Ed.Branen, A.L., Davidson, P.M. &Salminen, S. (2007), Marcel Dekker.
2. **Encyclopedia of Food and Color Additives**,George, A.B. (2006), Vol. III, CRC Press, LLC.BocaRaton,FL

3. **Fenaroli's Handbook of Flavor Ingredients**, 5th Ed, George, A.B. (2008) CRC Press, LLC. Boca Raton, FL
4. **Food Antioxidants: Technological, Toxicological and Health Perspective**, Madhavi, D.L., Deshpande, S.S., & Salunkhe, D.K. (2006), Marcel Dekker
5. **Food Flavors**, Part A, B & C. Morton, I.D., & MacLeod, A.J. (2008) Elsevier.
6. **Food Proteins. Processing Applications**, Nakai, S., & Modler, H.W. (2007). Wiley VCH.

**DFP L202: CHEMICAL ANALYSIS AND SAFETY OF FOODS –II**  
**(Contact Hrs: 60 Credits: 02)**

**Learning Objectives:**

Students will be able to

1. Know estimation of turbidity in solution, non-enzymatic browning in foods in foods.
2. Know determination of chlorophyll, anthocyanin content in foods.
3. Know detection of adulteration in foods, determination of sugar concentration.
4. Know determination nitrate and nitrite in foods

**List of Practical's (15)**

1. Estimation of turbidity of solution.
2. Determination of carotenes, anthocyanin and chlorophyll content in foods
3. Determination of anthocyanin in foods.
4. Analysis of pesticide residues in foods
5. Determination of nitrate in foods.
6. Determination of nitrite in foods
7. Analysis of fumigant residue in foods.
8. Determination of benzoic acid in foods.
9. Determination of sorbic acid in foods.
10. Determination of sugar concentration and soluble solids by the use of hand and Abbe's refractometer.
11. Estimation of non-enzymatic browning in foods
12. Determination of chlorophyll content in foods.
13. Determination of sodium chloride in brine.
14. Determination in sodium chloride in pickel.
15. Determination of Iron in foods.

**Learning Outcomes:**

After completion of the unit, Student is able to

1. Understand estimation of turbidity in solution, non-enzymatic browning in foods.
2. Understand determination of sugar concentration.
3. Understand determination of chlorophyll content, anthocyanin in foods.
4. Understand determination of nitrate and nitrite in foods.

**Reference Books:**

1. **Hand book of analysis and quality control for fruit and vegetable products**, S. Ranganna, IIEd., Tata McGraw Hill Publishing Co. New Delhi.
2. **Manual of methods of analysis of food, food safety and standards authority of India, ministry of health and family welfare, GOV of india new dehli, 2016.**

**D FPP101 (Project): CHEMICAL ANALYSIS AND SAFETY OF FOODS  
(Contact Hrs. 30, Credits: 1)**

- Students should have complete project work in laboratory.
- They have to submit project report in given time of period.

**BOS Sub-Committee**

1. Chairman- Dr. S.S Wadikar
2. Member- Miss. Deshmukh. M.B

**Expert Committee**

1. Name of Academic Expert- Mr. D.B. Ghorpade
2. Name of Industrial Expert- Mr. S.P. Teli