UNIVERSITY OF JAMMU

NOTIFICATION
(12/July/ADP/10)

It is hereby notified for the information of all concerned that the Vice-Chancellor in anticipation of the approval of the Competent Authority, is pleased to authorize adoption of the Syllabi and Courses of Study in the subject of Food Science & Technology/Quality Control for M.Sc. II & III Semesters of Master's Degree Programme for the examinations to be held in the years as indicated below against each:

Class	Semester	For the Examinations to be held in the year	%age of change
M.Sc	II	May 2013, 2014 & 2015	450 – Less than 25% 451 – Less than 25% 452 – Less than 25% 453 – No change 454 – 100% change 455 – Less than 25%
M.Sc	III	Dec 2013, 2014 & 2015	500 – No change 501 – No change 502 – 40% 503 – No change 504 – No change

Sd/-
REGISTRAR

No. F.Acd./XXI/43/12/ 8198-8222
Dated: 06-08-2012

Copy for information and necessary action to:

1. P.S. to Vice-Chancellor
2. P.S. to Dean Academic Affairs
3. P.A. to Registrar
4. Sr. P.A. to Controller of Examinations
5. Dean, Faculty of Science
6. Convener, Board of Studies in Food Science & Technology/Quality Control
7. All the members of the Board of Studies in Food Science & Technology/Quality Control /College concerned
8. C.A. to Controller of Examinations
9. I/c Deputy Registrar (Publication)
10. Asst. Registrar (Conf./ Exams. P/G /Inf.)
11. S.O (Confidential)
12. Content Manager, University Website

Vivek Sathia
I/c Deputy Registrar (Academic)

2458

3/8/12

UNIVERSITY OF JAMMU

SEMESTER COURSES FOR

MASTER DEGREE PROGRAMME IN

FOOD SCIENCE & TECHNOLOGY

The following courses of study are prescribed for 2nd Semester of the Master's Degree Programme in Food Science & Technology.

II - SEMESTER

COURSE NO	TITLE	CREDITS
450	Packaging Technology	4
451	Food Toxicology & Food Safety	3
452	Instrumentation & Enzymes	3
453	Research Methods And Scientific Writing	4
454	Technology of Fermentation, Malting & Brewing	2
455	Practicals	8

Each student will have to offer courses carrying total credits of atleast 24 (16 Theory +8 Practicals). All the course numbers are compulsory.

SESSIONAL ASSESSMENT

20% of the marks in each theory paper & 50% in the practical paper will be reserved for sessional assessment. In case of regular students, sessional assessment received from the college will be added to the marks obtained by them in the University examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionately in accordance with the Statutes/Regulations.

DISTRIBUTION OF MARKS

Distribution of marks in each course would be as under:

COURSE	SEMESTER EXAMINATION	SESSIONAL ASSESSMENT
4 Credits	80 Marks	20 Marks (Theory Course)
Practical Course	100 Marks	100 Marks

COURSE NO:- 450 **TITLE:-** PACKAGING TECHNOLOGY

CREDITS:- 4 **DURATION OF EXAMINATION:-**3 Hrs.

Max. Marks : 100

a) Semester Exam: 80

b) Sessional Assessment: 20

Syllabus for examination to be held in May 2013, May 2014, May 2015.

Objectives:

- Gain knowledge about various packaging material and importance of packaging.
- Be familiar with testing and evaluation of packaging media.
- Be familiar with packaging laws and regulations.
- Be able to select appropriate packaging material for variety of foodstuffs vis-à-vis the need for preventing environment degradation.

Contents:

UNIT I

Introduction to packaging functions of a package and package design.
Physico-chemical aspects of package design, packaging materials-basics and laminates.

Paper-Principles of manufacture, Types and Properties
Paperboards, Corrugated fibreboard, Cellulose films-Types and Properties Different types of plastic films used in food industry and their properties.

(10 Hrs)

UNIT II

Principles of developing a protective package for hygroscopic, odour and light sensitive products.

Special packaging methods-Vacuum and gas packaging, Shrink packaging, CAP, MAP,

Aseptic and Retort Packing, Bag-in-box.
Power Fillers, Liquid Fillers, FFS Machines.

(10 Hrs)

UNIT III

Determination/Assessment of shelf-life of packaged products-Storage Tests, Sensory Tests.

Principles of packaging fresh Fruits and Vegetables-handling and transporation, Controlled atmosphere (CA) Technology, Modified Atmosphere Packaging Technology To develop MAP for fish, meat, poultry and different other types of products. Microwave Ovenable Packages.

(10 Hrs)

UNIT IV

Specific Packaging requirements for different foods: Spice and Spice Products, Biscuits, Sugar and Confectionery, Edible Oils, Vanaspati & Ghee, Snack Foods, Drinking Water Development of Insect resistant package.

(10 Hrs)

UNIT V

Packaging Standards and Regulations. (FDA, PFA, MFPO, FPO Packaging Commodity Rules, Weights & Measure Act)-As per Food Safety and Standards Authority of India.

National Standards of Packaging Code for different foodstuffs.

Intelligent Packaging- Product Tempering, Counterfeiting, Holograms etc.

(10 Hrs)

NOTE FOR PAPER SETTING:

The question paper will contain to question for each unit (Total 10 question) and the candidates will be required to answer one question from each unit (Total question to be attempted will be five i.e. there will be internal choice within each unit)

REFERENCES:

1. Sacharow & Grifin, Food Packaging- AVI Publication
2. Stanley & Sacharow Food Packaging
3. Robertson G. L. Food Packaging
4. Athalye Plastics in packaging

COURSE NO:- 451 **TITLE:-** FOOD TOXICOLOGY & FOOD SAFETY

CREDITS:- 3 **DURATION OF EXAMINATION:-**3 Hrs

Max. Marks:- 75

a) Semester Exam: 60
b) Sessional Assessment: 15

Syllabus for examination to be held in May 2013, May 2014, May 2015.

UNIT I

Introduction to Food Safety and Toxicology: Hazards – Microbiological, Nutritional, Environmental, Natural Toxicants, Pesticide residues and Food Additives.
Environmental pollution sources: Air, Water, Sludge and Soil, Hazards involved, Water treatment and waste management.
Food safety Act – as per F.S.A.I.

(8 Hrs.)

UNIT II

Assessment of Food Safety –

- Risk assessment and risk benefit
- Indices of human exposure
- General design of toxicity assays
- Acute toxicity
- Reproductive and developmental toxicity
- Neurotoxicity and behavioural effects
- Immunotoxicity
- Biotechnology and food safety (8 Hrs.)

UNIT III

Evaluation Guidelines and Computer Modelling of Risk Assessment, Risk Management and Risk Communication, Risk assessment of Chemical and Biological Hazards.

Microbial Problems in Food Safety including Mycotoxins and viruses, Heavy metals, Radio nuclides in foods.

(8 Hrs.)

UNIT IV

Intentional Direct Additives: Preservatives, Nitrate, Nitrite and N-nitroso Compounds. Indirect Additives, Residues and Contaminants: Multi-contaminant studies. Anti-microbial and veterinary drugs, pesticides, polyhalogenated aromatic hydrocarbons, polycyclic aromatic hydrocarbons. Other organic residues.

(8 Hrs.)

UNIT V

Naturally occurring toxicants and food contaminants, Sea food toxins. Toxicity of mushrooms alkaloids, phenolic compounds, glucosinolates, protease inhibitors, phytate, other antinutritional compounds.

(8 Hrs.)

NOTE FOR PAPER SETTING:

The question paper will contain two question from each unit (Total 10 questions) and the candidates will be required to answer one question each unit (Total question to be attempted will be five i.e. there will be internal choice within each unit)

REFERENCES:

BIS : Specifications & Standards
Early Guide to Quality Management System for Food Industry.
Walker And Quattrucci Nutritional and Toxicological aspects of food processing.
Graham, H.D. The Safety of Foods.

COURSE NO:- 452 **TITLE:-** INSTRUMENTATION & ENZYMES
CREDITS:- 3 **DURATION OF EXAMINATION:-** 3 Hrs.

Max. Marks:- 75

a) Semester Exam. : 60

b) Sessional Assessment : 15

Syllabus for examination to be held in May 2013, May 2014, May 2015.

UNIT I

Spectrometric Methods

- UV and visible molecular absorption spectrometry.
- Atomic absorption Spectrometry, Hollow cathode, choppers, Inductively coupled plasma, Atomic Emission Spectrometry.
- Fluorescence spectrometry.
- Atomic Mass Spectrometry.
- Infrared Spectrometry.

(8 Hrs.)

UNIT II

Chromatorgraphic Separations: Paper Chromatography, Gas Layer Chromatography, Thin Layer Chromatography, Super Critical fluid extraction.
Electrophoresis: Paper electrophoresis, Zone electrophoresis, Disc electrophoresis, Gel electrophoresis.

(8 Hrs.)

UNIT III

Radiochemical Methods: Geiger Muller counter, proportional counter, Scintillation counter, semi conductor detectors, Use of radio isotopes.
Measurement of Specific Gravity, Refractrometry, Refractive index, Gel strength.

(8 Hrs.)

UNIT IV

Instrumental Measurement of Texture of Dough, Baked Products, Fruits & Vegetables, Diary Products, Meat.
Densitometry, Polarimetry, Measurement of colour: CIE System, Relative Humidity of ambient air.

(8 Hrs.)

UNIT V

Enzymes: General Properties, Classification, Co-enzymes and activators. Co-factors kinetics and mechanisms of enzyme inhibitors, immobilization of enzymes. Enzymatic modification of proteins. Enzymes in analytical methods.

(8 Hrs.)

NOTE FOR PAPER SETTING:

The question paper will contain two question from each unit Total 10 questions and the candidates will be required to answer one question from each Unit (Total question to be attempted will be five i.e. there will be internal choice within each unit)

REFERENCES:

1. Fung D. Y. C. and Mathews, R Instrumental Methods for Quality Assurance in Foods.
2. Skoog D. A. Holler F. H. and Mieman Principles of Instrumental Analysis.
3. Moskowitz H. R. Food Texture Instrumental and Sensory Analysis.
4. Enzymes in Food Processing by Tilak Nagodainthana and Gerald Reed.
5. Enzymes in Food Processing by G. A. Tucker and LFJ Woods.

COURSE NO: 453 **TITLE:** RESEARCH METHODS & SCIENTIFIC WRITING

CREDITS : 4

DURATION OF EXAMINATION : 3 Hrs.

Max. Marks : 100

a) Semester Exam : 80

b) Sessional Assessment : 20

Syllabus for examination to be held in May 2013, May 2014, May 2015.

UNIT I

Objectives of research: Definitions of research, explanations, characteristics and application of research

Types of Research : Historical, descriptive, experimental, case study, social research participatory research.

(10 Hrs.)

UNIT II

Definition and Identification of a Research Problem.

- Selection of research problem
- Justification, Limitations in searching problems
- Hypothesis, errors in testing hypothesis, meaning, importance, sources basic assumptions, limitations of the problem.

(10 Hrs.)

UNIT - III

Scientific Writing as a means of communication: Different forms of scientific writing, Article in journals, Research notes and reports, review articles, Monographs, Dissertations, Bibliographies.

How to formulate outlines: The reasons for preparing outlines; as a guide for plan of writing, as skeleton for the manuscript. Kinds of outlines; topic outlines, conceptual outline, sentence outlines, combination of topic and sentences outlines.

(10 Hrs)

UNIT – IV

Drafting Titles, Sub Titles, Table, Illustrations: Tables as systematic means of presenting data in rows and columns and lucid way of indicating relationships and results.

Formatting Tables: Title, Body Stab, Stab Column, Column Head, Spanner Head, Box Head, Appendices: Uses and guidances.

The Writing Process: Getting started, use outline as a starting device, drafting, Reflecting, Re-reading; checking organization, checking headings, checking content, checking clarity, checking grammar.

(10 Hrs)

UNIT – V

Brevity and precision in writing, Drafting and Re-drafting based on critical evaluation.

Parts of Dissertation/Research Report/ Article: Introduction, Review of Literature, Method, Results and Discussion

(10 Hrs)

Note for Paper Setting:

The question paper will contain two questions from each unit (Total 10 questions) and the candidates will be required to answer one question from each Unit (Total questions to be attempted will be five i.e. there will be internal choice within each unit)

References:

1. Integrating Research: A guide for Literature Reviews: Cooper, H M
2. Disseminating Research- Changing Practices: Dunn, F V & Others
3. Writing Strategies: Richardson

COURSE NO:- 454 **TITLE:-** TECHNOLOGY OF FERMENTATION, MALTING AND BREWING.

CREDITS:- 2 **DURATION OF EXAMINATION:-** 3 Hrs.

Max. Marks:- 50

a) Semester Exam: 40

b) Sessional Assessment: 10

Syllabus for examination to be held in May 2013, May 2014, May 2015.

Objectives:

Provide an understanding of about Fermentation Technology.
Familiarise students with changes occurring due to Fermentation, Malting & Brewing.
Enable students to use the theoretical knowledge in various applications and food preparations.

UNIT I

Food Fermentation: Introduction, History of Development. Types of Fermentation- Solid State, Submerged and Surface Fermentation, Batch, Fed- Batch and Continuous Fermentation. Food Fermentation Industry, Organisms responsible for Fermentation (Bacteria, Yeast, Moulds), Principles types of Fermentor – Factors responsible for Fermentor design, Fermentor Centrfigation, Parts of Fermentor, Measurement of process variables and their control.

(5hrs)

UNIT II

Production Media – Introduction, Characterstics, Medium Optimization, Sources of carbon, Nitrogen, Trace elements, Growth factors, Precuesors, Buffers.
Conventional and non- conventional substrates used in Fermentation industry.
Screening Media (Methods, Characterstics & Selection)
Sterlization – Introduction, Principle and procedure, Use of Fermentation Technology for Industry Waste Utilization.

(5 hrs)

UNIT III

Fermented Fruits & Vegetables Products (Sauerkraut, cucumbers and Olives)

Fermented Milk Products – Cheese, Curd, Fermented – Milk (Acidophilus & Bulgaricus Milk), Prebiotics and Probiotics Foods and their benefits.
Non – alcoholic beverages – Types of non-alcoholic beverages (Cocoa, Coffee & Tea), Process and their control, Nutritional & energy values.
(5 hrs)

UNIT IV

Microbial production of Enzymes (Cellulase), Amino Acids (Glutamic acid), Vitamins (Vit. B_{12}), antibiotics (Streptomycin), Organic acids (Citric and Lactic Acids).
Production of Single Cell Protein and its usage.
Production of Bakers Yeast and industrial utilization. (5 hrs)

UNIT V

Alcoholic Beverages – Classification & Characteristics:-
Elements of Brewing Process – Hops (Processing & Products), Malt (Processing, Gushing), Adjuncts, Wort Production (Mashing, Filtration, Boiling & Coiling), Culture Yeast and Fermentation (Biochemistry/Biochemical route of process),Maturation and Miscellaneous Additives.

Beer – History and Development, Classification, Processing, Commercial Potential in Fermentation Industry, Effect of Aging, Spoilage by Bacteria & Yeast.

Fruit Wine (Grape – Red and White) History and Development. Raw Material Selection& Processing.

Quality Factors and Composition of Wines, Consumption and health concerns.
(5 hrs)

NOTE FOR PAPER SETTING:

The question paper will contain two question from each unit (Total 10 questions) and the candidates will be required to answer one question each unit (Total question to be attemped will be five i.e. there will be internal choice within each unit)

References:

1. The Technology of Wine making by M A Amerine, H N Berg and W V Gruers
2. Indigenous Fermented Food by Stoin-Kram
3. Industrial Microbiology by Proscoot and Dunn

12

DETAILED SYLLABUS

COURSE NO: 455 **TITLE:** PRACTICALS

CREDITS : 8

DURATION OF EXAMINATION : 8 Hrs.

Minimum 3 exercises shall be given in the examination.

Max. Marks : 200

a) Semester Exam : 100

b) Sessional Assessment : 100

Minimum 250 hours of practical work shall be carried out during the semester.

Syllabus for examination to be held in Jun 2013, Jun 2014, Jun 2015

Related to course no. 450

1. Identification of different types of packaging material.
2. Physical and chemical properties of packaging films.
3. To measure the GSM
4. Use of Screw Gauge & Vernier Calliper in Packaging Materials
5. Prepackaging of Fruits & Vegetables
6. ERH studies of different foods.
7. WVTR of packaging material.
8. Shelf life studies of packaging food.
9. Grease resistance of packaging material.
10. Shrink packaging of any food product.
11. Visits to paper manufacturing industry.

Related to course no. 451

1. To perform plating Techniques for E. Coli
2. To perform plating Techniques for Yeast & Mold
3. To perform plating Techniques for TBC
4. To perform BOD for the Treated/Untreated Waste
5. To perform COD for the Treated/Untreated Waste

Related to course no. 452

1. Demonstration of HPLC/GLC
2. To measure the sugar strength of unknown solution by Hydrometer
3. To measure the sugar strength of unknown solution by Refractometer.
4. To measure the specific gravity.
5. To find out the Relative Humidity of ambient air.

Related to course no. 453

1. Report Writing

Related to course no. 454

1. Preparation of any fermented Pickle
2. Preparation of any fruit Wine
3. To Carry out Malting- Steeping and Germination.
4. To study various types of liquors

UNIVERSITY OF JAMMU
SEMESTER COURSES
FOR
MASTER DEGREE PROGRAMME
IN
FOOD SCIENCE & TECHNOLOGY

The following courses of study are prescribed for 3rd Semester of the Master's Degree Programme in Food Science & Technology.

III - SEMESTER

COURSE NO	TITLE	CREDITS
500	Sensory Evaluation & Quality Control	4
501	Technology of Processing of Milk & Milk Products,	4
502	Technology of Processing of Cereals, Pulses & Oil seeds	4
503	Technology of Egg, Meat & Meat Products	4
504	Practicals	8

Each student will have to offer courses carrying total credits of at least 24 (16 Theory +8 Practicals). All the course numbers are compulsory.

SESSIONAL ASSESSMENT

20% of the marks in each theory paper & 50% in the practical paper will be reserved for sessional assessment. In case of regular students, sessional assessment received from the college will be added to the marks obtained by them in the University examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionately in accordance with the Statutes/Regulations.

DISTRIBUTION OF MARKS

Distribution of marks in each course would be as under:

COURSE	SEMESTER EXAMINATION	SESSIONAL ASSESSMENT
4 Credits (Theory Course)	80 Marks	20 Marks
2 Credits (Theory Course)	40 Marks	10 Marks
8 Credits (Practical Course)	100 Marks	100 Marks

THIRD SEMESTER
DETAILED SYLLABUS

COURSE NO: 500' **TITLE:** SENSORY EVALUATION & QUALITY CONTROL

CREDITS: 4
DURATION OF EXAMINATION: 3 Hrs.
Max. Marks: 100
a) Semester Exam: 80
b) Sessional Assessment: 20

Syllabus for examination to be held in Dec. 2013,Dec. 2014, Dec. 2015

Objectives:

- Gain knowledge about various aspects of Sensory Evaluation.
- Be familiar with testing and evaluation of Sensory Methods.
- Be familiar with Quality Control and Quality Assurance.
- Be able to implement various quality control and quality assurance methods in a Food Industry.

Contents:

UNIT-I

Introduction to sensory analysis and uses of sensory tests.
Introduction to human senses
General testing condition & Designing a Sensory Evaluation Room
Sample preparation and Presentation - Serving Procedures, Sample Size, Temperature, Utensils, Coding, Order of Serving, Dilution and Carriers

(10 Hrs.)

UNIT-II

Factors Influencing Sensory Evaluation
Selection of panel and types
Methods for Sensory Testing:
Discrimination/difference test: Simple Paired Comparison test, Scheffe Paired Comparisons Test, Triangle test, Duo-trio test; Multiple Comparisons Test, Scoring Test (These Tests should include Experiment Design, Questionnaire and Data Analysis)

(10 Hrs.)

UNIT-III

Preference/Acceptance Test: Paired Comparison Test, Hedonic Scale and Ranking
Descriptive Sensory Analysis : Methods, Panel Selection, Procedure, Advantages.
Threshold tests
Dilution Test

(10 Hrs.)

UNIT-IV

Introduction, objectives, importance and functions of quality Control and Quality Assurance.
Analysis of Colour and appreance, Analysis of Taste, Analysis of Aroma, Analysis of

Texture
Sampling Process, Methodology (As per IS & ISO)
Inspection Levels

(10 Hrs.)

UNIT-V

Food Laws and Regulations: Agricultural product Act,1937 (AGMARK), Fruit Product Order,1955 (FPO), Prevention of Food Adulteration Act,1954 (PFA), Meat Food Product Order,1974, Bureau of Indian Standards (Certification Marks) Act,1952, ISO Certification

NOTE FOR PAPER SETTING :

The question paper will contain two questions from each unit (Total 10 questions) and the candidates will be required to answer one question from each Unit (Total questions to be attempted will be five i.e. there will be internal choice within each unit)

REFERENCES:

1. Sensory Evaluation Practices : Stone
2. Principles of Sensory Evaluation of Foods : M A Amerine, R M Rangborn and E B Roessler
3. Quality Control in Food Industry by Hershoerfer.

COURSE NO: 501

TITLE: TECHNOLOGY OF PROCESSING OF MILK & MILK PRODUCTS

CREDITS: 4
DURATION OF EXAMINATION: 3 Hrs.
Max. Marks: 100
a) Semester Exam: 80
b) Sessional Assessment: 20
Syllabus for examination to be held in Dec. 2013,Dec. 2014, Dec. 2015

Objectives:

- Provide an understanding of composition of various Milk and Milk Products,
- Familiarise students with changes occurring in various Milk and Milk Products, as a result of processing and cooking.
- Enable students to use the theoretical knowledge in various applications and food preparations.

Contents:

UNIT-I

Dairy Industry in India and its scope
Physiology of location, various factors affecting the composition of milk from various Species.
Physico Chemical properties and nutritive value of milk
Microbiology of milk, source of contamination
Methods of milk collection, transportation and storage of liquid milk.
(10 Hrs.)

UNIT-II
Liquid Milk processing-Filtration/Clarification, Standardisation, Pasteurization (Objectives, LTLT, HTST, UHT, equipments, advantages)
Homogenization (Objectives, process, advantages)
Packaging, Distribution and Storage of liquid Milk.
Defects in milk-its causes and prevention.
Special types of milk – Sterilised, flavoured, homogenized, reconstituted, toned, double toned, standardized milk.
(10 Hrs.)

UNIT-III
Chemistry and Technology of cream, butter, margarine and ghee manufacture
Chemistry and Technology of: Evaporated Milk, Condensed Milk Chemistry and Technology of:

- Non-fat milk solid (Skim Milk Powder)
- Full Fat milk powder
- Instantised milk powder

Production, properties, storage and distribution of ice cream and frozen desserts

(10 Hrs.)

UNIT-IV

Chemistry and Technology of Cheese and other fermented products
Fortification of milk products with nutrients, quality standards,
Milk Plant Sanitation and hygiene.

(10 Hrs.)

UNIT-V

Indigenous Milk products and their technology.
Packaging of dairy products, Quality control in dairy industry
By products of dairy industry and their utilisation

(10 Hrs.)

NOTE FOR PAPER SETTING :

The question paper will contain two questions from each unit (Total 10 questions) and the candidates will be required to answer one question from each Unit (Total questions to be attempted will be five i.e. there will be internal choice within each unit)

References:

1. Technology of Dairy products by Early, R
2. Outlines of Dairy Technology by De. S
3. Chemistry and Testing of Dairy Products by Atherten
4. Technology of Dairy Products by Early,R
5. Outlines of Dairy Technology by De.S

COURSE NO: 502

TITLE: TECHNOLOGY OF PROCESSING OF CEREALS, PULSES & OIL SEEDS.

CREDITS: 4
DURATION OF EXAMINATION: 3 Hrs.
Max. Marks: 100
a) Semester Exam: 80
b) Sessional Assessment: 20

Syllabus for examination to be held in Dec 2013, Dec 2014, Dec 2015

Objectives:

- Provide an understanding of composition of Cereals, Pulses & Oil Seeds.
- Familiarise students with changes occurring in various Cereals, Pulses & Oil seeds as a result of processing and cooking.
- Enable students to use the theoretical knowledge in various applications and food preparations.

UNIT I

Wheat Technology:
Wheat production, varieties and their quality. Types of wheat and grading system. Structure and composition. Enzyme in wheat and their implications in wheat technology, milling of wheat, principles and machine operations, air fractionation of flours. Flour and its treatment. Utilization of by products.
Chemistry and Technology of Durum wheat
and Pasta products.

(10 Hrs)

UNIT II

Technology of bakery product such as bread, biscuits, cakes, doughnuts, crackers, buns etc. methods and equipments. Role of different ingredients in bakery products.
Introduction to dough, rheology and dough chemistry.
Testing properties of flour slurry and dough using Instruments like-Farinograph, Falling Number apparatus, Extonsiograph, Amylograph, Mixograph and Alveograph.

(10 Hrs)

UNIT III

Rice Technology:
Rice structure and proximate composition, distribution of various chemicals constituents in rice grains. Changes during cooking and aging. Methods of accelerating aging of rice.

Methods of enrichment with vitamins, minerals. Rice milling, operation milling machines, degree of milling, milling yields of paddy. Milling effects on nutrition and quality of rice. Methods of parboiling, economics and nutritional advantages.

(10 Hrs)

UNIT IV

Maize Technology:

Maize structure and proximate composition, distribution of various chemicals constituents in maize grains. Maize Milling (Dry & Wet)

Production and utilization of corn starch derivatives.

Various nutritional products made from maize.

Different millets and their chemical composition. Processing and utilization of millets.

Barley and Sorghum-Grain characteristics, Malting and milling

(10 Hrs.)

UNIT V

Pulses & Legumes : Structure, Composition, Processing, Fermentation and germination, Toxic Constituents

Oil Seeds: Composition, Oilseed pressing, Solvent Extraction, Purification (Degumming, refining, bleaching, deodorization), hydrogenation, plasticizing and tempering products-butter, margarine, shortening, mayonnaise and salad dressings, Oil extraction and by-products.

(10 Hrs.)

Reference:

1. Wheat Chemistry and Technology by Yashajaha Pomeranz F, H Websten
2. Oats chemistry and technology by F.H. Websten
3. Cam Chemistry and technology by S.A. Watsan and P.E.
4. Rice Chemistry and Technology of by B.O.Juliano
5. Durum Wheat Chemistry and technology by G.Fabriani and C.Lintas.
6. The Amylography Handbook by W.C. Shuey and K.H. Topples.
7. The Farinograph Handbook by B.L.D. Appolonia and W.H. Kunerih.
8. Fundamentals of Dough rheology by H, Faridi and J.M. Faubion.
9. Food Science, Fifth Edition, Potter, N. and Hotchkiss, J.H.
10. Mathews, R.H. Legumes: Chemistry, Technology and Human Nutrition.
11. Maize: Recent Progress in chemistry and Technology by George E Inglett

20

COURSE NO: 503

TITLE: TECHNOLOGY OF PROCESSING OF EGG, MEAT AND FISH

CREDITS: 4
DURATION OF EXAMINATION: 3 Hrs.
Max. Marks: 100
a) Semester Exam: 80
b) Sessional Assessment: 20
Syllabus for examination to be held in Dec 2013, Dec 2014, Dec 2015

Objectives:

- Provide an understanding Egg, Meat & Fish.
- Familiarise students with changes occurring in Egg, Meat & Fish as a result of processing and cooking.
- Enable students to use the theoretical knowledge in various applications and food preparations.

Contents:

UNIT-I

Scope of meat and meat products Industry in India. Chemical and microscopic structure of meat tissue. Chemical composition and nutritive value of meat.
Postmortem biochemical changes – factors affecting post mortem changes
Properties of fresh meat, Packaging of meat-fresh and cured.
Preservation of Meat-chilling, freezing, curing, smoking, canning, dehydration, irradation, freeze drying

(10 Hrs.)

UNIT-II

Meat carcass grading and cuts, Prerigor processing of meat, mechanical deboning of meat, meat tenderisation and its techniques.
Sausages-types and other comminuted meat products and their processing steps.
Microbial Spoilage of meat
Meat Plant sanitation and safety
Utilisation of meat by products

(10 Hrs.)

UNIT-III

Egg processing: structure, composition nutritive value and functional properties of eggs.
Quality of eggs and its preservation, Microbial spoilage of eggs.
Egg products – Egg Powder, frozen eggs, egg foams.
Packaging and transportation of eggs

(10 Hrs)

UNIT-IV

Poultry-types, factors affecting quality, chemical composition and nutritive value of poultry meat

Poultry dressing-pre and post mortem examination, methods of stunning, slaughter, scalding and dressing.

Grading and packaging of poultry meat

Preservation of poultry meat- chilling, freezing, curing, smoking, dehydration, canning, irradiation

Utilization of poultry industry by-products.

(10 Hrs.)

UNIT-V

Fish processing, introduction, fisheries resources of the world. Cold storage and freezing preservation. Canning of fish and fish products. Drying and dehydration. Smoking, curing and pickling. Fish pastes and sauces. Fish oils, fish protein concentrates, fish meal, by products of fish processing industry.

(10 Hrs.)

NOTE FOR PAPER SETTING :

The question paper will contain two questions from each unit (Total 10 questions) and the candidates will be required to answer one question from each Unit (Total questions to be attempted will be five i.e. there will be internal choice within each unit)

References:

6. Technology of Dairy products by Early, R
7. Outlines of Dairy Technology by De. S
8. Egg Science & Technology by Staddeman.
9. Principles of Meat Science by Ferral et al.
10. Poultry Products Technology by G.J. Mountney.

DETAILED SYLLABUS

COURSE NO: 504 **TITLE:** PRACTICALS
CREDITS: 8
DURATION OF EXAMINATION: 8 Hrs.
Minimum 3 exercises shall be given in the examination.
Max. Marks: 200
a) Semester Exam: 100
b) Sessional Assessment: 100
Minimum 250 hours of practical work shall be carried out during the semester.
Syllabus for examination to be held in Dec 2013, Dec 2014, Dec 2015

Practicals:

PRACTICALS RELATED TO C.No. 500

1. Preparation of Samples for Sensory Evaluation
2. To carry out the Threshold tests for the Basic Tastes
3. To carryout Sensory Evaluation of any Food Products by two different methods.

PRACTICALS RELATED TO C.No. 501

1. Quantitative determination of milk constituents.
2. Determination of ph, electrical conductivity, Viscosity of milk.
3. Detection and estimation of adulterants and preservatives.
4. Visit to Milk Processing Plant..
5. Preparation of spray-dried milk Powder.

PRACTICALS RELATED TO C.No. 502

1. Determination of quality characteristics of flours.
2. Evaluation of cooking quality of rice and pulses.
3. Experimental baking of different baked products and their evaluation.
4. Determination of trypsin inhibitors.
5. Preparation of premixes.
6. Visit to wheat, rice, corn, and oil seed processing industries.

PRACTICALS RELATED TO C.No. 503

1. Meat cutting and handling.
2. Evaluation of meat quality
3. Pickling of fish and meat
4. Experiments on egg-structure composition, quality determination, preservation and egg products
5. To prepare different egg products