Scheme of Teaching and Examination for

5th Semester of 3 Years Diploma in Food Technology

Duration of Semester : **14 Weeks**

Student Contact Hours : **36 Hrs**

Total Marks : **800**

Effective from : 2017 -18 Session

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Environment and Agro-food Management	FTC 503	Theory	3		-	3	100	80	20	26	40
2.	Handling, Transportation & Storage of Foods	FTC 504	Theory	3	-	-	3	100	80	20	26	40
3.	Food Product development Analysis and Sensory Evaluation	FTC 505	Theory	3	-	-	3	100	80	20	26	40
4.	Unit operations in Food Processing-II	FTC 506	Theory	3	-	-	3	100	80	20	26	40
5.	Elective-I	FTC 507/508/509	Theory	3	-	-	3	100	80	20	26	40
6.	Food Product development Analysis and Sensory Evaluation Lab	FTC 510	Sessional	-	-	2	-	50	30	20	-	25
7.	Unit operations in Food Processing-II Lab	FTC 511	Sessional	-	-	2	-	50	30	20	-	25
8.	Elective-I Lab	FTC 512/513/514	Sessional	-	-	2	-	50	30	20	-	25
9.	Project Work	FTC 515	Sessional	-	-	2	-	50	30	20	-	25
10.	In plant Training	502	Sessional	-	-		-	50	30	20	-	25
10.	DLS	501	Sessional	-	-	2	-	50	30	20	-	25
Total Hours of Teaching per week :				**15**		**14**						

Elective-I (Technology of Oils and Fats- FTC507 / Enzyme Technology- FTC508/Food Additives & Preservatives-FTC 509)

Elective-I Lab (Technology of Oils and Fats-FTC512 / Enzyme Technology-FTC 513/Food Additives & Preservatives-FTC514)

Total Marks: Theory : Practical : Sessional :

L : Lecture, T : Tutorial P : Practical

Note: 1. Period of Class hours should be of 1 hrs duration as per AICTE norms.

2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.

3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.

4. Board will depute examiner for Practical examination.

5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

6. In plant training of 04 weeks duration to be undertaken after 4th semester Exam and before start of 5th semester classes.

Subject : Environment and Agro-Food Management
Subject : FTC503
Hours : 42
Marks : 80+20=100

RATIONALE

Education about environment protection is a must for all the citizens. In addition, a diploma holder must have knowledge of different types of pollution caused by industries and construction activities so that he may help in balancing the eco system and controlling pollution by adopting pollution control measures. He should also be aware of environmental laws related to the control of pollution.

DETAILED CONTENTS

1. Basics of environment and ecology, biodiversity, eco system and sustainable development (02hrs)

2. Sources of pollution - natural and manmade, causes, effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear) and their units of measurement (06 hrs)

3. Mining and deforestation – Causes, effects and control measures (02 hrs)

4. Environmental Legislation - Water (prevention and control of pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board, Environmental Impact Assessment (EIA) (2 hrs)

5. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio Energy, Hydro Energy) (04 hrs)

6. Current Issues in Environmental Pollution – Global Warming, Green House Effect, Depletion of Ozone Layer, Recycling of Material, Environmental Ethics, Rain Water Harvesting, Maintenance of Groundwater, Acid Rain, Carbon Credits. (06 hrs)

7. Cropping patterns in different agro-climatic zones of the country. Impact of high- yielding and short-duration varieties on shifts in cropping patterns. Concepts of various cropping and farming systems. Organic and Precision farming. Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, commercial and fodder crops. Agro forestry and value addition. (06 Hrs)

8. Seeds: Seed production and processing technologies. Seed certification, seed testing and storage.DNA fingerprinting and seed registration. Role of public and private sectors in seed production and marketing. Intellectual Property Rights (IPR) issues, WTO issues and its impact on Agriculture. (06 Hrs)

9. Weeds, their characteristics, dissemination and association with various crops; their multiplications; cultural, biological, and chemical control of weeds. (2 Hrs)

10. Soil - physical, chemical and biological properties. Processes and factors of soil formation. Soils of India. Mineral and organic constituents of soils and their role in maintaining soil productivity. Essential plant nutrients and other beneficial elements in soils and plants. Principles of soil fertility, soil testing and fertilizer recommendations, integrated nutrient management. (6 Hrs)

INSTRUCTIONAL STRATEGY

The contents will be covered through lecture cum discussion sessions. In addition, in order to have more appreciation of need for protection of environment, it is suggested that different activities pertaining to Environmental Education like video films, seminars, environmental awareness camps and expert lectures may also be organized.

RECOMMENDED BOOKS

1. Environmental Engineering and Management by Suresh K Dhameja; SK Kataria and Sons, New Delhi.
2. Environmental Science by Dr. Suresh K Dhameja; SK Kataria and Sons, New Delhi.
3. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
4. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
5. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
6. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Co. (P) Ltd. Delhi.
7. Environmental Studies by Erach Bharucha; UGC University Press.
8. Handbook of Post Harvest Technology, edited by Chakrawarti Majumdar & Otrs.

Subject : Handling, Transportation & Storage of Foods
Subject Code : FTC 504
Hours : 42
Full Marks : 80+20= 100

RATIONALE

This subject is aimed to develop an understanding among the students about various methods of handling, transportation and storage of food grains and perishables. It will also impart knowledge and skills as how to minimize post – harvest loss of food commodities

DETAILED CONTENTS

1. Introduction (03 hrs)

   Scope and importance of handling, transportation and storage of food and food products, post harvest losses

2. Post Harvest Changes in Foods – Physiological, chemical, microbiological and Biochemical (06 hrs)

3. Handling, Transportation and Storage (06 hrs)

   Various unit operations of post-harvest handling, transportation, introduction to different conveying systems like belt conveyors, chain conveyors, screw conveyors, hydraulic conveyors, pneumatic conveyors, vibrating and oscillating conveyors, bucket elevators – their selection, operation and maintenance.

4. Grains (06 hrs)

   Preparation of grains for storage, Storage requirements, infestation control, mycotoxin, handling practices, causes of spoilage and their prevention, factors affecting quality of grain during storage and types of storage structures and Facilities

5. Fruits and Vegetables (05 hrs)

   Handling, transportation and storage, spoilage and prevention

6. Animal Foods (07 hrs)

Pre-slaughter handling and transportation system – their effects on quality of meat products, transportation and storage requirements, ante-mortem examination of animals

7. Milk (02 hrs)

Collection, pre-cooling, handling and transportation systems – their effects on quality of milk

8. Eggs (02 hrs)

Candling and grading, packaging, handling, pre-treatment, transportation and storage

9. Cold Storage (05 hrs)

Introduction to cold storage facilities & requirements for storage of different fruits and vegetables.

RECOMMENDED BOOKS

1. Handling, Transportation and Storage of Fruits and Vegetables by A Lloyd, Ryall Penizer (AVI Publications)
2.
3. Proceedings of Regional Workshop on Warehouse Management of Stored Food Grains by Girish and Ashok Kumar (UNDP)
4. Modern Potato and Vegetable Storage by Volkind and Roslov (Amerind)
5. Controlled Atmospheric Storage of Fruits by Mettel Skilv
6. Food Grains in Tropical and Sub Tropical Areas by Hall
7. Food Storage Part of a system by Sinha and Muir (AVI)
8. Post Harvest Technology of Fruits and Vegetables – Handling, Processing, Fermentation and Waste Management by LR Verma and VK Joshi; Indus Publishing com., New Delhi
9. Drying and Storage of Grains and Oilseeds by Brooker & Hall, CBS

Subject : Food Product Development Analysis and Sensory
Subject Code : FTC *505*
Hours : 42
Marks : 80+20=100

1. New Food Products: Definition, Classification, Characterization, Factors shaping new product development- Social concerns, health concerns, impact of technology and market place influence.

(04 Hrs)

2. Market Survey, Consumer survey to identify new products in terms of Line Extension Repositioning Existing Products New form/Reformulation. New packaging of existing products Innovative products, Creative Products. Tapping traditional foods and unconventional sources of foods. Minimizing post harvest losses. Identification of concept & product for development, Market research for the concept and selected product, Identification of products, selection of one product and its standardization improving success. (10 Hrs)

3. Bulk preparation of product, Packaging and Labeling of the product, Packaging design, graphics and labeling nutritional evaluation (estimation of relevant parameters), Shelf life testing of the product (testing for appropriate quality parameters- chemical, microbiological and nutrient content, acceptability studies), Product integrity and conformance to standard, Costing the product and determining the sales price, Advertising and test marketing the product, Report preparation.

(08 Hrs)

4. Overview of sensory principles and practices: General consideration in sensory testing, flowcharts of sensory evaluation. Anatomy, physiology and function of various senses. (04 Hrs)

5. Psychological methods Selection and screening of panel: Types of panel (Trained panel, discriminative and communicative panel). Methodology for sensory evaluation: Discriminative test - difference test: paired comparison, Duo-trio, triangle, ranking, Sensitivity Test, Descriptive test - category scaling, ratio scaling, flavor profile analysis, texture profile analysis, quantitative descriptive analysis.

(08 Hrs)

6. Effective Tests: paired performance test, ranking test, rating scale: hedonic rating, food action scale rating. Maintaining suitable environmental conditions: laboratory setup and equipment.

(04 Hrs)

7. Sample preparation, Basic statistical concepts for sensory evaluation: Hypothesis testing and sensory inference, variation of T Test, Nonparametric and binomial based, Statistical methods, Chi-square test, analysis of variation, Correlation regression. (04 Hrs)

Subject : Food Product Development Analysis and Sensory
Subject Code : FTC 510

List of Practical:

1. Study of Crop Pattern based on social setup.
2. Study of effect of season and analysis of availability on pricing
3. Study of packaging of seasonal foods and preservation techniques.
4. Packaging of raw foods/ fruits in automated manner.
5. Packaging of processed foods/ fruits in automated manner.
6. Determination of microbiological and nutrient content of food / fruits.
7. Evaluation of different types of flavors/ texture and sensory analysis.
8. Evaluation of Sensitivity and Descriptive test of commonly available food items.
9. Determination of calorific values of different foods and cereals.
10. Sample preparation of different food materials for preparation of processed food products.
11. Sample preparation of futuristic product and its analyses for product promotion.
12. Sample preparation of different food materials for preparation of processed beverages.

Books:

1. Lyon, D.H.; Francombe, M.A.; Hasdell, T.A.;Lawson, K. (eds) (1992): Guidelines for Sensory Analysis in Food Product Development and Quality Control. Chapman and Hall, London.
2. Amerine, M.A.; Pangborn, R.M.; Roessler, E.B.(1965): Principles of Sensory Evaluation. AcademicPress, New York.
3. Kapsalis, J.G. (1987): Objective Methods in Food Quality Assessment. CRC Press, Florida.
4. Martens, M.; Dalen, G.A.; Russwurm, H. (eds)(1987): Flavour Science and Technology. John Wileyand Sons, Chichester.
5. Moskowitz, H.R. (eds) (1987): Food Texture: Instrumental and Sensory Measurement. MarcelDekker Inc. New York.

Subject : Unit operations in Food Processing-II

Subject Code : FTC 506

Full Marks : 80+20=100

Hours : 42

RATIONALE

This subject is aimed to develop an understanding among the students about various methods of handling, transportation and storage of food grains and perishables. It will also impart knowledge and skills as how to minimize post – harvest loss of food commodities

DETAILED CONTENTS

1. Preliminary Unit operation (04 hrs)

   Cleaning, sorting & Grading - aims, methods and applications

2. Size Reduction and Sieve Analysis (16 hrs)

   Theory of comminution; Calculation of energy required during size reduction. Crushing efficiency; Size reduction equipment; Size reduction of fibrous, dry and liquid foods; effects of size reduction on sensory characteristics and nutritive value of food

   Sieving: Separation based on size (mesh size); types of screens; effectiveness of Screens

3. Mixing (10 hrs)

   Mixing, Agitating, kneading, blending, homogenization and related equipment

4. Separation Processes (12 hrs)

   Principles of Filtration, Sedimentation, Crystallization and Distillation and equipment used

Subject : Unit operations in Food Processing-II Lab

Subject Code : FTC 506

LIST OF PRACTICALS

1. Analysis of sampled foods for physical characteristics
2. Determination of critical speed of ball-mill
3. Size reduction, particle size measurement and distribution using hammer-mill
4. Steam steeping , maceration and distillation of herbs
5. Crystallization by Concentration.
6. Clarification of fruit juice using filter press
7. Visit to a public distribution system (PDS) showing storage facilities, warehouse, cold storage, refrigeration system and slaughter house etc
8. Visit to seasonal food industries for demonstration of various unit operations
9. Visit to fruit packaging industries for demonstration of various unit operations
10. Visit to cereal food processing industries for demonstration of various unit operations

RECOMMENDED BOOKS

1. Handling, Transportation and Storage of Fruits and Vegetables by A Lloyd, Ryall Penizer (AVI Publications)
2. Proceedings of Regional Workshop on Warehouse Management of Stored Food Grains by Girish and Ashok Kumar (UNDP)
3. Modern Potato and Vegetable Storage by Volkind and Roslov (Amerind)
4. Controlled Atmospheric Storage of Fruits by Mettel Skilv
5. Food Grains in Tropical and Sub Tropical Areas by Hall
6. Food Storage Part of a system by Sinha and Muir (AVI)
7. Post Harvest Technology of Fruits and Vegetables – Handling, Processing, Fermentation and Waste Management by LR Verma and VK Joshi; Indus Publishing com., New Delhi
8. Drying and Storage of Grains and Oilseeds by Brooker & Hall, CBS

Subject : Technology of Oils and Fats (Elective-I)
Subject Code : FTC 507
Full Marks : 80+20=100
Hours : 42

RATIONALE

This subject is aimed at imparting thorough knowledge and skill related to the extraction and processing techniques of oils & fats and their nutritional and qualitative effects on food

1. Introduction (10 hrs)

   Oils and Fats, sources, composition their, physico-chemical properties

2. Nutritional importance of oils and fats (02 hrs)

3. Functions of oils and fats in food (02 hrs)

   - Tenderness
   - Texture
   - Flavor
   - Emulsion

4. Processing of oil and fats (06 hrs)

   Pretreatment; extraction method; rendering; pressing; solvent extraction; refining; bleaching; hydrogenation; winterization; degumming; fractionation; deodorizing; plasticizing; packaging

5. Production and processing of animal fats (8 hrs)

   - Margarine
   - Lard
   - Fish oil

6. Production and processing of vegetable oils (12 hrs)

   - Soya bean oil
   - Mustard oil
   - Groundnut oil
   - Sunflower oil
   - Olive oil, palm oil, coconut oil

7. Blending and nutritional enrichment of oils. (02 hrs)

Subject : Technology of Oils and Fats (Elective-I)
Subject Code : FTC 512

PRACTICALS

1. To determine the smoke point, flash point and fire point of given sample
2. To determine the acid value of given sample
3. To determine the iodine value of given sample
4. To determine the saponification value of given sample
5. Determination of rancidity of given sample
6. To determine the melting point of given sample
7. To determine the fat content of a given sample by soxhlet apparatus
8. Visit to oil processing industry
9. Detection of adulteration in oils
10. Detection of adulteration in fats.

RECOMMENDED BOOKS

1. Food Science: Norman. N. Potter CBS Publication, *CBS* Publishers and distributors Pvt. Ltd, New Delhi
2. Food Oils & Fats: Lawson Harry-CBS Publication, *CBS* Publishers and distributors Pvt. Ltd, New Delhi
3. Food Oils & Fats: Bailey Publication, Oxford & IBH *Publishing* Co., New Delhi
4. Bailey's Industrial Oil and Fat Products by Daniel Swern, Interscience *Publishers,* New York
5. The Chemical Analysis of Food and Food Products by Jacobs, Morris B *Jacobs Publisher*: New York,
6. A First Course in Food Analysis by A.K. Sathe, New Age Publications, New Delhi
7. Standards for Fats & Oils by Lawson, AVI *Publishing* Company, Westport.

Subject : Enzyme Technology
Subject Code : FTC508
Full Marks : 80+20=100
Hours : 42

1. Enzymes–classification, properties, characterization, kinetics and immobilization; **4 Hrs**
2. fermentative production of enzymes (amylases, proteases, cellulases, pectinases, xylanases, lipases) used in food industry and their downstream processing. **6 Hrs**
3. Enzymes for production of protein hydrolysates and bioactive peptides, maltodextrins and corn syrup solids (liquefaction, saccharification, dextrinization, isomerization for production of high-fructose-corn-syrup), fructose and fructo- oligosaccharides. **8 Hrs**
4. Enzymes as processing aids: Role of enzymes in cheese making and whey processing; fruit juices (cell wall degrading enzymes for liquefaction, clarification, peeling, debittering, decolourization of very dark coloured juices such as anthocyanases); **8 Hrs**
5. Role of enzymes in baking (fungal α-amylase for bread making; maltogenic α-amylases for anti-staling; xylanses and pentosanases as dough conditioners; lipases or dough conditioning; oxidases as replacers of chemical oxidants; synergistic effect of enzymes); meat and meat processing (meat tenderization); egg processing. **8 Hrs**
6. Enzyme processing for flavors (enzyme-aided extraction of plant materials for production of flavors, production of flavour enhancers such as nucleotides; flavors from hydrolyzed vegetable/animal protein) **6 Hrs**
7. Enzymatic approach to tailor- made fats. **2 Hrs**

Subject : Enzyme Technology Lab
Subject Code : FTC513

List of Practical's

1 Enzymes constituents
2 Fermantation agents
3 Isomerization for production of high-fructose-corn-syrup
4 Fructo- oligosaccharides
5 Enzymes as processing aids
6 Preparation of dark coloured juices
7 Role of enzymes in baking
8 Synergistic effect of enzymes
9 Dough conditioning
10 Flavors from hydrolyzed vegetable/animal protein

Books:

1. Flickinger MC & Drew SW. 1999. *Encyclopedia of Bioprocess Technology*. A Wiley- Inter Science Publ.
2. Kruger JE *et al*. 1987. *Enzymes and their Role in Cereal Technology*. American Association of Cereal Chemists Inc.
3. Nagodawithana T & Reed G. 1993. *Enzymes in Food Processing*. Academic Press.
4. Tucker GA & Woods LFJ. 1991. *Enzymes in Food Processing*, Springer.S
5. Whitehurst R & Law B. 2002. *Enzymes in Food Technology*. Blackwell Publ.

Subject : Food Additives & Preservatives (Elective-I)
Subject Code : FTC 509
Full Marks : 80+20=100
Hours : 42

1. Additives in food processing and preservation - classification and their functions. Safety and quality evaluation of additives and contaminants, acute and chronic studies, NOAEL, ADI, Ld50.Indirect food additives. Various additives such as preservatives, antioxidants, antimicrobials, colors, flavor, emulsifiers, sequesterants, humectants, hydrocolloids, sweeteners, acidulants, anticaking agents, buffering salts, stabilizers, thickners etc. with respect to chemistry, food uses and functions in food formulations Acids, bases and buffers. **(06 Hrs)**
2. Flavor Technology: Types of flavors, flavors generated during processing - reaction flavors, flavor composites, stability of flavors during food processing, analysis of flavors, extraction techniques of flavors, flavor emulsions, essential oils and oleoresins, authentication of flavors etc. **(04 Hrs)**
3. Ingredients used in food production e.g. sugar, starches/modified starches, fibres, proteins/protein hydrolysates and fats etc and their technology of production and application. Sugars and Sweeteners: Sugars, syrups, sugar alcohols, potent sweeteners, sugar products, caramelization. Sweetener chemistry related tousage in food Products. Food colours - Types and properties, regulatory aspects, safety issues - natural food colours - pigments, chlorophylls, carotenoids, anthocyanins and flavonoids, tannins, caramel and others Artificial food colours **(05 Hrs)**
4. Principles of food preservation, Asepsis, removal of microorganisms, Maintenance of anaerobic conditions, Methods of food preservation. **(2 Hrs)**
5. Water Activity and Food Preservation, Free and Bound water, Effect of water activity on quality of food constituents during storage (proteins, lipids and carbohydrates) Effect on physical and nutritional quality, Water activity and food stability, Effect of packaging material on water activity. **(4 Hrs)**
6. Preservation through temperature reduction, Storage of food at chilling temperature - behaviour, Refrigeration Controlled Atmosphere Storage (CAS),Modified Atmosphere Storage (MAS), Chilling defects Freezing-principles, fundamental aspects of freezing process-technological aspects, Freezing damage-osmotic damage, solute Structural damage Preservation by use of High Temperatures Concentration of food Evaporation Freeze concentration, Membrane process for concentration **(05 Hrs)**
7. Dehydration of food (Food Preservation through water removal), Transport of water in foods, Different methods of dehydration, Cabinet drying, sun / solar drying, Osmo drying, Osmo-vac drying, micro-vac drying, vacuum drying, Nutritional, physico-chemical changes during drying Quality aspects of dehydrated food. Recent advances in dehydration of food Freeze drying Introduction, principles, process and preservation Physico-chemical changes in food Nutritional changes during freeze drying Recent advances in freeze drying methods (industrial developments). Evaporators- types & food applications, Preservation using high Sugar-Jam, Jellies, Squashes, syrups, marmalades, cordials, concentrate etc. Intermediate moisture fruits (candies / murabbas, tutti-frutti / glazed fruits) Processing of Tomato products Tomato juice, Ketchup, Sauce, Paste, Soup **(8 Hrs)**
8. Process technology and its quality evaluation Chutneys and allied traditional products Salting preservation Use of common salt, principle, process Fish salting Pickling Pickle salting (sauerkraut, cucumber, Kim chi) Vegetable salting Acidified - brined pickles (vegetables- onion, garlic) Fermentation process (Beverages) Pickle making technology Wine making technology (grape and others)Beer making. **(4 Hrs)**

9. Industrial Applications Canning and bottling Commercial canning operation Containers for canning of vegetables and their products Canning of fruits and their products Machinery and equipment, processing Spoilage of canned food and its quality evaluation Irradiation (in brief Principle Commercial applications Quality / Technological aspects Wholesomeness of irradiated food Prospects for the future UV rays application Microwave technique, its application in food preservation (surface sterilization of food) Food Packaging. **(4 Hrs)**

Subject : Food Additives & Preservatives Lab (Elective-I)
Subject Code : FTC 514

List of Practical

1. Evaluation of additives and contaminants.
2. Determination of Ph value of Preservatives and Buffers.
3. Determination of reaction flavors and constituents.
4. Determination of constituents of sweeteners.
5. Analysis of protein, lipids & Vitamins
6. Visit to relevant industry
7. Chilling defects Freezing-principles.
8. Demonstration of Osmo drying, Osmo-vac drying, micro-vac drying, vacuum drying
9. Demonstration of Evaporators for Sugar-Jam, Jellies, Squashes, syrups, marmalades, cordials, concentrate etc.
10. Preparation of instant pickles using permissible additives & preservatives.
11. Preparation of fermented beverage.
12. Visit to a canning and bottling plant for foods.

Books:

1. Branen, A. F. et al (2001). Food Additive s, 2nd Edition, MarcelDekker.
2. George, A. B. (1991). Encyclopedia of food and coloradditives, Vol III, CRC Press.
3. Nakai, S. and Modler, H. W (2000). Food proteins. ProcessingApplications, Wiley
4. Food Quality Assurance-Principles and Practices - Inteaz Ali,CHIPS, Texas.
1. Mircea Enachescu Dauthy (1997) 'Fruit and vegetable processing', FAO Agricultural Services Bulletin 119, International Book Distributing Co.
2. Brain J.B. Wood (1985) Microbiology of Fermented Foods, Vol.I, Elsevier Applied Science Publishers.
3. Diane M. Barrett, Laszlo Somogyi, Hoshahalli RamaswamyProcessing Fruits, II edition, Science and Technology, CRC Press.
4. Marcus Karel, Owen R. Fennema Physical principles Food Science, Part I and IIMarcel Dekker inc.
5. IGNOU-2006 Food Processing and Engineering -II, Practical Mannual, www.ignou.ac.in.
6. Giridhari Lal, G.S. Siddappa and G.L. Tondon Preservation of Fruits and Vegetables, CFTRI, ICAR , New Delhi -12.

Subject Title : Development of Life Skills (Common Paper)
Subject Code : 502
Full Marks : 50

Rationale:

In today's competitive world, the nature of individual and organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. After completing his course work he has to face the world and seek meaningful employment also. Merely having knowledge is not sufficient these days. He has to show his communicative skill also. As such the individual skills with capability to show his strength and communicate his willingness new skills for further advancement with to impart his ability and acquiring has to be displayed and learned.

This subject will develop the student as an effective individual to grab the available situation and be member of the unseen team in which he may be put in . It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

Objectives: The students will be able to:

1. Develop acumen to face interview.
2. Lead in the group discussion and set goals and targets for others
3. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survive self in today's competitive world
9. Follow moral and ethics
11. Convince people to avoid frustration

CONTENTS:

SOCIAL SKILLS

1. Social understanding for group discussion, imaginative thinking and develop free ideas .
2. SWOT Analysis – Concept, and know himself in details. Learn how to make use of SWOT.
3. **Inter personal Relation:-** How to effectively counter arguments of others without hearting their feeling Sources of conflict and conflict resolution, Ways to enhance interpersonal dependence and relations.
4. **Problem Solving**

I) STEPS IN PROBLEM SOLVING,

1) Identify and clarify the problem,
2) Information gathering related to problem,
3) Evaluate the evidence,

4) Consider alternative solutions and their implications,
5) Choose and implement the best alternative,
6) Review

II) Problem solving technique.(any one technique may be considered)

1) Trial and error
2) 2) Brain storming
3) 3) Lateral thinking

5. Presentation Skills

Body language --
Dress like the audience, Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
Voice and language – Volume, Pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language,
Practice of speech. Use of presentation aids, Summarizing the facts

6. Group discussion –

Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making

7. INTERVIEW TECHNIQUE

Necessity, Techniques to influence interviews and giving directions, Tips for handling common questions.

8. Working in Teams

Understand and work within the dynamics of a groups.
Tips to work effectively in teams,
Establish good rapport, interest with others and work effectively with them to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

9. Task Management

Introduction, Task identification, Task planning, organizing and execution, Closing the task

BOOKS:

Sl. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt
10	Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
11	Stress Management Through	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
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