

Department of Food processing and packaging

Revised Syllabus of Diploma Courses (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 get familiarized about the food analysis
3. Students are able to understand the importance of food safety, food quality, food laws and regulations
4. Student are to develop skills required in various industries, food analytical labs and in the field of food,

Diploma course (I Year)

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

Year	Semester	Paper No.	Paper Code	Contact Hours	Credits (1Credit =12H)	Marks		
						Semester/ Annual Exam	Internal	Total
1	I	PT I	D FOOD CHEMICAL ANALYSIST 101	30	2.5	50	15	65
	II	PT II	D CHEMICAL SAFETY OF FOODST 202	30	2.5	50	10	60
		PL I	D CHEMICAL ANALYSIS AND SAFETY OF FOODS L101	120	5	100	25	125
		PP I	D CHEMICAL ANALYSIS AND SAFETY OF FOODSP101	30	2.5	50	-	50
		Total			210	12.5	250	50
2	III	PT III	D FOOD MICROBIAL ANALYSIS T 301	30	2.5	50	15	65
	IV	PT IV	D MICROBIOLOGICAL SAFETY OF FOODS T 402	30	2.5	50	10	60
		PL II	D MICROBIOLOGICAL ANALYSIS AND SAFETY OF FOODS LAB	120	5	100	25	125

Diploma Courses

			L202					
		PP II	D MICROBIOLOGICAL ANALYSIS AND SAFETY OF FOODS P202	60	5	100	-	100
		Total		240	15	300	50	350
3	V	PT V	D FOOD STANDARDS,IMP ORT AND EXPORT POLICIES OF FOOD T 501	30	2.5	50	15	65
	VI	PT VI	D INSPECTIONAL REQUIREMENT S AND ESTABLISHME NTS IN FOOD INDUSTRIES T 502	30	2.5	50	10	60
		PL III	D FOOD STANDARDS AND SPECIFICATION STUDY L 303	120	5	100	25	125
		PP III	D FOOD STANDARDS AND SPECIFICATION STUDY P303	60	5	100	-	100
		Industrial/Incubation Training		10	1	-	-	-
		Total		250	16	300	50	350
	Total				700	43.2	850	150

Total No. of Papers: Theory:6, Practical:3, Project:3

Number of Lectures per week: 07

Theory: Semester, Practical and Project: Annual

PT: Paper Theory, PL: Paper Lab, PP: Paper Project, D: Diploma, * : Name of Subject, T : Theory,

L: Lab, P: Project

D FOOD CHEMICAL ANALYSIST 101:

(Contact Hrs: 30 Credits: 2.5)

Learning Objectives:

1. Students will be able to know role of carbohydrates, lipids, proteins in food structure.
2. Students will be able to know analytical methods for determination of food components.

Unit I:

(15)

- The role of carbohydrates in food structure, color, flavor, and texture (Concepts emphasized in a laboratory experiment)
- The role of lipids in food structure, color, flavor, and texture (concepts emphasized in a laboratory experiment)
- The role of proteins in food structure, color, flavor, and texture (Concepts emphasized in a laboratory experiment) The roles of enzymes in food production, Processing and quality attributes (concepts emphasized in a laboratory experiment)

Unit II:

(15)

- 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,

1. Student is able to understand analytical methods for determination of food components.
2. Student is able to understand role of carbohydrates, lipids, proteins in food structure.

D CHEMICAL SAFETY OF FOODST 202:

(Contact Hrs: 30 Credits: 2.5)

Learning Objectives:

1. Students will be able to know detection of pesticides, veterinary drugs and environmental chemicals.
2. Students will be able to know detection quantification and health hazards of direct contaminants and indirect contaminants.

Unit I:

(15)

- Pesticides and veterinary drugs: Detection and quantification of carbamates, organochlorine and organosuplhur, organohalogens, nitrites, herbicides, hormones, antibiotics, steroids,
- Environmental chemicals - heavy metals, toxic residues, radioactive isotopes

Unit II:

(15)

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

Learning Outcomes:

After completion of the unit,

1. Student is able to understand detection of pesticides, veterinary drugs and environmental chemicals
2. Student is able to understand detection quantification and health hazards of direct contaminants and indirect contaminants.

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 WS., 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
6. **Food Additives**, 2nd Ed. Branen, A.L., Davidson, P.M. & Salminen, S. (2007), Marcel Dekker.
7. **Encyclopedia of Food and Color Additives**, George, A.B. (2006), Vol. III, CRC Press, LLC. Boca Raton, FL
8. **Fenaroli's Handbook of Flavor Ingredients**, 5th Ed, George, A.B. (2008) CRC Press, LLC. Boca Raton, FL

9. **Food Antioxidants:** Technological, Toxicological and Health Perspective, Madhavi, D.L., Deshpande, S.S., & Salunkhe, D.K. (2006), Marcel Dekker
10. **Food Flavors,** Part A, B & C. Morton, I.D., & MacLeod, A.J. (2008) Elsevier.
11. **Food Proteins. Processing Applications,** Nakai, S., & Modler, H.W. (2007). Wiley VCH.

D CHEMICAL ANALYSIS AND SAFETY OF FOODS L101: **(Contact Hrs: 120 Credits: 05)**

Learning Objectives:

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

List of Practical's (30)

- 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 sugar concentration and soluble solids by the use of hand and Abbe's refractometer.
- 8) Determination of vitamin A.
- 9) Determination of benzoic acid in foods .
- 10) Determination of sorbic acid in foods .
- 11) Estimation of turbidity of solution.
- 12) Determination of carotenes, anthocyanin and chlorophyll content in foods
- 13) Determination of anthocyanin in foods.
- 14) Determination of chlorophyll content in foods.
- 15) Estimation of non-enzymatic browning in foods
- 16) Estimation of crude fibre in foods
- 17) Saponification value and unsaponifiable matter of fats and oils.
- 18) Determination of unsaponifiable matter of fats and oils.
- 19) Analysis of pesticide residues in foods

- 20) Determination of nitrate in foods.
- 21) Determination of nitrite in foods.
- 22) Determination of sodium chloride in brine.
- 23) Determination in sodium chloride in pickel.
- 24) Determination of vitamin C in food.
- 25) Analysis of fumigant residue in foods.
- 26) Study of role of protein in food structure development in curd, yogurt and cheese making.
- 27) Study of role of enzymes in food processing.
- 28) Study of role of carbohydrate in food colour and flavour development in confectionary products.
- 29) Preparation of Primary and Secondary solutions.
- 30) Determination of Iron in foods.

Learning Outcomes:

1. Students are able to understand determination of Moisture, total ash, vitamin A and C, benzoic acid, sorbic acid, sodium chloride in foods.
2. Students are able to understand estimation of turbidity in solution, non-enzymatic browning in foods, crude fibre, gluten content in foods
3. Students are able to understand determination of iodine value, saponification value, carotene content, chlorophyll content, protein content, nitrate and nitrite in foods.
4. Students are able to 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 IIIrd Edition, CBS Publishers and distributors New Delhi.
4. **Hand book of analysis and quality control for fruit and vegetable products**, S. Ranganna, IIEd., Tata McGraw Hill Publishing Co. New Delhi.

D CHEMICAL ANALYSIS AND SAFETY OF FOODS P101 (Contact Hrs.30, Credits: 2.5)

- Students should have complete project work in laboratory.

- They have to subm project report in given time of period.