

MANIPUR UNIVERSITY

APPROVED COURSE STRUCTURE OF Certificate, Diploma, Advanced Diploma and B.Voc. (FOOD PROCESSING AND ENGINEERING) UNDER DDU KAUSHAL Kendras

SEMESTER – I

Sl. No	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-101	Communicative English	6	0	0	20	80	100	6
2.	BVGE-102	Management Concepts and Organizational Behaviour	6	0	0	20	80	100	6
3.	BVFP-103	Introductory Microbiology	3	0	3	10+10	40+40	100	6
4.	BVFP-104	Food Chemistry	3	0	3	10+10	40+40	100	6
5.	BVFP-105	Principles of Food Processing & Preservation	3	0	3	10+10	40+40	100	6
Total			21	0	9	100	400	500	30

SEMESTER – II

Sl. No	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-201	Personality Development & Communication Skills	6	0	0	20	80	100	6
2.	BVGE-202	Introduction to Information Technology (IT)	6	0	0	20	80	100	6
3.	BVFP-203	Principles of Food Engineering & Quantitative Techniques in Food Processing	3	0	3	10+10	40+40	100	6
4.	BVFP-204	Food Handling & Storage Engineering	3	0	3	10+10	40+40	100	6
5.	BVFP-205	Refrigeration & Air Conditioning & Boiler Technology	3	0	3	10+10	40+40	100	6
Total			21	0	9	100	400	500	30

SEMESTER – III

Sl. No	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-301	Interpersonal Effectiveness & Business Communication	6	0	0	20	80	100	6
2.	BVGE-302A	Basics of Accounting & Finance	3	0	0	10	40	50	3
	BVGE-302B	Communicative Hindi	3	0	0	10	40	50	3
3.	BVFP-303	Technology of Dairy Products	3	0	3	10+10	40+40	100	6
4.	BVFP-304	Cereal, Pulses & Oil seeds Technology	3	0	3	10+10	40+40	100	6
5.	BVFP-305	Food Packaging Technology	3	0	3	10+10	40+40	100	6
Total			21	0	9	100	400	500	30

SEMESTER – IV

Sl. No	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-401	Entrepreneurship Development Programme (EDP): Theory & Practices of Entrepreneurship	6	0	0	20	80	100	6
2.	BVGE-402A	Human Resource Management, Planning & Development	3	0	0	10	40	50	3
3.	BVGE-402B	Basic Principles of Economics	3	0	0	10	40	50	3
4.	BVFP-403	Dairy Engineering	3	0	3	10+10	40+40	100	6
5.	BVFP-404	Fruits, Vegetables Processing & Food Additives	3	0	3	10+10	40+40	100	6
6.	BVFP-405	Unit Operation in Food Engineering	3	0	3	10+10	40+40	100	6
Total			21	0	9	100	400	500	30

SEMESTER – V

Sl. No.	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-501	Environmental Studies -I	6	0	0	20	80	100	6
2.	BVGE-502	Business Research Methods (Research Methods for Courses Concerned)	6	0	0	20	80	100	6
3.	BVFP-503	Baking & Confectionary Technology	3	0	3	10+10	40+40	100	6
4.	BVFP-504	Fermented Food Products	3	0	3	10+10	40+40	100	6
5.	BVFP-505	Project (Project Execution and Report)	0	6	0	20	80	100	6
Total			18	6	6	100	400	500	30

SEMESTER – VI

Sl. No	Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
1.	BVGE-601	Environmental Studies -II	6	0	0	20	80	100	6
2.	BVGE-602A	Business Laws & Ethics for Tourism (Optional Module)	6	0	0	20	80	100	6
	BVGE-602B	Food Laws and Legislation (Optional Module)							
3.	BVFP-603	Technology of Meat & Poultry Products	3	0	3	10+10	40+40	100	6
4.	BVFP-604	Quality Control in Food Industry & Instrumentation	6	0	0	20	80	100	6
5.	BVFP-605	Internship/Project Execution and Report	0	6	0	20	80	100	6
Total			21	6	3	100	400	500	30

MANIPUR UNIVERSITY

COURSE STRUCTURE OF B.Voc. (FOOD PROCESSING AND ENGINEERING) UNDER B.Voc. PROGRAMME

SEMESTER-I

Paper Title: Communicative English

Paper/Module Code: BVGE-101

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1: (15 Hours)

Principles of correct use of languages- words, sentences, paragraphs, continuity and flow. Pronunciation: Phonemic symbols, Consonants, Vowels, Syllable-word stress, Strong and weak forms, Intonation. Dialogue Practice (Students should be given ample practice in dialogue, using core and supplementary materials), Functional Grammar and Business Vocabulary- English for Specific Purposes, Phrasal Verbs, Word Pairs, Synonyms and Antonyms- Use of Tense.

Unit 2: (15 Hours)

Communication: Understanding Communication, The purpose of communication, The communication process, The importance of Communication, Communication in the organization, Forms of Communication- oral and written, verbal and non- verbal (kinesics, proxemics, Occulesics, Haptics, Paralinguistics, Chronemics), Barriers in effective Communication, Electronic media in Communication.

Unit 3: (15 Hours)

Listening skills: Difference between listening and hearing, Types of Listening, Barriers to listening, Academic listening- listening for details- listening and note taking- listening for sound contents videos-listening to talks and descriptions- listening for meaning- listening to announcements-listening to news programmes.

Unit 4: (15 Hours)

Speaking skills: Interactive nature of communication, Importance of context- Formal & informal, Set expressions in different situations- Introducing-making, Requests-asking for giving permission, Giving instructions and directions, Agreeing/disagreeing, Seeking and giving advice, Inviting and apologizing, Telephonic skills, Public speaking, Conversational manners.

Unit 5: (15 Hours)

Professional Speaking skills: Group Discussion with evaluation, Debate, Presentation with evaluation, Jam/ Extempore, Mock Interview and Meetings with evaluation, Dealing with difficult people- Role play based on behavioural patterns.

Unit 6: (15 Hours)

Reading & Writing skill: Reading skills, Types, Reading strategies, Guidelines for effective reading, Writing as a skill, Functional use of writing- Principles of Communicative Writing, Business & Personal Letters, Formal letters, Covering letter, Follow-up letter, Application,

Enquiry, Complaints, Reservations- E –Mails, CV Writing, Fax, Job application, Writing Proposals

Reference Books:

1. A. Ashley: Commercial Correspondence, Oxford University Press
2. Agrawal, Suchi: Business Communication- A streamlined approach to Business Communication, Authors Press
3. Bailey Stephen, “Academic Writing”, ”, Routledge, 2006
4. Hamp-Lyons, Liz, Ben Heasley, “Study Writing”, 2nd Edition. Cambridge University Press, 2008
5. Horner, David & Strutt, Peter: Words at Work, Cambridge University Press
6. Ilona, Leki, “Academic Writing”, CUP, 1998
7. Kenneth Anderson, Lynch T., Mac Lean J., “Studying Speaking” New Delhi: CUP, 2008
8. Littlejohn, Andrew: Company to Company, Cambridge University Press
9. Lynch T., “Studying Listening” New Delhi: CUP, 2008
10. Marks J., “English pronunciation in use”, New Delhi: CUP, 2007
11. McCarter, Sam, Norman Whitby, “Writing Skills”, Macmillan India, 2009
12. Nira `Konar: English Language Laboratories: A Comprehensive Manual, PHI Learning
13. Raman, Meenakshi & Sharma, Sangeeta: Communicative English, Oxford University Press
14. Raman, Meenakshi & Sharma, Sangeeta: Technical Communication, Oxford University Press
15. Raman, Meenakshi & Singh, Prakash: Business Communication, Oxford University Press
16. Robert, Barraas, “Students must write”, Routledge, 2006
17. R.C. Sharma: Business Correspondence and Report Writing
18. Sweeney, Simon: Communicating in Business, Cambridge University Press

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Management Concepts and Organisational Behaviour

Paper/Module Code: BVGE-102

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Unit 1: (15 Hours)

Concept and Nature of Management: Concept & Definitions, Features of Management, Management As Science, Art & Profession, Levels of Management, Scope of Evolution of Management Thought. Approaches to Management (Classical, Behavioural, Quantitative Contingency), Contribution of Leading Thinkers, Recent Trends in Management Thought.

Unit 2: (15 Hours)

Planning and Decision Making: Nature, Strategic planning process and Types of Planning, Management by Objectives (MBO), TOWS Matrix & Porter's Industry Analysis, Decision Making, Forecasting.

Unit 3: (15 Hours)

Organising: Nature & Principles of Organisation, Departmentation, Span of Management, Authority & Responsibility, Delegation and Decentralisation of Authority, Forms of Organisation Structure, Line & Staff Functional Authority Relationships.

Unit 4 (15 Hours)

Directing: Nature & Scope of Directing, Motivation & Morale, Theories of Motivation, Communication, Leadership, Coordination.

Unit 5: (15 Hours)

Controlling: Nature & Process of Controlling, Techniques of Control, Control for Organisational Effectiveness and Organisational Culture.

Unit 6: (15 Hours)

Organisational Behaviour: Definition, Importance, Fundamental Concepts of Organisational Behaviour, Influence of Socio-Cultural Factors on Organisation, Perceptions, Personality and Attitudes, Learning, Group Dynamics, Management of Change, Conflict Management.

Reference Books:

1. Stoner, Freeman and Gilbert Jr., "Management", Prentice Hall of India, New Delhi, 2003
2. Gupta, C.B., "Management Concepts and Practices", Sultan Chand and Sons, New Delhi, 2003
3. O'Donnel, Koontz and Wehrich, "Management", Tata Mc Graw Hill Publishing
4. Robbins, S.P. "Organisational Behaviour", New Delhi, Prentice Hall of India, 2005
5. Prasad L.M. "Organisational Behaviour" New Delhi, Sultan Chand

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Introductory Microbiology

Paper/Module Code: BVFP- 103

Contact Hours: Minimum 90

Credit: 6

(Practical-50 marks, Theory-50 marks)

Unit 1:(9 hrs):

Systematic Study of major group of micro-organism of importance in food industry.

Unit 2:(9 hrs):

Principles and methods of food preservation. Food spoilage and its causes. Food in relation to diseases.

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 3:(9 hrs):

Sources and types of micro-organisms of milk; Starter culture: Role of micro-organism in the manufacture of milk and milk products. Microbial spoilage and dairy products and their control;

Unit 4:(9 hrs):

Isolation and identification of micro-organisms involved in food spoilage; Enumeration and diagnosis of food poisoning organisms

Unit 5:(9 hrs):

Isolation of micro-organisms from milk and milk products and their identification; Microbiological grading milk and milk products.

Practicals: (45 hours): Familiarity with equipment to be used in Microbiology Laboratory, Cleaning, washing and sterilization of glass wares, Staining techniques of bacteria and fungi, Preparation and sterilization of different media types.

Books Recommended:

1. "Microbiology" by M. J. Pelczar Jr., E.C.S. Chan and N.R. Krieg, Vth edn., TMH BookCompany (1993).
2. "Modern Food Microbiology" by James M. Jay, IVth edn. CBS Publishers Delhi (1993).
3. "Food Microbiology" by W. C. Frazier & D.C. Westhoffs, IV thedn., TMH (1993).
4. Perman D. 1977-79. *Annual Reports of Fermentation Processes*. Vols. I-III.
5. Prescott SC & Dunn CG. 1959. *Industrial Microbiology*. Mc Graw Hill.
6. Waits MJ. 2001. *Industrial Microbiology*. Blackwell Science.
7. Ward OP. 1989. *Fermentation Biotechnology*. Prentice Hall.
8. Adams M. 2006. *Emerging Food-borne Pathogens*. Woodhead Publ.
9. Adams MR & Moss MO. 2000. *Food Microbiology*. Panima.
10. Easter MC. 2003. *Rapid Microbiological Methods in the Pharmaceutical Industry*.
11. Harrigan W. 2003. *Laboratory Methods in Food Microbiology*. University of Reading, UK, Elsevier.
12. James MJ, Loessner MJ & David A. 2005. *Modern Food Microbiology*. 7th Ed. Golden Food Science Text Series.
13. Pederson CS. 1979. *Microbiology of Food Fermentations*. AVI Publ.
14. Roberts R. 2002. *Practical Food Microbiology*. Blackwell Publ.
15. Rossmore HW. 1995. *Handbook of Biocide and Preservative*. Blackie.

Paper Title: Food Chemistry

Paper/Module Code: BVFP- 104

Contact Hours: Minimum 90

Credit:6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1:(9 hrs):

Physico-chemical properties of foods. Physical properties- solutions, osmotic pressure, acids, bases, pH, buffers, boiling point, freezing point, colloids, viscosity, surface tension emulsions. Water, moisture content of food, bound water.

Unit 2:(9 hrs):

Carbohydrates - structure, cooking properties & functions of starches dextrins, cellulose, fibers, hemicellulose, pectins, gums in different foods, function of sugar in food browning.

Lipids- classification, physical characteristics, structure and functions, effect on cooking properties of lipids in foods, rancidity, hydration. .

Unit 3:(9 hrs):

Proteins- types of food proteins, physical characteristics, structures, functions and effects on cooking properties of various animal & plant proteins, denaturation properties, protein gels, pigments and color.

Unit 4:(9 hrs):

Role and effect of cooking on chlorophyll, myoglobin, haemoglobin, anthocyanins, flavonoids, tannins, carotenoids, quinones, xanthenes, pectins and their contribution to acceptability of food.

Unit 5:(9 hrs):

Use of synthetic colours in food.

Flavour- sensation of taste, smell, visual appearance, flavor and texture of food. Flavour compounds terpenoids, flavonoids, sulphur compounds & others volatile flavour compounds and their role in sensory evaluations.

Enzymes- enzymes in food processing, enzymic browning.

Practicals: (45 hours) :

Proximate analysis of foods, physico-chemical properties of foods, measurement of T.S.S., conductivity, pH, acidity, etc. estimation of vitamins and anti nutritional factors.

Books Recommended:

1. Aurand, L.W. and Woods, A.E. 1973. Food Chemistry. AVI, Westport.
2. Birch, G.G., Cameron, A.G. and Spencer, M. 1986. Food Science, 3rd Ed. Pergamon Press, New York.
3. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
4. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
5. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
6. Food :Facts and Principles-N. ShakuntalaManay, N.Shadksharawamis.

Paper Title: Principles of Food processing and Preservation

Paper/Module Code: BVFP- 105

Contact Hours: Minimum 90

Credit: 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1:(9 hrs):

Introduction and historical development in food processing and preservation.

Unit 2:(9 hrs):

General principles in Food processing. Methods of food processing.

Unit 3:(9 hrs):

Principles of food preservation. Preservation by high temperature; preservation by low temperature

Unit 4:(9 hrs):

Preservation by sun drying, dehydration, freeze drying, dehydro freezing.

Unit 5:(9 hrs):

Preservation by Chemicals. Preservation by fermentation and irradiation; Canning, can manufacture.

Practical:(45 hrs): Estimation of water activity, Study of processing and preservation equipments, freezing and dehydration of fruits, vegetables and meat. Preservation of syrups, squashes, juices, jams, jellies and pickles.

Books Recommended :

1. O.R.Fennema Principles of Food science
2. V.Kyzlink Principle of Food Preservation
3. James M.Jay Modern Food Microbiology

SECOND SEMESTER

Paper Title: Personality Development & Communication Skills

Paper/Module Code: BVGE201

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1: (15 Hours)

Understanding Personality: Benefits of Self Knowledge, Personality Type, Patterns of diversity, Energy sources- Extroversion. Ways to talk people like you. Make people think in your way. Analyse worry.

Unit 2: (15 Hours)

Personality Development Training: Interview skill- Interview dress code, Controlling your nerves, Positive visualization, Creating a positive Impression, Opening conversation, Assessing the degree of formality, Getting comfortable, Recovering from poor starts etc.

Unit 3: (15 Marks)

Group Discussion- Questions, attributes, Individual characteristics, Do's & Don'ts, Must & Must Not's. Management skills- Time Management, Keeping & Analysing time log, Task typing, Effective decision making, Break daunting tasks etc.

Unit 4: (15 Hours)

Meeting Skill: Meeting agenda, Illustration of agenda, Guidelines, Formal closure of meeting, Action notes etc. Negotiation skill: Introduction, Phases of negotiation, Characteristics of negotiation, Critical factors, Types of approaches etc. use of concessions, Concessions trading, Avoiding use of trends, Removing deadlock.

Unit 5: (15 Hours)

Presentation skill: Preparation of venture, Attention to detail, Equipment check, Optimisation of seating arrangements, Audience, Final Preparation. Getting started, Introduction, Best style, Using audio-visual aids. Body language, Communication, Movement, Eye Contact, Posture. Control, Reading audience, Coping audiences with hostile.

Unit 6: (15 Hours)

Writing Strategies & Study Skills: Paragraph writing- Characteristics of good paragraph, Paragraph writing tips, Types of paragraphs. Essay Writing- Types of essays, Precis writing- Paraphrasing & Summarizing, Note taking- Tips of note taking, Synopsis, Reports, Professional Brochures, Surveys, Questionnaires, Writing Proposals.

Reference Books:

1. Agrawal, Suchi: Business Communication- A streamlined approach to Business Communication, Authors Press
2. Bajpai, B.L.: Making Management still more effective
3. Bajpai B.L.: Indian Ethos and Modern management
4. Bailey Stephen, "Academic Writing", ", Routledge, 2006
5. Hamp-Lyons, Liz, Ben Heasley, "Study Writing", 2nd Edition. Cambridge University Press, 2008
6. Horner, David & Strutt, Peter: Words at Work, Cambridge University Press
7. IGNOU: Study materials
8. Ilona, Leki, "Academic Writing", CUP, 1998

9. Kenneth Anderson, Lynch T., Mac Lean J., "Studying Speaking" New Delhi: CUP, 2008
10. Littlejohn, Andrew: Company to Company, Cambridge University Press
11. McCarter, Sam, Norman Whitby, "Writing Skills", Macmillan India, 2009
12. Nira `Konar: English Language Laboratories: A Comprehensive Manual, PHI Learning
13. Raman, Meenakshi & Sharma, Sangeeta: Communicative English, Oxford University Press
14. Raman, Meenakshi & Sharma, Sangeeta: Technical Communication, Oxford University Press
15. Raman, Meenakshi & Singh, Prakash: Business Communication, Oxford University Press
16. Robert, Barraas, "Students must write", Routledge, 2006
17. R.C. Sharma: Business Correspondence and Report Writing
18. Sweeney, Simon: Communicating in Business, Cambridge University Press

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Paper Title: Introduction to Information Technology (IT)

Paper/Module Code: BVGE202

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 4

Internal Assessment: 20

Unit 1: (15 Hours)

Introduction to computers- Definition of computer, Advantages and Characteristics, Origin, Evolution, Types. Classification of computers, Essentials of computer systems Generation of computers, Essentials of computer systems Data and information, Data representation, Bits and bytes, Number systems conversion, Binary arithmetic.

Unit 2: (15 Marks)

Components of computers- Hardware: Hardware elements- Input devices, Memory types (primary & secondary), Storage devices, Processing & Output devices. Software: Software and its classifications, Types of software, Operating software- DOS & Windows.

Unit 3: (15 Hours)

Application Software: Windows based MS Word, Excel, Power point (MS Office). Internet: Browser, Search engine, World Wide Web (WWW), Websites, e-mail etc.

Unit 4: (15 Hours)

Programming languages- Low level languages (machine, assembly), high level languages, Translators (assembler, compiler, interpreter), Utilities- Software utilities (zip, recovery, pdf etc.), Hardware utilities (hardware diagnosis, partition managers etc.), Viruses, definitions & types.

Unit 5: (15 Hours)

Application of IT in Industries: Use of networks, Internet, Intranet, Extranet, Types of Network (LAN, WAN, MAN), Centralized & Global reservation system, Intranet, Property Management systems. Computer for communication in companies: Application in MS Word, MS Excel & Power point for industries.

Unit 6: (15 Hours)

Uses of computers in industries: Performing front office operations, Features of Packages. Back office Management- Use of Property management system. Computerized management system and their application for sales and Yield management & Billing.

Reference Books:

1. Yadav, D.S.: Fundamentals of Information Technology. New age International Publisher, New Delhi
2. Goel, R. & Kakkar, D.N.: Computer Applications in Management. New Age Publisher, New Delhi
3. Saxena. S & Chopra, P.: Computer Applications in Management. Vikas Publishing Hose Pvt. Ltd. New Delhi
4. Lucey, T: Management Information System. BPB Publication, New Delhi, 1997
5. Obrien, James A.: Management Information System. Tata McGraw Hill Publication, New Delhi
6. Fundamental of Computers, Prentice Hall India
7. Mastering Microsoft Office, Lonnie.E.Moseley, BPB Publication

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Principles of Food Engineering & Quantitative Techniques in Food Processing**Paper/Module Code:** BVFP- 203**Maximum Marks:** 100**Contact Hours:** Minimum 90**End Semester Exam:** 80**Credit:**6**Internal Assessment:** 20

(Practical-50 marks, Theory-50 marks)

Unit 1:(9 hrs):

Introduction to food engineering; material and energy balance: basic principles, process flow diagram, total mass balance. Fluid flow principle: fluid statics and dynamics Units and dimensions, mass and energy balance in fluid flow, Newtonian and Non- Newtonian fluid, streamline and turbulent flow.

Unit 2:(9 hrs):

Heat transfer in food processing: mode of heat transfer- conductive, convective and radiative heat transfer;; heat exchangers: plate, tubular, scraped surface and steam infusion heat exchangers

Unit 3:(9 hrs):

Kinetics of chemical reaction in foods, evaporation, dehydration, drying, refrigeration. Physical separation process and extraction.

Unit 4:(9 hrs):

Scope in Agricultural and Food engineering. Application of linear and dynamic programming in food processing.

Unit 5:(9hrs):

Transportation and assignment models in food processing. Queing theory. Application of PERT-CPM in food processing. Optimization and simulation techniques in food processing.

Practicals:(45 hrs): Application of psychometric chart in food engineering, measurement of pressure and fluid flow, study of heat exchangers, dryers, pulper, juicer, bottle washer, vacuum Packaging,, milling machines and equipments.

Books Recommended :

1. Rao DG. 2010. *Fundamentals of food engineering*. PHI learning private ltd.
2. Singh RP and Heldman DR.1993, 2003, 2009. *Introduction to food engineering*. Academic press 2nd, 3rd and 4th edition.
3. Rao C G 2006 *Essentials of food process engineering*. B S publications.
4. Fellow P. 1988 *Food processing technology*. VCH Ellis Horwood.

Paper Title:Food Handling and Storage Engineering

Paper/Module Code: BVFP- 204

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit:6

Internal Assessment: 20

(Practical-50 marks, Theory-50 marks)

Unit 1:(9 hrs):

Overview of material handling system and devices in food processing plants.

Unit 2:(9 hrs):

Design of screw, bucket, belt, oscillation and vibrating conveyor.

Unit 3:(9 hrs):

Refrigerated transportation of food materials. Principles and practice of storage. Physico-chemical changes in stored products during storage , air tight, non air tight, under ground

Unit 4:(9 hrs):

Conventional and modern storage structures for fruits, vegetables, meat and marine products;)

Unit 5:(9 hrs):

Aerated, refrigerated and controlled atmospheric storage. Layout and Design of storage structures, economics of storage structures

Practical: (45 hrs):Study of bucket elevator, belt conveyor, screw conveyor and vibrating conveyor, determination of capacity of cold storages, visit and study of godown and cold storages.

Books Recommended :

1. Newslow, D.L. "The ISO 9000 Quality System: Applications in Food and Technology", John Wiley & Sons, 2001.
2. Hubbard, Merton R. "Statistical Quality Control for the Food Industry", 3rd Edition, Springer, 2003.
3. Lopez – Gomez, A. and Barbosa – Canovas, G.V. "Food Plant Design", Taylor & Francis, 2005.
4. Food Production Operations Paperback – 19 Aug 2009 by Parvinder S. Bali
5. Food chains: quality safety and efficiency in a challenging by Taylor & Francis group

Paper Title: Refrigeration & Air Conditioning & Boiler Technology**Paper/Module Code:** BVFP- 205**Maximum Marks:** 100**Contact Hours:** Minimum 90**End Semester Exam:** 80**Credit:**6**Internal Assessment:** 20

(Practical-50 marks, Theory-50 marks)

Unit 1:(9 hrs):

Thermodynamic cycles, mechanical vapour compression refrigeration, properties of refrigerants, calculations of single stage saturation and actual cycles, two stage cycles and cascade refrigeration system

Unit 2:(9 hrs):

Heat pump, Compressors, expansion valves, evaporators and condensers., absorption system of refrigeration

Unit 3:(9hrs):

Ice manufacture, comfort chart and effective temperature and respiration heat, cooling, load calculations and design of cold storage's conveying and distribution of processed air, air conditioning controls.

Unit 4:(9 hrs):

Fuels: types of fuels and their properties, chemical properties, combustion, stoichiometric air requirement burners, Storing of fuels, properties of steam, mollier chart and steam tables.

Unit 5:(9 hrs):

Classification of boilers, fire tube and water boiler, mounting and accessories, feed water treatment; draught, natural and force height of chimneys, plant layout, economy in heat energy, boiler maintenance and safety. Use of boilers in food industries, boiler codes, Indian Boiler Regulation Act.

Practicals: (45 hrs): Study of various types of compressors, Study of household refrigerator and window air conditioner, Determination of coefficient of performance of a vapour compression refrigeration system and absorption system. Determination of freezing time of food products, Determination of heat transfer coefficient inside a cold storage or refrigerator, Determination of thermal conductivity of various insulating material.

Books Recommended :

1. Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press
2. Food Science and Processing Technology, Vol., 2 by Mridula and Sreelata
3. Rao PG, Fundamentals of Food Engineering, PHI Learning Pvt Ltd, New Delhi, 2010.
4. Toledo Romeo T, Fundamentals of Food Process Engineering, Aspen Publishers, 1999
5. Rao DG. 2010. *Fundamentals of food engineering*. PHI learning private ltd.
6. Singh RP and Heldman DR. 1993, 2003, 2009.
7. *Introduction to food engineering*. Academic press 2nd, 3rd and 4th edition.
8. Rao C G 2006 *Essentials of food process engineering*. B S publications.
9. Fellow P. 1988 *Food processing technology*. VCH Ellis Horwood

THIRD SEMESTER

Paper Title: Interpersonal Effectiveness & Business Communication

Paper/Module Code: BVGE301

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Unit 1: (15 Hours)

Use of English language for communication, Pronunciation: Phonemic symbols, Consonants, Vowels, Syllable-word stress, Intonation. Dialogue Practice, Grammar and Business Vocabulary- Phrasal Verbs, Word Pairs, Diminutives, Homonyms, Homophones, Synonyms and Antonyms, Use of Tense. English idioms & Idiomatic expressions.

Unit 2: (15 Hours)

Communication: Concept & Process, Forms of Communication- Verbal, Visual & Non-verbal, Body language- Kinesics, Para-language; Media/Channels of Business Communication, Barriers to Business Communication & Overcoming methods.

Unit 3: (15 Hours)

Personal skills: Knowing oneself- JOHARI window, Transactional analysis, Confidence building, Defining strengths, Thinking effectively, Personal values-time & Stress management. Art of effective communication & Listening.

Unit 4: (15 Hours)

Workplace Speaking: Steps of effective Speaking, Workplace communication essentials, Team briefing, 12Cs of Team building, Conflict management- Elements of conflict, Steps to resolve conflicts, Workplace conflict management strategies. Negotiation skills, Meeting & Guidelines for effective meeting.

Unit 5: (15 Hours)

Business Correspondence- Faxes, Memos, e-mail, Reports, Memorandum, Meeting, Documentation etc. Telephone equipment & Telephone handling for business purposes. Technology enabled Business Communication. Audio-visual communication.

Unit 6: (15 Hours)

Writing Business letters, Components, Kinds of Business letters, Planning and the 7Cs of Business writing. Business reports & Proposals writing- Importance, Need, Types, Techniques, Languages, Structure, Planning & Drafting.

Reference Books:

1. Agrawal, Suchi: Business Communication- A streamlined approach to Business Communication, Authors Press
2. Lesikar, Pettit: Business Communication. AITBS
3. K.K. Sinha: Business Communication. Galgotia Publishing House
4. Shirley Taylor: Communication for Business. Pearson Education Asia
5. Asha Kaul: Effective Business Communication. Prentice Hall of India
6. Rajinder Pal: Business Communication. Himalayan Publishing House

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Basics of Accounting & Finance

Paper/Module Code: BVGE 302A

Contact Hours: Minimum 45

Credit: 3

Maximum Marks: 50

End Semester Exam: 40

Internal Assessment: 10

Unit 1: (8 Hours)

Introduction- Accounting- Definition, Nature & Scope, Objectives of Financial accounting, Accounting v/s Book Keeping, Conceptual framework- Accounting concepts, Generally Accepted Accounting Principles (GAAP), and Conventions, Accounting standards. Recording of transactions- Journals, Subsidiary books, Ledger, Cash book, Bank reconciliation statement, Trial balance.

Unit 2: (7 Hours)

Preparation of Final accounts- Preparation of trading and Profit & Loss account and Balance sheet of sole proprietary business with adjustments. Basics of computerized accounting- Journalizing and preparing final accounts using TALLY.

Unit 3: (8 Hours)

Nature of Financial Management: Introduction- Financial Functions; goals of financial management; risk & return trade off; organization of finance functions, time value of money. Basic of capital budgeting: Nature of investment decisions; importance of investment decisions; investment evaluation criteria; capital budgeting techniques – NPV, IRR, payback and accounting rate of return.

Unit 4: (7 Hours)

Capital Structure: Source of Finance; meaning of capital structure, Determinant of capital structure, Financial Leverage, Debt capacity of company Debt equity ratio.

Unit 5: (8 Hours)

Working Capital Management: Concept of working capital; need for working capital; determinants of working capital; computation of working capital; an elementary knowledge of components of working capital management: cash management, receivables management and inventory management

Unit 6: (7 Hours)

Financial Statements and Analysis: Meaning, Analysis – Ratio, Fund flow, Cash flow, Cost volume Analysis. Dividend decisions: Introduction; meaning of dividend; aspects of dividend policy; practical considerations on dividend policy; forms of dividend.

Reference Books:

1. Gupta R.L. and Radhaswamy, M.: Advanced Accounting. Sultan Chand & Sons, New Delhi.
2. Shukla M.C., Grewal T.S. & S.C. Gupta: Advanced Accounts. S. Chand & Co. Ltd. New Delhi
3. Jain S.P.. and Narang P.L.: Financial Accounting. Kalyani Publishers, New Delhi
4. Naseem Ahmed, Nawab Ali Khan & Gupta M.L.: Fundamentals of Financial Accounting: Theory & Practice. Ane Books Pvt. Ltd. New Delhi
5. Anthony and Reece, Management Accounting Principles : Text and Cases
6. Pandey, L.M., Management Accounting : A Planning and Control Approach, Vikas Publication.
7. Davis D., The Art of Managing Finance, Mc Graw Hill.
8. Pandey, I.M., Financial Management, Vikas Publication
9. Van Horne, Financial Management and Policy, Prentice Hall.
10. Panday, I.M., and Bhatt, Ramesh, Cases in Financial Management, TATA Magraw Hill.
11. Van Horne/ Financial Management & Policy, 12th edition, Prentice hall of India
12. Financial Management by I.M. Pandey – Vikas Publishing House
13. Financial Management by P. V. Kulkarni & B. G. Sathyaprasad- Himalaya

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Communicative Hindi**Paper/Module Code:** BVGE 302B**Contact Hours:** Minimum 45**Credit:** 3**Maximum Marks:** 50**End Semester Exam:** 40**Internal Assessment:** 10**Unit 1: (10 Hours)**

Principles of correct use of Hindi languages- words, sentences, paragraphs, continuity and flow. Pronunciation: Consonants, Vowels, Syllable-word stress, Intonation. Dialogue Practice (Students should be given ample practice in dialogue, using core and supplementary materials), Functional Grammar and Business Vocabulary, Synonyms and Antonyms- Use of Tense.

Unit 2: (5 Hours)

Communication: Understanding Hindi Communication, The importance of Hindi Communication in India, Communication in the organization, Forms of Communication- oral and written, verbal and non- verbal.

Unit 3: (10 Hours)

Listening skills: Academic listening- listening for details- listening and note taking- listening for sound contents videos-listening to talks and descriptions- listening for meaning- listening to announcements-listening to news, programmes etc.

Unit 4: (10 Hours)

Speaking skills: Interactive nature of communication, Importance of context- Formal & informal, Set expressions in different situations- Introducing-making, Requests-asking for giving permission, Giving instructions and directions, Agreeing/disagreeing, Seeking and giving advice, Inviting and apologizing, Telephonic skills, Public speaking.

Unit 5: (10 Hours)

Reading & Writing skill: Reading skills, Reading strategies, Guidelines for effective reading, Writing as a skill, Functional use of writing- Business & Personal Letters, Formal letters, Application, Notice, Enquiry, Complaints, E –Mails, Fax, Job application.

REFERENCES???

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit.

Paper Title:Technology of Dairy Products

Paper/Module Code: BVFP- 303

Contact Hours: Minimum 90

Credit:6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1:(9 hrs):

Fluid Milk: Composition of milk and factors affecting it; Physico-chemical characteristics of milk and milk constituents, production and collection, cooling and transportation of milk.

Unit 2:(9 hrs):

Packaging storage and distribution of pasteurized milk: whole, standardized, toned, double toned and skim milk. Test for milk quality and adulteration; UHT processed milk, flavored, sterilized milk.

Unit 3:(9 hrs):

Cleaning and sanitation of dairy equipments;

Unit 4:(9 hrs):

Butter: Definition, classification, composition and methods of manufacture;

Ice cream: Definition, classification, composition and their role. Preparation of mixes and freezing of ice cream, over run, judging, grading and defects of ice cream;

Unit 5:(9 hrs):

Evaporated and condensed milk : Method of manufacture, packaging and storage. Manufacture of casein, whey protein, lactose from milk or use in formulated foods.

Practical: (45 hrs): Preparations of paneer, chena, ghee, dahi, khoya, kulfi, etc. Preparation of butter, ice creams, cheese yogurt, casein etc.

Books Recommended:

1. Outlines of Dairy Technology by SukumarDe, Oxford University Press.
2. Principles of Dairy Processing by James N. Warner, Wiley Eastern Ltd.
3. Milk and Milk Products by Eckles, Combs; and Macy, Tata McGraw Hill.
4. Technology of Indian Milk Products by Aneja et al. A Dairy India Publication.
5. PFA Act 1954 & Rules 1955 as amended to date.

Paper Title: Cereals, Pulses & oil seeds Technology**Paper/Module Code:** BVFP- 304**Contact Hours:** Minimum 90**Credit:**6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1:(9 hrs):**

Composition, Structure and Processing characteristic of cereal grains, Legumes and oilseeds. Post-harvest, Post Processing practices for their safe storage,.

Unit 2:(9 hrs):

Curing and aging of rice Processed rice products

Unit 3:(9 hrs):

Wheat and its quality characteristics of milling into flour and semolina. Technology and quality parameters for baked products; Bread, Biscuits and cakes: breakfast cereals.

Unit 4:(9 hrs):

Dry and Wet milling of corn, malting of barley, Pearling of Millets. Milling of legume-pulses by traditional and improved processes.

Unit 5:(9 hrs):

Processing of oil seeds for direct use and consumption, oil and protein products, Processing; Textured Protein, Functional protein preparations, peanut butter, Margarine and Spread.

Practical: (45 hrs): Experimental milling, physic chemical tests for flour quality of wheat, Rheological properties of dough, test baking, physic-chemical tests of rice and evaluation of cooking quality, Dhal milling. Visit to dhal mills; Preparation of protein concentrates and isolates.

Books Recommended

1. Cereals Technology by Samuel A. Matz. CBS Publications.
2. Technology of Cereals by N.L. Kent.
3. Food Facts and Principles by Mannay; New age International (P) Ltd.
4. Food Science by Norman N. Potter; CBS Publications.

5. Chemistry and Technology of Food and Food Products by M.B. Jacobs
6. Manuals on Rice and its Processing by CFDRI.
7. Cereals & Cereals Products-Chemistry & Technology by DAV Dendy&B.J.Dobraszezck, Aspen Publication.
8. Development in Milling & Baking Technology by AFST (I), CFDRI, Mysore, India.
9. Food Industries of CEEDC, IIT, Madras.
10. Articles on Pulse Milling in India Food Industry &JFST,both Publications of AFST (I).

Paper Title: Food Packaging Technology

Paper/Module Code: BVFP- 305

Contact Hours: Minimum 90

Credit:6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1:(9 hrs):

Chemical and physical properties of package materials. Interaction between package and food

Unit 2:(9 hrs):

Selection and evaluation of packaging materials and systems,

Unit 3:(9 hrs):

package design criteria, printing,

Unit 4:(9 hrs):

computers application in packaging,

Unit 5:(9 hrs):

modified atmospheres, corrosion, scale-up, waste engineering, CIP systems.

Practical: (45 hrs): Estimation of shelf life of fresh and preserved food using various packages such as metal container, glass container and flexible packages; Determination permeability of different plastic films; Estimation of protection against micro-organisms in various food packages; Identification of plastic films; Visit to Industries.

Books Recommended:

1. Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis 2006
2. Parry R. T. and Blakistone B. A. Principles & Applications of MAP –Springer, New York, 1999
3. Food Packaging Technology Handbook. NIIR Board, National Institute of Industrial Research, 2003
4. Ahvenainen, R. (Ed.) Novel Food Packaging Techniques, CRC Press, 2003
5. Han, J.H. (Ed.) Innovations in Food Packaging, Elsevier Academic Press, 2005
6. Coles, R., McDowell, D. and Kirwan, M.J. (Eds.) Food Packaging Technology, CRC Press, 2003

FOURTH SEMESTER

Paper Title: Entrepreneurship Development Programme (EDP): Theory & Practices of Entrepreneurship

Paper/Module Code: BVGE 401

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Unit: 1 (15 Hours)

The concept of Entrepreneurship: Definition, Significance; Types of entrepreneurs, characteristics-functions, Charms of being an Entrepreneur, Entrepreneurial traits, Distinction between entrepreneur and manager, Entrepreneur and intrapreneuer, Entrepreneur and Entrepreneurship- traits and motivation- Theories of motivation- Maslow's Need Hierarchy theory ,McClelland's Three Needed model and Aldefer's ERG theory. Problems faced by a new entrepreneur.

Unit: 2 (15 Hours)

Entrepreneurship and Intrapreneurship. Entrepreneurial process; identification of an opportunity, market assessment, analyzing competitive situation, understanding trade practices, resource mobilization. Entrepreneurship as a preferred "Career Option". Role and Importance of Entrepreneur in economic growth and socially responsible business. Factors affecting entrepreneurial growth in general. Women empowerment and entrepreneurship .

Unit: 3 (15 Hours)

EDP- Meaning and Objectives, Understanding and developing creativity and innovation; Creativity- Generating and implementing ideas, creative thinking skills (imaginative problem solving) and motivation (passion for specific challenges), Strategies to boost employee's expertise (technical, intellectual and procedural). Innovation: Sources of innovation, innovation management.

Unit: 4 (15 Hours)

Venture promotion steps- Idea Generation and searching for prospective business ideas or opportunities, Environment scanning, sources of information (primary, secondary), Product Selection, Technology determination, Site selection, Financial planning, Financial institutions for small enterprises.

Unit: 5 (15 Hours)

Preparation of business plan, Elements of business plan, Environmental analysis (situation analysis (PESTEL), SWOT analysis, Market structure, market trend, and target market and competitor analysis), Project classification. Project identification, Project formulation, Project appraisal, Project selection, Project implementation, Management. Format of feasibility report. Comparative study of PERT and CPM. Forms of ownership, TQM.

Unit: 6 (15 Hours)

Functional Management: Marketing (Needs, wants and demand; markets, marketing mix strategies); Finance (investment and financing decisions); Human resource (workforce planning, recruitment and selection, remuneration and compensation, and performance management). Procedures and formalities for setting up new enterprise, Regulations governing new ventures: Schemes of assistance, insurance, incentives of Government and other institutions. Role of business incubation centers. Stages of new venture development, Why new ventures fail, Causes and remedies.

Reference Books:

1. Peter Drucker, 'Innovation and Entrepreneurship'
2. Desai, V. Dynamics of Entrepreneurial Development and management. Himalaya Publishing house.
3. Gupta, C.B. & Srinivasan, N.P – Entrepreneurial development.
4. Jeffry A. Timmons and Stephen Spinelli. (2004). New Venture Creation: Entrepreneurship for the 21st Century. McGraw-Hill/Irwin: NY
5. Kuratko, D.K. Strategic entrepreneurial growth. South Western Publication.
6. Thomas & Zimmerer. Essentials of entrepreneurship and small business management. Prentice Hall of India.
7. Timmons, J. A and Spinelli, S. (2004). New Venture Creation (6th Ed.) New York. Mc-Graw Hill/ Irwin.
8. W.Ed McMullan and Wayne A. Long. (1990).Developing New Ventures: The entrepreneurial option. Harcourt Brace Jovanovich,Inc: USA.
9. Baporikar Neeta. (2011), Entrepreneurship Development and Project Management, Himalaya: New Delhi.
10. Hisrich.D.Robert. (2011), International Entrepreneurship: starting, Developing and, Managing a Global Venture, Sage.
11. Rice P. Mark (2008), Entrepreneurship, Atlantic Publishers.
12. Arora Renu & Sood. S. K (2007), Entrepreneurship Development and Management, Kalyani, New Delhi.
13. Abraham M.M., Entrepreneurship Development and Project Management, Prakash: Changanacherry. .
14. Vasant Desai, Entrepreneurship & Small Scale Industries, Himalaya Publishers.
15. Vasant Desai, Entrepreneurship Development, Himalaya Publishers.
16. 9. Feroze Banker, Progressive Entrepreneur, Kanishka Publishers.

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Human Resource Management, Planning & Development

Paper/Module Code: BVGE 402A

Maximum Marks: 50

Contact Hours: Minimum 45

End Semester Exam: 40

Credit: 3

Internal Assessment: 10

Unit 1: (10 Hours)

Foundations of Human Resource Management: Concept of HRM & HRD, Role of HR practitioner, Basic Philosophy and Approaches in HRD Planning. HRD Functions, Managing the HR function, Contribution of HR function to organization success, Evaluating HR functions.

Unit 2: (5 Hours)

Human Resource Management (HRM) in Perspective: HRM- The Field and It's Environment. The Evolving Role of HRM in the tourism industries.

Unit 3: (10 Hours)

Human Resource policy: Job, Role & Competence analysis, Human resource Planning, recruitment & selection, Induction, redundancy, Outplacement & dismissal, Maintenance & Welfare activities- Employee health & safety, Fatigue & Welfare activities.

Unit 3: (10 Hours)

Human resource Development: Learning & development, Personal development planning, Training, Management development, career management, HR approaches to improving competencies. Managing Employee Growth: Conflict and Stress management. Importance of Discipline and Counseling.

Unit 5: (10 Hours)

Employee Compensation: Aims, Components, factors influencing employee compensation, Internal equity, External equity & Individual worth, Pay structure, Incentive payments, Employee benefits & services, Performance appraisal, 360 degree feedback.

Reference Books:

1. Pattanayak: Human Resource Management. Prentice Hall of India
2. Dessler: Human Resource Management. 7th Edition, Prentice Hall of India
3. Armstrong, Michael: A handbook of Human Resource Management. Practice Kurgan page, 1999
4. Aswathappa K.: Human Resource & Personal Management. Tata McGraw Hill, New Delhi
5. Fischer, Schoen Feldt & Shaw: Human Resource Management. Houghton Mifflin, 1996
6. Ivancivich, John.M: Human Resource Management. Irwin/McGraw Hill 1996
7. Monappa, Arun: Managing Human Resource. Macmillan India Lt. New Delhi
8. Ross, Darren lee: HRM in Tourism & Hospitality
9. Dr. Jagmohan Negi: Human resource Development & Management in Hotel Industry. Frank Bros & Co.

10. Sybil Hofmann, Collin Johnson, Michael Lefever: International Human Resource Management in the Hospitality Industry. EI-AH & LA, USA

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Basic Principles of Economics

Paper/Module Code: BVGE 402B

Maximum Marks: 50

Contact Hours: Minimum 45

End Semester Exam: 40

Credit: 3

Internal Assessment: 10

Unit 1: (10 Hours)

Introduction- Nature, scope and application of economics in industries, Theory of the firm and business objectives - Economic, Behavioural and Managerial theories.

Unit 2: (10 Hours)

Law of Demand, Determinants of Demand; Elasticity of Demand; Nature of demand analysis and its forecasting; Law of supply; Determinants of demand and supply; Elasticity of supply analysis and forecasting

Unit 3: (10 Hours)

Input-Output decisions, Production function, Short-run analysis; Long-run function; Short run and long-run cost functions. Empirical estimation of production and costs.

Unit 4: (10 Hours)

Price-Output Decisions- Price determination under different market conditions; Pricing practices and strategies; Profit measurement and profit policy; Determinants of investment decision

Unit 4: (5 Hours)

Macroeconomic environment, economic transition in India, a quick Review- Liberalization, privatization & Globalization

Reference Books:

1. Peterson, H.C. & W.C. Lewis: Managerial economics. Prentice Hall India, New Delhi, 2004
2. Varshney R.L. & Oza A. L.: Micro Economics for Management Students. Oxford Universal Press, New Delhi, 2004
3. Dwidevi DN: Managerial Economics. Vikash publications, New Delhi, 2001

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Dairy Engineering**Paper/Module Code:** BVFP- 403**Contact Hours:** Minimum 90**Credit:** 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1:(9 hrs)**

Market Milk-definition, composition. Physio-chemical properties of milk and other dairy products. Milk reception and storage.

Unit 2:(9 hrs)

Processing of milk- pasteurization, sterilization, homogenization, standardization. Fortification of milk and milk products.

Unit 3: (9 hrs)

Production and preservation of cream butter, ghee, butter oil, condensed and powdered milk, ice cream. Technology of yoghurt, paneer, cheese spread.

Unit 4:(9 hrs)

Packaging and distribution of milk and milk product. Utilization of milk industry by-products. Milk and milk product standards.

Unit 5:(9 hrs)

Process flow chart for product manufacture, Batch and Continuous drying systems. Freezing and low temperature preservation of food.

Practical: (45 hrs)

Treatment of raw milk- chilling, clarification and infiltration, cream separation and standardization of milk. Operation of LTLT, HTST pasteurizer and sterilizer & UHT plant. Evaluation of milk & dairy products. Visit to dairy units.

Books Recommended:

1. Outlines of Dairy Technology by SukumarDe, Oxford University Press.
2. Principles of Dairy Processing by James N. Warner, Wiley Eastern Ltd.
3. Milk and Milk Products by Eckles, Combs; and Macy, Tata McGraw Hill.
4. Technology of Indian Milk Products by Aneja et al. A Dairy India Publication.
5. PFA Act 1954 & Rules 1955 as amended to date.

Paper Title: Fruits, Vegetables Processing and Food Additives**Paper/Module Code:** BVFP- 404**Contact Hours:** Minimum 90**Credit:** 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1:(9 hrs)**

Unit operations-receiving, washing, grading, peeling, size reduction, blanching, sulphiting/sulphuring, syruping/brining, exhausting, processing and packaging.

Unit 2:(9 hrs)

Preservation technologies and packaging requirements of beverages, sauces, pickles, soup and others; Spoilage of processed fruits, vegetables and their control; Nutritional evaluation of processed foods.

Unit 3: (9 hrs)

Fruit and vegetable plant layout, design, personal hygiene, plant sanitation and waste disposal; Quality control in fruits and vegetables processing industry.

Unit 4:(9 hrs)

General principles for the use of food additives. GRAS and international regulatory status (FAO, WHO, WTO) of food additives, functions, types, modes of action, consequences of use, risks and benefits of food additives.

Unit 5:(9 hrs)

Nutritional additives, preservatives, antimicrobial agents, antioxidants, emulsifiers, enzymes and acidulates. Flavouring agent and flavour enhancers, sweeteners, natural and synthetic, colouring agents. Methods used for safety evaluation, food additives and hypersensitivity.

Practical: (45 hrs)

Equipment for fruits and vegetable processing, Plant-layout, can seaming operation, Preparation of fruit juices, squashes, syrups and ready to served beverages; Preparation of jams, jellies, marmalade, preserved, and candies; Preparation of pickles, chutneys, and tomato products; Drying of fruits and vegetables, quality control of processed products; Processing of mushroom. Visit to fruit and vegetable processing factories, freezing of foods.

Books Recommended

1. Food science by B.Srilakshami;New Age International.
2. Fundamentals of Foods and Nutrition by R. Madambi& M.V. Rajgopal.
3. Foods :Facts and Principles by N Shakuntalamanay;New Age International (P) Ltd.
4. Preservation of Fruits and Vegetable by Girdharilal and Sidappa; CBS Publications
5. Food Science and Processing Technology, Vol., 2 by Mridula and Sreelata
6. Food Preservation by Sandeep Sareen
7. Fruit and Vegetable Preservation by Shrivastava and Kunal.
8. Post-Harvest Physiology & Handling of Fruits & Vegetables by Wills, Lee, Graham, McGlasson& Hall (AVI)
9. Branen AL, Davidson PM &Salminen S. 2001. *Food Additives*. 2nd Ed. Marcel Dekker.
10. Gerorge AB. 1996. Encyclopedia of Food and Color Additives. Vol. III. CRC Press.
11. *Toxicological and Health Perspective*. Marcel Dekker.

Paper Title: Unit Operation in Food Engineering**Paper/Module Code:** BVFP-405**Contact Hours:** Minimum 90**Credit:** 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1: (9 hrs)**

Principles of fluid flow, heat transfer, heat exchanger, EMC & water activity, Evaporation, Distillation, Drying, Dehydration, Types of dryers.

Unit 2:(9 hrs)

Materials handling; Size reduction, Energy requirement in Size Reduction; Sieve analysis, Mixing, Kneading, Blending, Homogenization, Size Separation.

Unit 3:(9 hrs)

Sedimentation, Extraction, Leaching, Crystallization, Thermal Processing.

Unit 4:(9 hrs)

Refrigeration principles- Cooling, freezing, thawing of food materials. Irradiation, absorption and adsorption.

Unit 5:(9 hrs)

Mechanical cleaning, grading, Sorting, Filtration, Membranic Separation, Emulsification.

Practical: (45 hrs)

Separation efficiency of centrifugal separator, energy requirements in size reduction using burr mill, hammer mill, muller mill, economy and thermal efficiency of rotary flash evaporator for concentration of juice, collection efficiency of cyclone separator, liquid-solid separation by filtration, particle size determination by sieve analysis. Visit to solvent extraction, sugar, tapioca, starch and food industries, drying rate calculation, calculation of refrigeration load.

Books Recommended :

1. Lopez – Gomez, A. and Barbosa – Canovas, G.V. “Food Plant Design”, Taylor & Francis, 2005.
2. Smith, P.G. “Introduction to Food Process Engineering”, Springer, 2005.
3. Rao, M.A. S.S.H. Rizvi and A.K. Datta, “Engineering Properties of Food”, 3rd Edition, Taylor & Francis, 2005.

FIFTH SEMESTER

Paper Title: Environmental Science-I

Paper/Module Code: BVGE 501

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1: (15 Hours)

Environmental Studies- Meaning, Scope, Importance, Ecology and ecosystem, Biodiversity and its conservation, and Natural resources.

Unit 2: (15 Hours)

Meaning of ecology- Structure and function of an ecosystem-producers- consumers-decomposers- Energy flow in the ecosystem, Ecological succession- Food chain, Food webs and ecological pyramid.

Unit 3: (15 Hours)

Ecosystem- Concept, Types of ecosystems, Structure and functions of Forest ecosystem, Grass land ecosystems, Desert ecosystem, Aquatic ecosystem.

Unit 4: (15 Hours)

Natural resources: Features, Air resources, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources- Consequences, Conservation of natural resources, Role of an individual in conservation of natural resources.

Unit 5: (15 Hours)

Biodiversity and its conservation: Introduction, definition, genetic, species and ecosystem diversity. Value of biodiversity- Biodiversity at global, national and local levels.

Unit 6: (15 Hours)

India as a mega- Diversity nation: hot-spots of diversity, Threat to biodiversity: habitat loss, poaching of wild life, man-wild life conflicts. Conservation of diversity in in-situ, ex-situ.

Paper Title: Business Research Methods (RESEARCH METHODS FOR COURSES CONCERNED)

Paper/Module Code: BVGE 502

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1: (15 Hours)

Business research: Meaning & Definition, Features of Business research, theory- Building, induction & Deduction theory, Concept, Operational definition, Variable, Proposition, Hypothesis, Types of Business research- Basic & Applied, Exploratory, Descriptive & causal, Phases of Business research.

Unit 2: (15 Hours)

Exploratory research: Objectives, Methods, Experience survey, Secondary data analysis, Case study, Pilot study by focus group interview & Depth interview & Projective techniques.

Unit 3: (15 Hours)

Process of problem definition, Ascertaining decision makers objectives, Understanding background of the problem, isolate & identify problem from symptoms, Determination of UNIT analysis, determine the relevant variables & State the research questions, Hypothesis & Research objectives.

Unit 3: (15 Hours)

Meaning of research design- Methods of Descriptive & causal research, survey, Experiments, secondary data studies & Observation, sampling design, Simple random sampling, restricted random sampling-Stratified, Cluster & Systematic, Non-random sampling- Convenient & Judgmental sampling, Sampling error & Non-sampling error.

Unit 4: (15 Hours)

Measurement & Scaling- Criteria for good measurement, reliability & Validity, Designing Questionnaire, Means of data collection.

Unit 5: (15 Hours)

Data processing- processing stages, Editing, Coding & Data entry, descriptive analysis under different types of measurements, Percentage frequency table, contingency table, Graphs, Measures of central tendency & Index number, interpretation

Unit 6: (15 Hours)

Preparation of report: Format, Report writing stages, Gathering material & data, Make overall format, Make detailed outline, Write first draft, Rewrite, Final word, Processing & Publishing.

Reference Books:

1. Kothari, C.R.: Research Methodology- Methods & Techniques, New Delhi, New Age International publishers
2. John Adams, Hafiz T.A. Khan, Robert Raeside, David White: Research Methods for Graduate Business & Social Science Students. Response Books, New Delhi
3. Naresh K. Malhotra: Marketing Research. Latest Edition, Pearson education
4. Deepak Kumar Bhattacharya, Research Methodology, Excel Books, New Delhi- 110028.

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Baking & Confectionery Technology**Paper/Module Code:** BVFP- 503**Contact Hours:** Minimum 90**Credit:** 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1:(9 hrs)**

Introduction: Status of bakery and confectionery industries in India- Raw materials for bakery and confectionery products-Essential and optional. PFA Specification of raw materials.

Unit 2:(9 hrs)

Technology of baking; raw materials and quality parameters; dough development; methods of dough mixing; equipments; rheological testing of dough rheology- Farinograph, Mixograph, Extensograph, Falling number, Hosney's dough stickiness tester baking of bread.

Unit 3:(9 hrs)

Technology for the manufacture of bakery products- bread, biscuits, cakes, flaky pastry, pie and the effect of variations in formulation and process parameters on the quality of the finished product; Staling and losses in baking.

Unit 4:(9 hrs)

Bakery machinery and equipment: Weighing Equipment- Manual scale, Automatic weigh, liquid measuring. Mixing- blenders, Horizontal and vertical planetary, continuous. Make up equipment-Divider, Rounder, Proofer, moulder. Baking equipment – different oven, slicer.

Unit 5:(9 hrs)

Confectionery products; chocolate, fondant, caramels, fudge, toffee and packaging; colour, flavour and texture of confectionery products; standards and regulations; machineries used in confectionery industry, visit to confectionery unit.

Practical:(45 hrs)

Rheology properties of dough; Effect of mixing method on the quality of baked product; Effect of syrup consistency and temperature on the quality characteristics of hard-boiled sweets; Preparation and quality evaluation of chocolate;visit to bakery and confectionery unit.

Books Recommended

1. Bakery Technology and Engineering by Samuel a. Matz, CBS Publications.
2. Cereals as Food and Feed by Samuel A.Matz, CBS Publications
3. Industrial Chocolate Manufacture by Beckette.
4. Dough rheology and baked product texture by FaridiFaubion, CBS Publications.
5. Chocolate, Cocoa and Confectionary by Minifie B.W.
6. Cookies & Cracker Technology by S.A. Matz.
7. Baking Science and Technology by Pyler
8. Basic Banking by S.C. Dubey.

Paper Title: Fermented Food Products**Paper/Module Code:** BVFP- 504**Contact Hours:** Minimum 90**Credit:** 6

(Practical-50 marks, Theory-50 marks)

Maximum Marks: 100**End Semester Exam:** 80**Internal Assessment:** 20**Unit 1:(9 hrs)**

Fermentation– definition and types of fermentation- submerged fermentation, surface fermentation and solid substrate fermentation; Inoculum development: techniques for the development of inocula for industrial fermentation/procedures of aseptic inoculation of industrial fermenters.

Unit 2:(9 hrs)

Lactic acid fermentation of milk, vegetables, cereals and meat. Alcoholic fermentation of fruit juices, sugar and starch substrates.

Unit 3:(9 hrs)

Vinegar fermentation, mixed fermentation of cereal legumes and milk, Malting, brewing, steeping, germination, kilning and curing.

Unit 4:(9 hrs)

Chemical and biochemical changes during malting and mashing. Separation of wort, wort boiling and hops addition.

Unit 5:(9 hrs)

Fermentation, separation, maturation, carbonation and packaging.

Practical:(45 hrs)

Lactic acid fermentation; Alcoholic fermentation of fruit juices; Acetic acid fermentation and alkaline fermentation; Barley steeping; Germination, malting mashing and brewing; Preparation of wine and distillation of wine.

Books Recommended:

1. Industrial Microbiology - Prescott & Dunn
2. Industrial Microbiology - L.E. Casida
3. Principle of Fermentation Technology - Whittaker and Stanbury
4. Handbook of Indigenous Fermented Foods - K.H. Steinkrus
5. Food Microbiology - Adams and Moss
6. Mushroom Cultivation - J. N. Kapoor, ICAR

Paper Title: Project (Project Execution and Report)**Paper/Module Code:** BVFP- 505**Contact Hours:** Minimum 90**Credit:** 6**Maximum Marks:** 100**End Semester Exam:** 80**Internal Assessment:** 20

Students shall be visiting a various industries and undertake a project in the area of his/her interest during the semester and shall be writing a report/case study on various aspects. Evaluation and Viva Voce shall be done by a team of people from industry preferably including an external expert and shall have presentation in groups/individual for evaluation in front of a team of evaluators.

SIXTH SEMESTER

Paper Title: Environmental Science-II

Paper/Module Code: BVGE 601

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Unit 1: (15 Hours)

Industry and environment: Pollution, Environmental pollution- Definition, Soil pollution, Air pollution, Water pollution, Thermal pollution, Noise pollution, Nuclear hazards.

Unit 2: (15 Hours)

Solid waste management: causes, effect and control measures of urban and industrial wastes. Waste management, Waste minimisation through cleaner technologies, Reuse and recycling

Unit 3: (15 Hours)

Social Issues and the Environment: From unsustainable to sustainable to sustainable development, Urban problems related to energy, water conservation, Rain water harvesting, Watershed management, Resettlement and rehabilitation of people; its problem and concerns.

Unit 4: (15 Hours)

Case studies, Environmental ethics, Climatic change, wasteland reclamation, consumerism and waste products.

Unit 5: (15 Hours)

Human population and environment- Population growth, Variation among nations, Population explosion, Environment and human health, Human rights, Value education- women and child welfare.

Practical: (15 Hours)

Identification and study of different Natural resources. Determination of chlorides in water sample. Determination of pH in water sample. Determination of Acidity in water sample. Determination of alkalinity in water sample. Determination of turbidity in water sample.

Reference Books:

1. Misra S.P. and Pandey S.N., “*Essential Environmental Studies*” Ane books India, New Delhi
2. Kiran B. Chokkas and others, “*Understanding Environment*” Sage publications, New Delhi
3. Arumugam N. And Kumaresan v., “*Environmental Studies*” , Saras publications Kanyakumari
4. Benny Joseph, “*Environmental Studies*” Tata McGraw Hill Publishing Co. Ltd., New Delhi

Note for Paper Setting

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Paper Title: Business Laws & ethics for Tourism (OPTIONAL MODULE)

Paper/Module Code: BVGE 602A

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Unit 1: (15 Hours)

Indian Contract Act 1872: Definition of Contract Offer & acceptance, Essentials of a valid contract, Void agreements, Performance of contract, Breach of contracts.

Unit 2: (15 Hours)

The Companies Act 1956: Meaning & Nature of company, Classification of companies, Memorandum & Articles of Association, Prospectus.

Unit 3: (15 Hours)

The Prevention of Food Adulteration Act 1954: Definition, Central committee for Food Standards, Central Food Laboratory, analysis of food, Offences & Penalties under the Act.

Unit 4: (15 Hours)

Consumer Protection Act 1986: Definitions, Consumer Disputes Redressal, Agencies at District, State, national levels then Jurisdiction composition, Power & Functions, penalties & Appeals. Travel Insurance & Consumer Protection act, international Consumer Protection acts in Tourism, Evacuation & International Insurance business foreigners Act, Passport Act & Visa extension. Ancient Monument Act, RTI.

Unit 5: (15 Hours)

Defining Ethics & its significance in Tourism. Principles & Practices in Business ethics. Business compulsions, Motivation & Ethical parameters. Laws relating to accommodation, Travels agencies and tour operation sector, Law regulations related to Airlines & Airways, Laws related to Surface transport. DGCA formalities for business & recreational flying in India.

Unit 6: (15 Hours)

Special permits to restricted areas for Foreign tourist in India, Restricted areas in India for Foreign tourists & related authorities at these places to obtain Permits, Permits related to various Monasteries & Wild life areas & their Procedure. Safety & Security of tourist.

Reference Books:

1. Tourism guidelines published by Govt. of India, Ministry of Tourism
2. Tourism Guidelines issued by Department of Tourism for Hotel & Restaurant Operation
3. Sajani Manohar: Indian Tourism Business-A Legal Perspective. New Delhi 1999
4. R.K. Malhotra: Socio-Environmental & legal Issues in Tourism. New Delhi 2005
5. Gupta, S.K.: Foreign Exchange Laws & Practice. Taxman publications, delhi, 1989
6. Gulshan S.S.: Merchantile Law. Sultan Chand & Sons, New Delhi
7. Kapur, N.D.: Maerchantile law
8. Dr. Jagmohan Negi: Hotel & Tourism Law. Frank Bros & Co.
9. Kapoor, G.K.: Elements of Companies laws. Taxman Allied Services, New Delhi, 2003

Note for Paper Setting

The question paper will contain two parts: Part-I is compulsory. There will be 10 questions carrying 2 marks each for Multiple Choices, Very Short Answer/Fill in the Blank type questions. Part-II will have 2 questions from each unit and the candidates will be required to answer one question from each unit, i.e. there will be internal choice within each unit. A case study may also be included in the question paper from any of the units wherever feasible.

Paper Title: Food Laws & Legislation (OPTIONAL MODULE)

Paper/Module Code: BVGE 602B

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Concept and significance of Food Legislation, Indian Food laws and Legislation, Prevention of Food Adulteration (PFA), Bureau of Indian Standards(BIS), Agmark, Agricultural and Processed Food Products Export Development Authority(APEDA), International Standardization and Organization(ISO), Codex Alimentarius Commission(CAC), Food Laws and Legislation in EU, Middle east, SAARC and ASEAN.

Paper Title: Technology of Meat & Poultry Products

Paper/Module Code: BVFP- 603

Maximum Marks: 100

Contact Hours: Minimum 90

End Semester Exam: 80

Credit: 6

Internal Assessment: 20

Unit 1:(9 hrs)

Meat and poultry industries in India- kinds of meat animals and poultry birds- pre-slaughter care. Methods of stunning- slaughtering- dressing of meat and poultry- post slaughter care and post mortem inspection.

Unit 2:(9 hrs)

Classification and quality of meat- Aging, curing smoking, canning and irradiation preservation meat and meat products, curing agents and additives.

Unit 3:(9 hrs)

Meat products- formed and sectioned meat- sausage products; hygiene and sanitary conditions in a meat processing plant.

Unit 4:(9 hrs)

Formation, structure, chemical composition and nutritive value of eggs- Collection, handling, grading and quality parameters of eggs – methods of preservation of egg and their products- spoilage of egg and their products- hygiene and sanitation, regulations.

Unit 5:(9 hrs)

Recent development in meat and poultry processing, quality processing, quality and safety control measures, planning, Layout design consideration in meat and poultry products.

Practical:(45 hrs)

Meat preservation, canning, cooking, freezing, sausage making, met products preparation, Visit to meat processing industries.

Books Recommended:

1. Meat Science by R.A. Lawrie,Pergamon Press.
2. Poultry Products Technology by G.J. Mountney.
3. Meat, Poultry & Sea Food Technology by R.L.Henricksons.
4. Poultry Meat and Egg Production by Parkhurst&Mountney.

Paper Title: Quality Control in Food Industry & Instrumentations**Paper/Module Code:** BVFP- 604**Maximum Marks:** 100**Contact Hours:** Minimum 90**End Semester Exam:** 80**Credit:** 6**Internal Assessment:** 20**Unit 1:(9 hrs)**

Hygiene regulation, personal hygiene and hygienic food handlings, employee health, cleaning compounds; choosing of cleaning compounds, handling and storing of cleaning compounds; waste disposal; solid and liquid; waste control; control of airborne contamination, Microbiological control methods.

Unit 2:(9 hrs)

HACCP: principles of HACCP, overview of biological, chemical and physical hazard in foods, designing safety into food and processes; grades and standard of identity, Codex Alimentarius, ISO:9000 series and ISO:14000 series.

Unit 3:(9 Hours)

Quality testing– objective analysis, sensory assessment, rapid microbiological techniques; acceptance sampling; operational characteristics, risks, attributes sampling plan, variables sampling plan, administration of acceptance sampling; adulteration of food; identification of adulterants both qualitative and quantitative; additives in foods; types, names, uses, maximum permissible limits.

Unit 4:(9 Hours)

Instrumental measurements of sensory attribute of foods; appearance, colour, volume, density and specific gravity, Rheological and textural characteristics, Textural profile analysis.

Unit 5:(9 hrs)

Microscope, Spectrophotometer, Calorimeter, pH meter, Fermenter, Laminar Air Flow, Chromatography, Centrifuge, Deep Freezer (-20).

Practical: (45 hrs)

Methods of evaluation of sensory quality evaluation of colour and rheological attributes, Detection and estimation of food additives and adulterants, Relation between subjective and objective methods, Handling of Spectrophotometer, Calorimeter, Ph meter, Fermenter, Laminar air Flow, Chromatography, Centrifuge, Deep Freezer.

Books Recommended:

1. Early, R. (1995): Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
2. Gould, W.A and Gould, R.W. (1998).. Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
3. Pomeraz, Y. and MeLoari, C.E. (1996): Food Analysis: Theory and Practice, CBS publishers and Distributor, New Delhi.
4. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organisation, Geneva.
5. Kirk, R.S and Sawyer, R. (1991): Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England.
6. Food and Agricultural Organisation (1980): Manuals of Food Quality Control. 2-Additives Contaminants Techniques, Rome.

Paper Title: Internship/ Project Execution and report

Paper/Module Code: BVFP- 605

Contact Hours: Minimum 90

Credit: 6

Maximum Marks: 100

End Semester Exam: 80

Internal Assessment: 20

Students are required to undertake an internship in the area of his/her interest. There will be an internal faculty member to supervise the project work. Evaluation and Viva Voce shall be done by a team of people preferably including an external expert.