Book No 37

Food

FOOD Technology

37/01

C U R R I C U L U M

OF

THREE YEARS DIPLOMA COURSE

IN

FOOD TECHNOLOGY

M.P. BOARD OF TECHNICAL EDUCATION BHOPAL.

UNDER

THE DIRECTORATE OF TECHNICAL EDUCATION

BHOPAL (M.P.)

PREPARED BY:-

BY:-

GOVT. WOMEN'S POLYTECHNIC

JABALPUR (M.P.)

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PREFACE

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The Institute is extremely grateful to the Director of Technical Education, Madhya Pradesh, Bhopal, and the secretary, M.P. Board of Technical Education Bhopal for providing necessary facilities for conducting the workshop for developing the curiculum of Diploma course in Food Technology. Food Technology is a 3 year diploma course and the Institute is going to start this course from the academic session 95-96. For developing the curriculum, a five days workshop from 27.3.95 to 31.3.96 was organised at this institution.

We are thankful to the staff members of the Jawahar Lal Nehru Krishi Vishwa Vidyalaya, Jabalpur and Govt. Home Science College, Jabalpur for their co-operation in developing the curriculum of Diploma course in Food Technology.

(L.B. Mishra)
Principal
Govt. Women's Polytechnic,
Jabalpur

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JOB POSITION/ JOB OPPORTUNITY

The passouts of Diploma in Food Technology are taken up in various organizations as- production supervisor, Quality control-officer, Chemist, Food Inspector Food Technologist, teachers and Scientist.

From the available information collected from various places, a list of organizations is given below .

I GOVT. ORGANIZATIONS

1. M.P. Agro industries corporation, Bhopal.
2. Deptt. of women's & child welfare, Bhopal.
3. Deptt. of Food & civil supplies.
4. Food & Drug administration.
5. Fruit & Vegetable processing factory, Bhopal.M.P.
6. ISI.
7. F.P.O. (Fruit Product order)
8. Agmark laboratories.
9. Bhabha Atomic Research centre, Bombay.
10. Diploma passouts will alsobe absorbed in polytechnics & higher secondary school as teachers.

II. PRIVATE ORGANIZATIONS

1. Arkay Food products private limited Ranital, Jabalpur.
2. Morden Food products, Jabalpur.
3. Bearl Biscuits limited, Richhai, Jabalpur.
4. Simplex cold drinks Madan Mahal, Jabalpur.

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5. Asawa flour mills, Jabalpur.
6. Maheshwari proteins private limited, Ratlam.
7. Godrej foods limited, Bhopal.
8. Narshing soyabean oil extraction plant Narshingpur.
9. Prestige foodslimited, ujjain.
10. Malwa vanaspati limited, Indore.
11. Parley drinks filling plant, Indore.

III. SEMI GOVT. ORGANIZATIONS

The food technology diploma holders will also have job opportunities in semi Govt. Organizations like.

1. F.C.I. Warehousing corporation.
2. Bhilai steel corporation, Durg.
3. M.P. Agro Industries corporation, Bhopal.
4. M.P. Consultancy organization, Bhopal.

Besides these job opportunities, there is a vast scope of self-employment in the field of food technology.

The manufacturing units of various processed food products can also be started and the related manufacturing items are mentioned below.

1. Bakery Industries.
2. Confectionary.
3. ICE cream.
4. Weaning foods.

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5. Fruit based Industries like- Jam, Jelly, Marmalades orange squash, lime squash-mango pulp pickles etc.
6. Biscuits- Industries.
7. Cold drinks- Non Alcoholic, beverages.
8. Spice powder Industries.
9. Maida mill
10. Dal mill
11. Rice mill
12. Poha mill
13. Oil mill
14. Vanaspati plant.
15. Papad & Vermicelli.
16. Instant mixes(Idli, dosa gulab jamun, soyabean etc.

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LIST OF TECHNICAL SKILLS

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1. Procurement of raw materials.
2. Collection of site.
3. Identification of the processed equipments and Instruments.
4. Analysis of the raw and processed material.
5. Operation of Instruments and equipments.
6. Reading the Instruments for the data number & catalog ues.
7. Standardization of the processing conditions for better product quality.
8. Quality control of the rawmaterials as well as the processed food products.
9. Checking the steam pressure & temp.during processing operation.
10. Suitability of the packaging material for various processed foods.
11. Checking ther physcial & sensory parameters of the processed foods for long shelf life.
12. Filling of the processed material in the packaging media depending upon the density in case of cereal & legume based food products.
13. Transportation of the raw materials & finished products.
14. Checking the quality of finished products for moisture & related sensory quality charactristics such as colour, flavour, taste & overall acceptability.

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NAME & ADDRESS OF INDUSTRIES _____

NAME OF THE MANAGING DIRECTOR _____

// LIST OF ACTIVITIES //

1. Marketing

   Market survey

2. Analysis of survey

3. Analysis of report of survey outcome.

SALE

1. Convincing attitude

   Product specification

2. Capablities of assessing the market, need for increasing the sale.

3. Obtaining the public opinion about the product and inform to higher authorities.

4. Guiding the sub ordinate staff.

5. Scheduling of supply and despatch.

SUPERVISOR

1. Supervision of product processing.
2. Planning of processing.
3. Testing of product.
4. Procurement of Raw material.
5. Quality of raw-material.
6. Man-power planning and supervising.
7. Utilization of machines.
8. Work study.
9. Signing of new-processer for improvement of existing processes.
10. Updating of schedules.

11. Preparation and interpretation of drawings.
12. Lay out preparation.
13. Estimation and costing.
14. Manufacturing of different food products.
15. Preservation of different food products.
16. Utilisation of waste product.
17. Disposal of waste material.

POLLUTION CONTROL

1. Pollutants and pollution control.
2. Process to control pollution of different nature.
3. Maintenance and operation of pollution control plants.

SAFETY

1. Maintenance of equipments, appliances machineries.
2. Preparation of maintenance schedule.
3. Minor repairing work.
4. Use of safety.
5. Transportation and material handling.
6. Storage.

HYGIENE AND SANITATION

1. Product testing.
2. Preservation for long time.
3. Products nursing quality.
4. Disposal of waste in a decent manner.
5. so that it is not in-jurious to others.

OTHER POINTS

1. Availability of raw-materials in the local area.
2. Season of harvesting to procure raw material.

3. List of reliable suppliers of raw materials.

4. List of firms supplying machinery/
Equipments and their specifications.

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MAIN FEATURES

TITLE OF THE PROGRAMME	-	DIPLOMA IN FOOD TECHNOLOGY.
DURATION OF PROGRAMME	-	3 YEAR(6 SEMESTERS)
TYPE OF PROGRAMME		FULL TIME INSTITUTIONAL
ENTRY QUALIFICATION	-	12th PASS OUTS FROM SCIENCE GROUP WILL BE ADMITTED IN I ST YEAR OF THREE YEAR DIPLOMA COURSE.
ADMISSION CRITERIA	-	BASED ON MERIT OF 12th SCIENCE GROUP.

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LIST OF CURRICULUM REFERRED

1. Syllabus of Central Food Technological Research Institute (CFTRI) Mysore.
2. Board of technical Examinations, Goa Syllabus for Diploma in Food Technology.
3. College of Home Science, Punjab Agricultural University, Ludhiana (Punjab).
4. Avinashlingham College of Home Science, Tamilnadu Agricultural University, Coimbatore. (T.N.)
5. Department of Food Science and Technology JNKVV, Jabalpur.
6. Board of Technical Examinations Maharashtra State, Bombay.
   Three Year Diploma Course in Food Technology.

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OFFICE OF THE PRINCIPAL, GOVT. WOMEN'S POLYTECHNIC, JABALPUR

FOOD TECHNOLOGY

(3Yr COURSE) 6 SEMESTERS.

FIRST YEAR

FIRST SEMESTER

1. Communication skill.
2. Applied mathematics and statistics.
3. Applied physics.
4. Applied chemistry.

SECOND SEMESTER

1. General Microbiology.
2. Food chemistry.
3. Computer Application.

SECOND YEAR

THIRD SEMESTER

1. Food composition and analysis.
2. Bio-chemistry and Nutrition.
3. Technology of forest food products.
4. Food and industrial microbiology

FOURTH SEMESTER

1. Food Engineering.
2. Animal products Technology.
3. Principles of food processing.
4. Inplant Tranning- 2 Weeks after fourth semester.

THIRD YEAR

FIFTH SEMESTER

1. Fruits and vegetable Technology.
2. Dairy Technology.
3. Confectionary & Convenience foods. - 505
4. Quality control and packaging 5 Inplant Training 2 weeks

SIXTH SEMESTER

1. Plant organisation and management.
2. Food Hygiene, Sanitation, Safety.
3. Technology of Cereals & pulses.
4. Project work including Enterpreneurship.

M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL

FIRST SEMESTER DIPLOMA PROGRAMME IN FOOD TECHNOLOGY

(TOBE INTRODUCED IN 1995-96AT GOVT. WOMEN'S POLYTECHNIC, JABALPUR)

S.NO.	NAME OF SUBJECT	SCHEME OF STUDY			SCHEME OF EXAMINATION										
		CONTACT HRS WEEK	SEM.	PER TOTAL	SESS TERM WORK	MKS LAB WORK	PROG. ASSM. I	PROG. ASSM. II	TH. PAPER	BOARD EXAMINATION DURATION	BOARD EXAMINATION MKS	PRACTICAL	DURATION	MKS	REMARKS
1.	Communication Skill	96(6)	(-)	96(6)	20	-	10	10	1	3Hrs	100	-	-	-	-
2.	Applied Mathematics and statistics	96(6)	(-)	96(6)	20	-	10	10	1	3Hrs	100	-	-	-	-
3.	Applied physics	96(6)	96(6)	192(12)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
4.	Applied chemistry	96(6)	96(6)	192(12)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
5.	Total :-	384(24)	192(12)	576(36)	80	60	40	40	4	-	400	2	-	100	-

NOTE:-
(1) No. of theory paper - 04
(2) Total theory marks - 400
(3) No. of practicals - 02
(4) Total Pract.Marks - 100
(5) Inplant Training Mks-
(6) Total mks. of sessional:- prog.Assessment,pract &-320 Inplant Training. (80+60+40+40+100=320
(7) Ratio of theory marks and (sessional + prog.Assess +Practical + Inplant Training i.e. Marks - 400:320 i.e. 1:0.80
(8) Total Marks: 720
(9) Passing marks for :-
(a) Theory - 33%
(b) Practicals-40%
(c) Sessionals-60%
(d) Inplant Training -50%

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DIPLOMA FOOD TECHNOLOGY

FIRST SEMESTER

1. subject;- COMMUNICATION SKILL

SAME AS PER CURRICULUM OF DIPLOMA IN ENGINEERING IN FIRST YEAR.

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FIRST SEMESTER

SUBJECT:- APPLIED MATHEMATICS AND STATISTICS.

THEORY HOURS:- 96

PER WEEK PERIOD:-06

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DIPLOM. IN FOOD TECHNOLOGY

I- SEMESTER

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COURSE: MATHEMATICS

MAX. THEORY MARKS- 75

RATIONALE:

The course in mathematics is a prerequisite to the different engineering subjects in diploma programme in food technology. This provides necessary knowledge of reasoning and computational skills.

1. Algebra- Ratio & proportion, percentage, Transposition of formule.
2. Logarithems- Definitions, properties, etc.
3. Quadratic equations- Solution method-factorisation, completing square, Relation between roots & coefficients.
4. Mensuration- Area of plane figures, volume & surface of cone, sphere etc.
5. Statistics - Definitions, use & limitations, measure of central tendency, mean, median & mode.
6. Differential calculus- Derivatives, Maxima & Minima, Tangent & Normal (cartesian form only)

Reference books- 1. Mathematics for polytechnic Students- S.P. Deshpande

2. Course in Diff. Calculus- Gorakh prasad.
3. Statistics- J.N. Sharma.

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FIRST SEMESTER

SUBJECT:- APPLIED PHYSICS

SCHEME OF STUDIES

TOTAL THEORY HRS	:-	96
LECTURE PER WEEK	:-	06
TOTAL PRACTICAL HRS	:-	96
PRACTICAL PER WEEK	:-	06

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FIRST SEMESTER

APPLIED PHYSICS

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MAX. MARKS THEORY- 100

MAX.MARKS PRACTICAL-50

RATIONALE:-

Understanding the fundamental concepts of physics will provide a common base for further studies for both science and technology. Such understanding is essential for many subjects in food technology like unit operations in food Engineering such as distillation,heat exchange, conveying, drying, concentration,centrifuging. A few topics like units, modern physics have been included for enabling, the students to appreciate the operation of some food process controls and laboratory instruments.To support the oretical studies, provision has been made for practical work also.

COURSE CONTENTS

1. UNITS & DIMENSIONS:- Fundamental units CGS,FPS MKS,& ST, units, conversion from one unit to another unit.
2. Mechanics:- Scalar & Vector quantities,Representation of a vector, unit vector,Resultant vector, Triangle, parallelogram and polygon law of vectors,scalar and vector product of two vectors.
3. Surface Tension:- Definition,Different theorems of surface tension, Angle of contact,Expression for surface tension, Rise of liquid in capillary tube, Determination of surface tension by capillary tube method.
4. Viscosity:- Definition, Expression for viscosity, coefficient of viscosity, Newton's law, poisseculle's method, critical velocity,Reynold's number.

5. ELECTROSTATIC

1. Colovmb's inverse square law, Unit charge, electric field, electric flux, flux density, relation between flux density & intensity.
2. Electric potential, potential difference expression potential difference between two points in an electric field due to a given charge, potential of sphere, potential of earth.
3. Capacitance, Principle of condensor, capacitance of a parallel plate condensor, condensor in series & parallel.

6. ELECTRONICS & MODERN PHYSICS

1. ATOMIC STRUCTURE

Structure of elements. The electron energy of an element, valance electron, free electron, voltage sources constant voltage source & constant current sources, maximum power transfer, theremin's theorem.

2. SEMICONDUCTOR PHYSICS

Semiconductor bonds in semiconductor energy, bond description of semiconductor, effect of temperature on semiconductor.

Semiconductor- N Type & P Type.

P-n junction. Properties of P-n junction volt ampere, characteristic of P-n junction.

3. SEMICONDUCTOR DIODE:- Crystal diode as an rectifier equivalent ckt of crystal, diode, Types of rectifier, Half & full wave and their efficiency, central taped full wave rectifier.

4. TRANSISTOR:-

Naming the transistor terminal, somefeet about transistor trahsistor symbol, transistor as an amplifier, transistor connection, common base, common emitter common collector & their comparison.

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LIST OF PRACTICALS

1. Use of vernier calipers, screw gauge & spherometer.
2. Verification of law of parallelogram of forces.
3. Determination of surface tension by capillary rise method using travelling microscope.
4. Determination to coefficient of viscosity by poiseuille's method.
5. Determination of coefficient of viscosity by stocks methods.
6. Measurement of temperature by thermocouple.
7. Determination of specific resistance by ammeter & Voltemeter method.
8. Determination of specific resistance of meterial of wire by Meter Bridge.
9. Verification of law of resistance of material of wire by Meter Bridge.
10. Calibration of Ammeter & voltmeter.
11. Camparison of e.m.f. of two cells by single cell method using potentimeter.
12. Determination of internal resistance of a cell by using potentimeter.

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APPLIED CHEMISTRY

FIRST SEMESTER

SUBJECT:- APPLIED CHEMISTRY

TOTAL THEORY HRS - 96

LECTURE PER WEEK - 06

TOTAL PRACTICAL HRS - 96

PRACTICAL PER WEEK - 06

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APPLIED CHEMISTRY

FIRST- SEMESTER

MAX.THEORY MARKS-100

MAX.PRACTICAL MARKS-50

RATIONALE

Knowledge of chemistry forms the basis to study food technelogy. It is very essential pre-requisite for food chemistry. Biochemistry and Nutrition, food Analysis, Quality control procedures and various areas of food technology. With this in view the syllabus in chemistry is framed to give the students a strong base in the subject.

This course in chemistry covers physical, Inorganic and organic chemistry. The Topics in organic chemistry give an introduction to the subject which would be taught in greater detail in the second semester and require further study of chemistry of foods and food processing technology the topics on acids-bases, ionisation,electrolysis,solubility etc form the basis for a proper understanding of food analysis and quality-control testing.

Practical work in this subject is designed to devolope basic skils in laboratory work such as volumetric analysis and for recording of results This would be useful for analytical work in the higher semesters. Further it would develop skills for conducting quality control testing which has been given a high priority by food industries according to a survey on curriculum development made by this Insti Institution.

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THEORY:- 37/25

1. SOLUBILITY:- Definition of solute, solvent, solution, true solutions, colloidal solution, standared solution, standared solution, normal & molar solution, strength of solutions, normality percentage, effect of heat.

2. IONISATION & ELECTROLYSIS:- Dissociation & Ionisation, Ionisation of water, conductor & non conductor Electrolytes, definitions of electrolysis, anode, cathode, cation & Anion, faradgy's law of electrolysis.

3. ACIDS & BASES:- Definition, Ionisation strong & weak acids & bases, Ionisation constant, ph value, Indicators, buffer solution.

4. CORROSION:- Definition, types of corrosion, Electrochemical series, methods of protection, metal coating, spraying, hot dip, tinning, galvanising, Electroplating.

5. FUELS:- A solid fuels & their classification, classification of coal, coal cleaning & storage, coal analysis,
B- Liquid fuels and their utilization.
Crude oil & its composition, processing of crude oil, knocking properties of gasoline, Antiknock agents, octane No.

6. PETROCHEMICALS:- Alkanes, alkenes & aromatic compounds, cracking thermal & caltalytic, Reforming, isomerisation alkylation, synthetic petrol.
B- GASEOUS FUELS:- Composition, properties and processes involved in manufacturing of coal gas, producer gas, Biogas.

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7. WATER ANALYSIS :- Impurities in natural water (dissolved, suspended & bacterial). Soft water & hard water, types & causes of hard ness of water.

disadvantage of hard water for

a. Domestic use

b. Industrial use such as dyeing textile, sugar, bakeries.

c. In generating steam in boilers.

8. Treat ment of hard water:- Lime soda process, permutit process, Ion exchange process Determination of hard ness by DDTA method Treatment of water for town supply.

9. POLYMERS:- Classification of macro molecules, monomers, polymers and copolymers, addition, polymerisation and condensation polymerisation, with examples of polythene, PVC, Nylon, polyster, Teflon, Bakelite, thermoplastic & thermosetting and their properties, Elastomers, rubber, Valeanisation of rubber and synthetic rubber.

10. ORGANIC CHEMISTRY:-

Classification of carbon compounds and general introduction of following:-

Alkyl radicals & aryl radicals,

Alkenes & Alkynes,

Halogen compounds,

Alcohols,

Phenols,

Ethers,

Aldehydes & ketones,

Carbonic acids.

Nitrogen compounds.

Nitrogen compounds,

Compounds with sulp

Phosphorus and other elements.

(General Introduction only)

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LIST OF EXPERIMENTS

1. **TEST FOR FUNCTIONAL GROUPS**

   a. Alcoholic group.

   b. Phenolic group

   c. Carbonyl group

   d. [illegible]group

   e. Ester group

   f. Carbohydrates.

2. Oxidation-Reduction titration.

3. Determination of pH of sample of water.

4. Determination of alkalinity of a water sample.

4. Determination of hardness of water sample.

5. Estimation of chloride in a water sample.
   by Mohr's method.

6. Proximate analysis of water.

7. Determination of calorific value of a solid or
   liquid fuel by Bomb calorimeter.

8. Fuel gas analysis by orstat apparatus.

9. Determination of Acid value of oil.

10. Determination of saponification value of oil,
    Iodine value of oil.

11. Handling Disposal of chemicals.

12. Acid base characters.

13. Bacterial analysis of water.

    a. No. of Baceria by colony counting method.

    b. M.P.N. of the sample of water-

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REF. BOOKS

1. Text book of organic chemistry- Bahl & Tuli
2. Applied chemistry- RME Diamant.
3. Applied Chemistry- Mahajan & Mehta
4. Inorganic Chemistry- Pandit.
5. Engineering chemistry- P.C. Jain.

Monika Jain.

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SECOND SEMESTERS YEAR DIPLOMA PROGRAMME IN FOOD TECHNOLOGY

(TO BE INTRODUCED IN 1995-96 AT GOVT.WOMENS POLYTECHNIC,JABALPUR)

S.NO.	NAME OF SUBJECT	SCHEME OF STUDY			SCHEME OF EXAMINATION										
		CONTACT HRS PER WEEK (SEM)			SESS.	MKS	PROG. ASSM.			BOARD EXAMINATION					
		THEORY	LAB.	TOTAL	TERM WORK		I.	II	TH. PAPER	DURATION	MKS	PRACTICAL	DURATION	MKS	REMARKS
1.	General Microbiology	128(8)	96(6)	224(14)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
2.	Food Chemistry	96(6)	96(6)	192(12)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
3.	Computer Application	64(4)	96(6)	160(10)	20	50	10	10	1	3Hrs	100	1	3Hrs	50	-
4.	Total :-	288(18)	288(18)	576(36)	60	110	30	30	3	-	300	3	-	150	-

NOTE:- (1) No. of theory paper :- 03
(2) Total theory marks :-300
(3) No. of practicals :- 03
(4) Total pract.Marks :-150
(5) Inplant Training mks:-
(6) Total mks. of Sessional pkeg.Assessment,Pract.& (60+110+30+30+150=380
(7) Ratio of theory marks and (Sessional + prog.Assess. (+Practical + Inplant Training i.e. marks. 300:380 i.e. 1:1.267
(8) Total marks:- 680
(9) Passing marks for :-
(a) Theory - 33%
(b) Practicals 40%
(c) Sessionals 60%
(d) Inplant Training. 60%

Total of Ist sem.+Second Sem. to gether - 720+680= 1400

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DIPLOMA IN FOOD TECHNOLOGY

SECOND SEMESTER

SUBJECT:- GENERAL MICROBIOLOGY

SCHEME OF STUDIES

Total Theory hrs	-	128
Lecture per week	-	08
Total Practical hrs	-	96
Practical per week	-	06

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DIPLOMA IN FOOD TECHNOLOGY

SECOND SEMESTER

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COURSE:- GENERAL MICROBIOLOGY

MAX. MARKS THEORY- 100

RATIONALE:- MAX. MARKS PRACTICAL 50

Basic knowledge of various aspects of general Microbiology is an important

Pre-quisite for the related subjects such as food & industrial microbiology, environment education, pollution & pollution control, food hygiene, Sanitation and safety.

The study of this subject includes different types of micro organisms, their classification & characteristics including advantages & harmful effects caused by various microorganisms in different kinds of environment, The knowledge of this subject is essential for developing various kinds of newer processed products.

Hence basic knowledge of Microscope sterilization methods, isolation technique and different kinds of media as well as morphological and cultural characteristics of different microorganisms. The unility ofthis course is very much significant for the subjects such as Dairy Technology fruit and Vegetable technology, legume and lipid technology, cereal technology, animal products technology etc.

THEORY:-

1. History scope and development of Microbiology Microorganism as allieds and foes.

2. Classification, structure, reproduction and economic importance of Microorganism Bacteria, fungi, yeast, Algae, protozoa and viruses.

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3. Morphology abd cultural characteristics of above micro organisms.
4. Vegetative cells & spores- of micro organisms.
5. Microscope techniques and microscopic examination.
6. Technique of isolation of pure culture and maintenance.
7. Sterilization- Different methods of sterilization.
8. Growth and physiology of micro organism.
9. Distribution of Micro-organisms in air, water, milk, soil, food.

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COURSE: GENERAL MICROBIOLOGY

PRACTICAL

1. Microscope- construction, working and Maintenance.
2. Microscopy of standard cultures for morphological characteristics.
3. Sterilization of glass wares & media.
4. Preparation of Media, sterilization of pure culture from water, milk, fruit juice, fish & meat products.
5. Cultural characteristics of cultures.
6. Staining procedures.
7. Viable count of micro organism.
8. Total count.
9. Growth techniques.

REFERENCE BOOKS:-

1. Fundamental of microbiology- M. Frazier.
2. Microbiology - M.J. Pelozar
   R.D. Reid
3. Microbes in action - Harry W- Seeley paul
   J. Vendomark
4. Microbiological methods - C.W. Cellein
   P.M. Lyne
5. Microbiology - Salle.

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FOOD CHEMISTRY

SUBJECT:- FOOD CHEMISTRY

SCHEME OF STUDIES

Total theory hours	-	96
Lecture per week	-	06
Total practical periods	-	96
Practical per week	-	06

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COURSE:- FOOD CHEMISTRY-

I SEMESTER

MAX. MARKS THEORY- 100

MAX. MARKS PRACTICAL 50

RATIONALE:-

The basic knowledge of various chemical constituents present in food material will help the students in understanding the measures adopted for processing of various food commodities.Besides this the course will assist the technicians working in the food industries for controlling various quality parameters.

INTRODUCTION:-

1. Significance of food chemistry in food processing and preparations.
2. Chemical composition, physio-chemical and [illegible] characterstics of :-
   - i. Charbohydrates and sugars.
   - ii. Proteins and its denaturation.
   - iii. Fats and Oils- Effects of processing & Rancidity.
   - iv. Flavour compounds.
3. Pigments in foods.
4. Browning Reactions
5. Emulsions.
6. Food Additives.
7. Antinutritional factors-Haema-agglutinins, Lathyrogens, Gossypol,trypsin inhibitor, polyphenols.

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PRACTICALS:-

1. Use of ph meter and analytical balance.
2. Determination of moisture in food sample.
3. Preparation of standard solutions.
4. Determination of acidity and ph of food sample.
5. Determination of ash in food sample.
6. Estimation of protein in food sample by kjeldahl method.
7. Quantitative analysis of starch.
8. Determination of carbohydrates by phenol sulphuric acid method.
9. Determination of Iodine value, saporification value and peroxide value of oil.
10. Determination of Dietary fibre in food stuff.

REFERENCE BOOKS:-

1. Food chemistry- Aurend woads
2. Food chemistry- L.H. Meyer.
3. Introductory food Chemistry - Gerrard
4. Food chemistry- Deman
5. Laboratory Manual- Aurand woods in food chemistry.

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COMPUTER APPLICATION

SUBJECT:- COMPUTER APPLICATIONS.

TOTAL THEORY HRS - 64

LECTURE PER WEEK - 04

TOTAL PRACTICAL HRS- 96

PRACTICALS PER WEEK- 06

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COURSE: COMPUTER APPLICATIONS

MAX. MARKS THEORY:- 100

MAX. MARKS PRACTICAL 50

RATIONALE:

We are in the age of beginning of Industrial development. The major cause of Industrial revolution is the invention of computers. Computers can perform complex & repeatative calculations, store large amount of data, make decisions, draw & printgraphs, automatically correct and modify by providing signals etc. That's why computer's knowledge is necessary for the students, teachers technicians or any body.

THEORY:-

1. Introduction: History of computers, types of computers, classification, computing concepts, Input devices. Central processing unit, (C.P.U.) out put devices storage devices.
2. Software: Driving the computer programming languages, common High level language programme execution modes, Interactive computing.
3. Problem Solving & Flow chart: Problem solving flow charting, Branching, Looping, Connectors, programme analysis.
4. Programming language: Introduction to Basic, celting, Basic into computer, testing & editing, Running, Merging & Variables, Restore statements, Expression printer control statement-Let, Read, Data, If Then, Goto for-Next Rem, Rom Etc.
5. Subscripted Variables:- Introduction Single & double subscripted variables, sorting, Functions & subreutines, Matrix algebra.

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6. Programme Design, Efficiency & testing Introduction, programme Bus, Debugging.
7. Case studies & file management:
   Introduction characteristics of AC circuit, parts Replacement problem, pay bill preparation, Salesman problems, sorting of numbers etc.
8. File management- Introduction, types of files, Handling.

LIST OF EXPERIMENTS

1. Sum of numbers.
2. Factorial of numbers.
3. Solution of Quadratic equation.
4. Calculation of Average age.
5. Calculation of Income Tax.
6. Programme to read the age of a employes & their annual income.
7. Result of students in descending order of total marks.
8. Characteristics of A.C. electronic circuit.
9. Preparation of pay bills of employees with their income tax calculations & deductions.
10. Salesman problems:- Like problem of a company who is selling 5 products with 5 salesman. Make a programme study the sales record as-
    1. Total value sold by each S.M.
    2. Total quantity sold.
    3. Cost during a week.
    4. Cost during a month.

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M.P. BOARD OF TECHNICAL EDUCATION, BHOPAL

THIRD SEMESTER DIPLOMA PROGRAMME IN FOOD TECHNOLOGY

(TO BE INTRODUCED IN 1995-96 GOVT. WOMEN'S POLYTECHNIC, JABALPUR)

S.NO.	NAME OF SUBJECT	SCHEME OF STUDY: CONTACT HRS PER WEEK	SCHEME OF STUDY: CONTACT HRS PER SEM.	SCHEME OF EXAMINATION: SESS MKS TOTAL	SESS MKS TERM WORK	PROG ASSM LAB WORK	PROG ASSM I	PROG ASSM II	BOARD EXAMINATION: TH. PAPER	DURATION	MKS	PRACTICAL	DURATION	MKS	REMARKS
1.	Food composition and analysis	96(6)	64(4) 160(10)	10	30	10	10	1	3Hrs	100	1	3Hrs	50	-	
2.	Biochemistry & Nutrition	96(6)	64(4) 160(10)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-	
3.	Technology of Forest food product	64(4)	64(4) 128(8)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-	
4.	Food and Industrial Microbiology	64(4)	64(4) 128(8)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	.	
	. Total :-	320(20)	256(16) 576(36)	80	120	40	40	4	-	400	4	-	200	-	

NOTE:-

(1) No. of theory paper :- 04
(2) Total theory marks :-400
(3) Total pract. Marks :- 04
(4) Total of Practical Mks 200
(5) Inplant Training Mks :-
(6) Total mks. of sessional 480 prog. Assessment, pract, Inplant training (80+120+40+40+200=480
(7) Ratio of theory marks and (Sessional + prog.Assess. (+practical + Inplant Training i.e. Marks :- 400:480 i.e. 1:1.20
(8) Total marks :- 880
(9) Passingmarks for:-
(a) Theory - 33%
(b) Practicals-40%
(c) Sessionals-60%
(d) Inplant Training-

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DIPLOMA IN FOOD TECHNOLOGY

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SUBJECT:- FOOD COMPOSITION & ANALYSIS

SCHEME OF STUDIES

Total theory hours	-	96
Lecture per week	-	06
Total Practical Hrs	-	64
Practicals per week	-	04

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DIPLOMA IN FOOD TECHNOLOGY

THIRD SEMESTER

COURSE: FOOD COMPOSITION & ANALYSIS

MAX. MARKS THEORY- 100

MAX. MARKS PRACTICAL50

RATIONALE:-

The basic knowledge of chemical composition of various food stuffs is an important prerequisite for the food processor in the country. Besides this, the nutritional aspects also play an important role in deciding the quality of final processed product. This course is the back bone of food technology as it covers the basic chemical composition of the raw meterials. The study of this subjects will help in understanding the various processing techniques and its effects on the quality.

THEORY:-

1. Requirement for setting up of food analysis lab.
2. Sampling procedures.
3. Maintenance & sample preservation.
4. Alkalinity- Acidity & buffer system.
5. Proximate composition, of food(Moisture proteins, oil & fat. Crudefibre, minerals, ash, carbohydrate etc.
6. Detection of adulteration-Methods based on physico-chemical composition.
7. Physical characteristics- Refractive index, melting, freezing, Tempreatures, optical, boiling, specific, gravity, spectral characteristics-colours etc.
8. Application of titrimetry, spectro-photometry/ colorimetry.
9. Recant development in food analysis techniques.

37/43

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PRACTICALS:-

1. Estimation of moisture.
2. Qualitative & quantitative measurement of carbohydrates.
3. Qualitative & Quantitative measurement of proteins.
4. Estimation of fat.
5. Estimation of ash.
6. Estimation of Vitamin C.
7. Estimation of Acidity & pH measurement.
8. [illegible]
9. Detection of adulteration in various food products.
10. Estimation of fiber.
11. Estimation of Mineral elements.

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37/44

REFERENCE BOOKS:-

1. Official method of analysis of the Association of official analytical chemists.
2. Standard method of chemical Analysis N.H. Furman.

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37/45

BIO CHEMISTRY & HUMAN NUTRITION

THIRD SEMESTER

2. SUBJECT:- BIO CHEMISTRY & HUMAN NUTRITION

Total theory hours - 96

Lecture per week - 06

Total Practicals Hours- 64

Practicals per week - 04

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THIRD SEMESTER

37/46

MAX. MARKS THEORY: 100

MAX.MARKS PRACTICAL 50

RATIONALE

This subject deals with different kinds of bio chemical constituents such as enzymes, their application in food processing industries & changes taken place in the foods as these effect the sensory qualities of the finally processed product. Besides this, it covers the nutritional aspects of different food & also the importance of vitamins & minerals, cause of various difficiency diseases & remedial measures.

The knowledge of this subjects is a prerequisite as it covers the changes in the nutritional qualities of the food material.

1. Engymes: Definition, properties, engymes kinetics, pH. Value, method of estimation by Biuret and lawry method.
2. Biochemical changes in Carbohydrates, proteins, lipids present in food stuffs.
3. Application of enzymes in food processing.

A. Carbohydrates- Amylases, invertases, Proteases.& cellulases.

B. Proteolytic enzymes, lipases, oxido reductases glucoseoxidase, catalase, peroxidase.

C. New developments in enzymes technology, use of enzymes in food analysis, commercialization of industrial enzymes, concept of biotechnology.

4. Metabolism of nutrients: Alimentary canal enzymes and break down of carbohydrates, protein and fats absorption process.

5. Vitamins: Definition, Classification, Properties water slouble, fat soluble, effect of deficiency/ excesses and their prevention, Estimation of Vitamin A.C and B complex.

6. Minerals, Sources, function, deficiencies R.D.A. of Sodium, Calcium, Phosphorus, Phosphate Iodine.

7. Nutritional requirements for persons of different age groups.

8. Nutritional deficiency diseases, symptoms and their remedial measures.

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PRACTICALS:-

1. Extraction & Estimation of enzymes from flour or any other food samples, Estimation of proteins by Biuret and Bawry's method.
2. Determination of amylase activity in flour or Saliva by estimating the product formed.
3. Estimation of vitamin 'C' in lime using
2.6 dichlorophenol method.
4. Estimation of vitamin 'A' in carrots: colorimetric method.
5. Estimation of calcium in food samplesag bread.
6. Estimation of phosphate in food samples by colorimetric or volumetric method.
7. Estimation of flourine in water.
8. Estimation of Iodine in salt by Volumetric, method.
9. Estimation of iron in food samples.
10. Identification of nutritional deficiency symptoms in different kinds of patients.
11. Estimation of haemoglobin in blood.

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PRACTICALS:-

1. Extraction & Estimation of enzymes from flour or any other food samples, Estimation of proteins by Biuret and Hawry's method.
2. Determination of amylase activity in flour or Saliva by estimating the product formed.
3. Estimation of vitamin 'C' in lime using
2.6 dichlorophenol method.
4. Estimation of vitamin 'A' in carrots: colorimetric method.
5. Estimation of calcium in food samplesեg bread.
6. Estimation of phosphate in food samples by colorimetric or volumetric method.
7. Estimation of flourine in water.
8. Estimation of Iodine in salt by Volumetric, method.
9. Estimation of iron in food samples.
10. Identification of nutritional deficiency symptoms in different kinds of patients.
11. Estimation of haemoglobin in blood.

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REFERENCE BOOKS

37/50

1. Encylopedia of food technology
   AVL publisher.
2. The soft Drink Bottlers
   Hard - All Americapub. Service
   tne.
3. Coffee processing Technology-
   Sivej & foote. AV
4. Food Industries- III (Madras publication)
5. Manufacture & Analysis of carbonated
   Beverages- M.B. Jacabs.
6. Beverage:- Carbonated & Now
   Carbonated- Woodroof &
   Philips AVL

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DIPLOMA IN FOOD TECHNOLOGY

THIRD SEMESTER

3. Subject:- Technology of forest food products.

SCHEME OF STUDIES

Total theory hrs	-	64
Lecture per week	-	04
Total practical hrs	-	64
Practicals perweek	-	04

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COURSE TECHNOLOGY OF FOREST FOOD PRODUCTS

THIRD SEMESTER

MAX. MARKS THEORY: 100

MAX.MARKS PRACTICAL 50

RATIONALE:

In M.P.. more than 60% area is covered under forest and forest food products is not being utilised properly for human consumption. These food materials are rich in various nutrients and available in abundance The knowledge of these important food materials to the students of food technology course will create awareness on the use of these material for setting up food industry based on these forest foods available in the locality. Hence inclusion this course is very much needed looking to the resources available in the state.

THEORY:-

1. Production potential of various forest products such as sal. Mahua, Char, Karanja, Tendu, Neem, kattha etc.
2. Nutritional composition of various kind of raw materials available in the forest.
3. Processing of raw materials for food and feed purposes.

37/53

4. Utilization of Processed materials as mentioned for incorportion in the nutritious food produtts.
5. Antinutritional factors such as saponins, polyphenols, lectins etc. present in the forest food products.
6. Storage and transportation of rawmaterials as well as finished products.
7. Packing of forest food products.
8. Utilization of forest food produce in pharmaceutical industries.

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37/.54

PRACTICALS:-

1. Determination of physical and chemical characteristics of forest products.
2. Assessment of nutritional quality.
3. Processing of sal seed to obtain Meal and fat.
4. Processing of Neem seed to obtain Meal and Oil.
5. Processing of Mahua to obtain Meal and fat.
6. Processing of Char to obtain edible portion.
7. Preservation of Tendu Fruit Using different processing techniques.
8. Keeping quality of various raw materials and processed products from forest produce.

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37/55

DIPLOMA IN FOOD TECHNOLOGY

THIRD SEMESTER

4 SUBJECT: FOOD & INDUSTRIAL MICROBIOLOGY

Total theory hrs	-	64
Lecture per week	-	04
Total Practical hrs	-	128
Practicals per week	-	08

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37/5-6

COURSE: FOOD & INDUSTRIAL MICROBIOLOGY

THIRD SEMESTER

MAX. MARKS THEORY - 100

MAX. MRKS PRACTICAL 50

RATIONALE:

This subject is important from health and nutritional point of view as it covers the microbiological spoilage of foods under different processing conditions. The knowledge of this subject will also help students in understanding the production processes of various products using micro-organismson a commercial scale.

THEORY:-

1. General principles of food preservation.
2. Microbiology of water, milk & milk products.
3. Cereals & cereal products, meat & meat products fish & fish products, eggs. Sugars & canned foods.
3. Food poisoning.
4. Aminoacids, antibiotics manufacturing.
5. Fermented beverages & foods, vinegar, pickles food flavours, organic acid manufacturing.
6. Food plant sanitation, disposal of factory waste.
7. Production & food use of algae, yeast.
8. Mushroom: Introduction, production, processing problem, contamination and its control.

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PRACTICALE:-

37/57

1. Microscopy & Micrometry.
2. Staining techniques.
3. Isolation of pure cultures.
4. Growth characteristics
5. Examination of moulds in foods.
6. Examination of yeast & algae.
7. Growth & different methods of estimation of Glutamic acid, penicillin.
8. Fermented foods, fermented beverages.

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37/58

REFERENCE BOOKS

1. Microbiology - Frazier.
2. Industrial Microbiology Miller & Litsky N.
3. Industrial Microbiology- Casida D.
4. Industrial fermentation-

   Prescott & Dunn.
5. Microbial Technology

   Peppler H.S. Perlman D.

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FOURTH SEMESTER (2ND YR) DIPLOMA PROGRAMME IN FOOD TECHNOLOGY
(TO BE INTRODUCED IN 1995-96 AT GOVT. WOMEN'S POLY.BSP)

S.NO.	NAME OF SUBJECT	SCHEME OF STUDY					SCHEME OF EXAMINATION								
		CONTACT HRS (SEM WEEK) PER			SESS	MKS	PROG. ASSM		BOARD EXAMINATION						
		THEORY	LAB.	TOTAL	TERM WORK	LAB WORK	I	II	TH. PAPER	DURATION	MKS	PRACTICAL	DURATION	MKS	REMARKS
1.	Food Engineering	96(6)	128(8)	224(14)	20	50	10	10	1	3Hrs	100	1	3Hrs	50	-
2.	Animal products technology	96(6)	96(6)	192(12)	20	50	10	10	1	3Hrs	100	1	3Hrs	50	-
3.	Principles of food processing	96(6)	64(4)	160(10)	20	50	10	10	1	3Hrs	100	1	3Hrs	50	-
5.	In plant Training (2 weeks) after semester (fourth)semester.														
	Total :-	288(18)	288(18)	576(36)	60	150	30	30	3	-	300	3	-	150	-

Note:-
(1) No. of theory paper - 03
(2) Total theory marks - 300
(3) No. of practical 03
(4) Total pract. Marks - 150
(5) Inplant training mks - 420
(6) Total mks. of sessional prog.Assessment pract.& Inplant training.
(60+150+30+30+150=420)
(7) Ratio of theory marks and (Sessional +prog.Assess (+Practical+Inplant training i.e. marks. 300:420 i.e., 1:1.40
(8) Total marks - 720
(9) Passing marks for :-
(a) Theory - 33%
(b) Practicals 40%
(c) Sessionals 60%
(d) Inplant training 60%

Total of IIIrd Sem. + IV Sem. marks = 880 + 720 = 1600

Note:- All students will under go inplant training of 15 days, 2 weeks) immediately after the fourth semester examination. The evaluating marks will be added in Vth semester.

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DIPLOMA IN FOOD TECHNOLOGY

IV- SEMESTER

SUBJECT:- FOOD ENGINEERING

TOTAL THEORY HRS. - 96

LECTURE PER WEEK - 06

TOTAL PRACTICAL HRS -128

PRACTICALS PER WEEK - 08

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37/61

COURSE : FOOD ENGINEERING

FOURTH SEMESTER

MAX. MARKS THEORY: 100

MAX. MARKS PRACTICAL 50

RATIONALE:-

The knowledge of various unit operations such as mixing, size reduction operation, material handling etc. will help the students in supervising & Maintaining the quality standards of raw materials as well as the processed food products. It also covers the working of various equipments & machines which will through some light on the handling of factory equipments & machinery in the industry during processing operation of food materials.

THEORY:

1. Units and dimensions systems of unit, operation and use of dimensional equalities.
2. Elementary thermodynamic laws, Thermodynamic properties of steam and refrigerants and mass and energy balance.
3. Fluid flow: Techniques for measurements. Basic equations of fluid flow, Bearnoules equation. Newtonian and Non-newtonian flow and pumps and meters.
4. Mechanical power transmission.
5. Steam generation and utilization.
6. Vacuum producing devices.
7. Refrigeration, principles and application, materials used for construction(Food Plant, Machinery) and contamination.

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PRACTICALS:-

1. Study of the boilers and use of steam tables.
2. Study of the power transforming devices and pumps.
3. Study of the flow measuring devices and meters.
4. Refrigeration plant.
5. Study of the pasteurization and sterilization.

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REFERENCE BOOKS

1. Fundamental of food Engineering-
   By S.E. Charm Mvl
   publications.
2. Elements of food Engineering
   by - J.C. Warper AVL
   publications.
3. Food process Engineering- by
   M.A. Leniger &
   W.A. Bevérlee
   Dreidel publishing
   co.
4. Introduction to chemical
   Engineering- Badger Banchevie.

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37/64

DIPLOMA IN FOOD TECHNOLOGY

FOURTH SEMESTER

SUBJECT:- ANIMAL PRODUCTS TECHNOLOGY

TOTAL THEORY HRS - 96

LECTURER PER WEEK - 06

TOTAL PRACTICAL HRS - 96

PRACTICALS PER WEEK - 06

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37/65

DIPLOMA IN FOOD TECHNOLOGY

COURSE: ANIMAL PRODUCTS TECHNOLOGY

FOURTH SEMESTER

MAX. MARKS THEORY- 100

MAX. PRACTICAL 50

RATIONALE:

The knowledge of meat & poultry processing techniques will help the students in understanding the various steps involved in the processing of animal product. These industries have got very good international market. Hence, the inclusion of this course is a prerequisite for food technology diploma.

THEORY:

1. INTRODUCTION

Meat animals & meat production development of meat & poultry industry in India & its need in Nations economy

2. SLAUGHTERING OF ANIMALS:

Antimortem and post mortem examination of meat and animals, slaughtering methods, dressing, grading, and packaging.

3. COMPOSITON OF MEAT & NUTRITIONAL QUALITY

Quality of meat, port beef, and poultry.

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37/66

4. Structure of meat muscles.

5. Quality factors in Meat & Meat Foods.

6. Chemical & Biochemical changes in meat,

7. Factors influencing the chemical & Microbial spoilage, of meat.

8. Preservation methods of meat.

9. Packaging of meat & meat products.

10. Egg:- Structure, composition & nutritional quality of Eggs.

Transportation, grading & shelf life of Egg.

11. Egg- products.

12. By products.

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PRACTICALS:

37/67

1. Meat cutting & handling.
2. Dressing of poultry.
3. Canning of meat products.
4. Cutting of meat.
5. Freezing of chicken, meat and shelf life study.
6. Preparation of sausages.
7. Preparation of chicken barbeque.
8. Measures of Egg, quality.
9. Preparation of meat pickles, corned meat, frozen meat & dehydrated meat.
10. Visit to slaughter house poultry farm & piggery.

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REFERENCE BOOKS

37/68

1. Meat Science- R.A. Lawrie.
2. Meat Hand book- Albert levie.
3. Egg Science & Technology-
   J.Stadelman.
4. Food Science- Potter.

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DIPLOMA IN FOOD TECHNOLOGY

FOURTH SEMESTER

SUBJECT:- PRINCIPLES OF FOOD PROCESSING.

TOTAL THEORY HRS - 96

LECTURE PER WEEK PERIODS 06

TOTAL PRACTICAL HOURS 64

PRACTICALS PER WEEK 04

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37/70

COURSE : PRINCIPLES OF FOOD PROCESSING
FOURTH SEMESTER

MAX. MARKS THEORY-100
MAX. MARKS PRACTICAL50

RATIONALE

The knowledge of this course is essential as it covers the working principles of various processing methods for different types of food products.

THEORY

1. INTRODUCTION:
   History & Development
2. FOOD CONTAINERS: Types & properties.
3. Preservation of food by Heat:-
   Canning botting etc.
4. PRESERVATION OF FOOD BY SUGAR & SALT
5. PRESERVATION BY DEHYDRATION OF FOODS
6. ANTIBIOTICS & MICROORGANISMS: use in food preservation.
7. USE OF CHAMICALS IN FOOD PRESERVATION:
8. TRANDITIONAL METHODS OF PRESERVATION- Badi, papad etc.

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PRACTICALS:-

37/71

1. Can seaming operations.
2. Testing of can-cut out test.
3. Applications of basic principles of food preservation.
4. Preservation of food using vinegar. Demonstration of food processing Techniques, canning of foods, etc.
5. Preservation by sugar & salt.
6. Preservation of food by chemicals and heat.
7. Preservation of food by dehydration.
8. Blanching of food.

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REF.:-

37/72

1. Food science- By potter.

2. Grain Storage- R.N. Sinha

3. Fruit & Vegetable Juice-

Processing Technology-Fressler.

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M.P. BOARD ... IN FOOD ...

V-SEMESTER YEAR DIPLOMA PROGRAMME IN FOOD TECHNOLOGY

(TO BE INTRODUCED IN 1995-96 AT GOVT.WOMEN'S POLYTECHNIC JABALPUR.)

S.NO.	NAME OF SUBJECT	SCHEME OF STUDY		SCHEME OF EXAMINATION									
		CONTACT HRS PER WEEK	SEM.	SESS TERM WORK	MKS LAB WORK	PROG. ASSM. I	PROG. ASSM. II	BOARD EXAMINATION TH. PAPER	DURATION	MKS	PRACTICAL	DURATION	MKS	REMARKS
1.	Fruits and Vegetable tech.	64(4)	96(6)	160(10)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
2.	Dairy Technology	64(4)	96(6)	160(10)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
3.	Confectionary & convenience foods	64(4)	64(4)	128(8)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
4.	Quality control & packaging	64(4)	64(4)	128(8)	20	30	10	10	1	3Hrs	100	1	3Hrs	50	-
5.	Marks Inplant training of IVth semester	-	-	-	-	-	-	-	-	-	-	-	-	50	-
	Total :-	256(16)	320(20)	576(36)	80	120	40	40	4	-	400	4	-	200 +50	-

NOTE:-
1. No. of theory paper = 04
2. Total theory marks - 400
3. No. of practicals - 04
4. Total practical mks - 200
5. Inplant Training mks - 50
6. Total mks of sessional: prog-Assessment, pract & Inplant Training. (80+120+40+40+200+50=530)
7. Ratio of theory marks and (Sessional prog.Assess (+Practical+Inplant Training i.e. 400:530 i.e., 1:1.325
8. Marks
8. Total Marks : 930
9. Passing marks for.
   a. Theory - 33%
   b. Practicals-40%
   c. Sessionals-60%
   d. Inplant - 50%
   Training

Note:- All students shall undergo inplant training of 15 days (two weeks) immediately after the fifth semester examination and evaluating marks shall be added in VIth semester.

37/73

37/74

DIPLOMA IN FOOD TECHNOLOGY

FIFTH SEMESTER

SUBJECT:- FRUIT & VEGETABLE TECHNOLOGY. 501

SCHEME OF STUDIES:-

TOTAL THEORY HRS. - 64

LECTURE PER WEEK - 04

TOTAL PRACTICAL HRS. - 96

PRACTICAL PER WEEK - 06

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COURES: FRUIT & VECETABLE TECHNOLCGY

V- SEMESTER:

MAX. MARKS THEORY 100

MAX. MARKS PRACTICAL50

RATIONALE:-

This course is very important in the field of food technology as the fruit and vegetable industry is very important in India and have got very good international market. In this field right from beginning i.e. purchasing of proper materials till end i.e. canning & packaging, the practical knowledge of food technology is much more helpful for students & technicians working in the food industries. Hence, this course is designed for that purpose also.

THEORY:-

1. Varieties of fruits & vegetables in different states Harvesting processed.
2. Canning & Bottling, Blanching, Brining and washing, filling & exhausting, Different processing methods.
3. Fruit Beverages:- Fruit Juice squashes fruit syrups, cordials, formulation. Manufacturing & precautions, change of states.
4. Jam & Jelly:- Pectin and its compound, process manufacturing, determination of end point, common defects, Marmalades.
5. Murabba pickle & chutney:- Manufacturing.
6. Dehydration-Process, packaging.
7. Tomato products:- Juice, purce, paste ketchup sauce, process & common defects.
8. Freezing:- Fruit, pulp & Juice.

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PRACTICALS:-

1. Canning of Fruits and Vegetables.
2. Preparation of Juice.
3. Preparation of fruit jelly.
4. Preparation of candied fruit.
5. Preparation of mixed fruit jam & jelly.
6. Preparation of preserved fruit (Mango/apple)
7. Preparation of Tomato juice & ketchup.
8. Canning of Tomato juice & ketchup.
9. Preparation of mango & lime & mixed pickle.
10. Freezing of green pea.
11. Dehydrationof fruit & vegetable(potato, carrot, chilries, mango)

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37/77

MATERIAL:

REFERENCE:-

1. Commercial preservation of fruit & vegetables by Girdharilal.

2. Storage, processing & Nutritional quality of fruits & vegetables by D.K. Salunkhe.

3. Fruits and vegetables preservation by cruess preservation.

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37/78

DIPLOMA IN FOOD TECHNOLOGY

FIFTH SEMESTER

SUBJECT:- DAIRY TECHNOLOGY. 502

SCHEME OF STUDIES

Total theory hours - 64

Lecture per week - 04

Total Practical Hours- 96

Practicals per week - 06

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37/79

COURSE: DAIRY TECHNOLOGY

FIFTH SEMESTER

MAX. MARKS THEORY 100

RATIONALE:- MAX. MARKS PRACTICAL50

Knowledge of milk & milk products processing technology is essential for India's important Dairy Industry. This course provides knowledge of dairy technology to the students and technicians working in the field.

THEORY:-

1. Introduction:- Definition of milk, sources, nutritive values, chemical and physical properties.

2. Processing of milk:-Standardised milk, single toned, double toned bottled & Flavoured milk.

3. Cream Butter & cheese:- Introduction, Definition & History, cream seperation, fat percentage, butter defects & their causes & prevention, cheese manufacturing, packaging defect & prevention.

4. Condensed Milk:- History, composition, types, process defects.

5. Dry milk:-History, composition, types process defects, Drying, packaging, Instant milk powder, malted milk power.

6. Milk products:- Cream khoa, ghee, paneer shrikhand, lassi, Dahi, Yoghart, composition & preparation.

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37/80

PRACTICALS:-

1. Platform tests in Dairy Industry, Acidity, odour, tasto, flavour Alc hol, C.O.B.
2. Chemical Analysis.
3. Determination of Fat(Solid & Non-solid)
4. Preparation of Dahi & Ghee.
5. Preparation of Butter.
6. Demonstration of Cream Separation.
7. Preparation of khoa & chhenna.
8. Preparation of shrikhand, rasgulla,
9. Preparation of cheese and paneer.
10. Preparation of Ice- Cream.

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37/81

REFERENCE BOOKS :-

1. Out lines of Dairy technology-by Sukumar De.

2. Milk & Milk products-by Clearence Henry Eckles

3. Principles of Dairy Processing-by James N. Warner.

4. Milk Production & processing-by Henry F. Judkin.

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37/82

CONFECTIONARY AND CONVENIENCEES FOODS.

503

RATIONALE:-

This course indudes the technology of variou processed foods of special interest in the food industry such as confectionary, oilseeds etc. Sufficient knowledg in the processing and care in developing the necessary laboratory skills have been incorporated so as to enable the technicians and students to work in the food industr

COURSE CONTENT:-

A. CONFECTIONARY:-

a. Chocolate and cocoa products.

i. Outline of cocoa manufacture from cocoa bean Cleaning, roasting, winnowing grinding, dutch and pressing.

ii. Chocolate manufacture, mixing, refining, conc moulding and packaging.

iii. Cocoa beverages and basic composition.

b. Candy and chewing gum-composition/formulatio manufecture of.

i. Hard boiled sweets.
ii. Toffee and caramels.

iii. Chewing gum.

c. Traditional Indian sweets: Manufacture of cereal based sweets, halwa, laddu, jelebi, mysore pak etc.

OILSEEDS:-

a. Major oilseeds of food importance, productio and composition.

b. Oil extraction mechanical and solvent.

c. Process of refining and hydrogenation.

C. Carbonated beverages:- Manufacerring& Equipments used in production.

37/83

PRACTICALS:-

1. Preparation of hard boiled sweets.
2. Prepatation of toffee.
3. Preparation of caramel.
4. Preparation of carbonated beverages.
5. Preparation of one veriety of cereal based Indian sweets.
6. Factory visits to the unit below and reports writin with details of processing. plant layout and by products.

a. Confectionary unit.
b. Sugar plant.
c. Soft drink bottling plant.

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37/8.4

COURSE:- QUALITY CONTROL & PACKAGING 504

MAX. MARKS THEORY:- 100
MAX. MARKS PRACTICAL 50

RATIONALE:-

The Knowledge of quality control measures and use of packaging materials will help the students in controling the quality of processed food products in a industry long shelf life.

THEORY:-

1. Quality dimensions of a food material.
2. Sensory attributes for product quality assessment.
3. Sensory methods used for assessment of quality characteristics of various food products.
4. Chemical quality control measures adopted in various food industries.
5. Chemical quality control measures adopted in
5. Packaging materials:- Physico chemical properties and their uses.
6. Shelf life of the processed food products.
7. Determination of moisture isotherm for long keepin quality.
8. Food laws and standards.
9. Prevention of food adulteration.

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37/85

PRACTICALS

1. Hedonic rating of a food product for various sensory quality attributes.
2. Duo-trio test for measuring the sensory quality of a food product.
3. Chemical analysis of various nutritional constituents of a processed food.
4. Storage study of the processed food material for keeping quality.
5. Methods of determining adulteration in various food products.

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37/86

REFERENCE BOOKS:-

Quality control for the food Industry Vol I&II, -A-Krammer AVI Publications

2. Food quality Assurance-W.A. Gould, AVI publications.
3. Prevention of food-Adultrations ACt(1954) with Rules.
4. Chemical Analysis of food product-M.B.Jacob
5. The chemical Analysis of foods:-David pears churchill livingstone publications.
6. I.S.I. specifications for various food products.

37/87

DIPLOMA IN FOOD TECHNOLOGY

SIXTH SEMESTER

SUBJECT:- PLANT ORGANISATION OF MANAGEMENTS.

601

SCHEME OF STUDIES

Total Theory Hours : 64

Lectures per week : 04

Total Practical Hours: 96

Practicals per week : 06

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37/88

COURSE:- PLANT ORGANISATION & MANAGEMENT

MAX. MARKS THEORY: 100

MAX. MARKS PRACTICAL50

RATIONALE:

Knowledge of plant organisation & management is a pre-requisite for Technical supervisors & other Technical persons. This course provides sufficient Knowledge & information about production & personal management, Costing, Factory laws etc. in food industries.

THEORY:-

1. Introduction: Definition, object & functions of Management.
2. Classification of Plant location, Selection of water & Electricity, Requirement, Effluent-Disposal Facilities.
3. Production costing: pruchasing & stores procedures. co-ordination between purchasing production & sales, Planning, Types of costing, sing & Job costing, process costing.
4. Business Administration & Types, Characteristics. Advantages & limitations of each type.
5. Finance & wage Payment: Sources, Financing, capital working & Management, Incentive Schem Fair wage & Minimum wage.
6. Manpower Management & Industrial Productivity Introduction as a new product, sales promotio Techniques, design of a product pack.

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37/89

REFERENCE BOOKS

1. Industrial Management - K.K. Ahuja (Khanna publishers)
2. Cost Accountant - Gupta.
3. Factory and production Management - K.G. Mokyer
4. Encyclopedia of food Technology - AVI publishers.
5. Introduction of Management - Peter F. Drnikar.

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37/90

COURSE: FOOD HYGIENE, SANITATION, SAFETY

SIXTH SEMESTER 602

MAX MARKS THEORY: 100

MAX MARKS PRACTICAL50

RATIONALE:

The awareness of food hygiene, sanitation and safety is highly required in various food processing units. Hygiene & sanitation is essential in preparation, processing & packaging of food product to avoid contamination of Micro organisms & other sources of spoilage. Hence, the food technologist must know the various aspects of sanitation & also I.S.I. and other food standards.

THEORY

1. Introduction- Importance of food Hygiene, Sanitation & safety, General Principles of food Hygiene in Processing, Packaging Evaluation- Health checkups, Measures of cleaning & their implementation, Food Handling.

2. Water, sources, purity, physical & chemical methods, storage.

3. Sanitation- Introduction & Importance, Terminology related to sanitation, Cleaning Techniques & their Importance, Factors, Sanitation of Equipments, Steam sanitation for closed system.

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37/91

4. Legal aspects of Food Hygiene & sanitation. Planning layout & Sanitation in Fruit & Vegetable processing, Dairy, Meat & Poultry Industries.

5. Safety- Safety Measures in Factory, Cold Storage, Factory act, Electricity, safety Precautions & Devices, Fire precautions, common Hazards, Types of Fuel Gases, Properties, precautions.

6. Demonstration of safety measures.

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37/92

REFERENCE BOOKS:-

Water and waste water

Treatment-Schroeder.

2. Quality control for the

food industry-Krammer- A

Toolgg - B

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37/93

COURSE:- TECHNOLOGY OF CEREALS AND PULSES

MAX. MARKS THEORY: 60

MAX. MARKS PRACTICAL:

RATIONALE:-

The field of food Technology includes a number of process technology. Cereal technology constitutes a very important area of food technology covering a large group of food processing industries such as bakery and related industries. The knowledge of the basic principles and procedures will help the students in understanding the production of important bakery and other cereal products and also the products based on pulses.

COURSE CONTENT

1. Introduction:-
   A- Main cereal crops grown in the country.
   B- Importance of cereals as food commodity.
2. Structure, Varieties, and classification of cerea
   Gain- Rice, wheat, Sorghum, Ragi, corn, Barlery,
   Bajra etc.
3. Physico-chemical characteristics and distribution
   of Nutrients in the Grain.
4. Milling technology of wheat, rice, and maige.
5. Production of break fast foods- process of
   manufacture of of puffed and flaked products fro
   Maize and Rice.
6. Traditional and modern methods of parboiling of
   paddy.

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37/94

7. Malting of Cereals

A- Process of production of Malted wheat flour.

8. use of malted cereal flour.

8. Baking- Bread, Biscuit, Cakes, Cookies etc. process, storage, ingredients, function formulation methods etc.

9. Processing of pulses.

A- Commonly cultivated pulses in the country.

B- Process of mileing of pulses.

C- Uses of pulses in production of nutritious food products such as intant foods.

10. Manufacture of traditional based extruded, items such as sev namkins, chakli, etc. cereal based Baby foods and possible utilisation of cereals in other processed foods(Sewai, noodles, maeroni spagathi.

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37/96

REFERENCE BOOKS:-

1. Cereal Technology- By matz

2. Bread Science and Technology-by pomeranz and Shellenberger.

3. Cookie and Craker Technology- by matz

4. Food processing operations- by Joslyn and Heid

5. Quality control for the - food industry Fol I & II by Kramer

6. Cereal Chemistry - by kent - Jones

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37/97.

COURSE : PROJECT WORK

SIXTH SEMESTER

MAS MARKS THEORY

MAX MARKS PRACTICAL:

RATIONALE:

The aim of project work is to develop the skill of independent analysis of food products & to collect the information regarding equipments & machines, raw materials & ingredients for a particular production.

CONTENT

This project work involves library & analytical work, paper presentation, library & Laboratory work is also involved in this project On completion of work, the student will submit a report on their project.

AREAS :

1. Waste utilisation in various food industries.
2. Indigenous food products.
3. Water treatment.
4. Fortification of food products.
5. Storage studies with additives.
6. Breakfast foods.
7. Dairy, fruit & vegetable processing.
8. fish animal products & poultry industry.