Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc First Year

First Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	**Course title**	**Periods/ Week**	**Total Period**	**Credits**
CCFT-1A	English : Communication skills-I	03	45	2
CCFT-2A	Principles of Food Processing	03	45	2
CCFT-3A	Food Production Trends and programmes.	03	45	2
CCFT-4A	Biochemistry	03	45	2
CCFT-5A	Food Chemistry –I	03	45	2
CCFT-6A	Fundamentals of Microbiology	03	45	2
CCFT-7A	Database Management Systems	03	45	2
CCFT-8A	Fundamentals of Computer Applications	03	45	2
CCFTP- 1A	Practical's based on CCFT-4 & 5A	03	60	2
CCFTP- 2A	Practical's based on CCFT-2 & 6A	03	60	2
CCFTP- 3A	Practical's based on CCFT-7 & 8A	03	60	2
Total Credits				22

Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc First Year

Second Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	**Course title**	**Periods/ Week**	**Total Period**	**Credits**
CCFT-1B	English : Communication skills-II	03	45	2
CCFT-2B	Food Chemistry –II	03	45	2
CCFT-3B	Human Nutrition	03	45	2
CCFT-4B	Cereal Processing Technology	03	45	2
CCFT-5B	Post harvest management of Fruit and Vegetables	03	45	2
CCFT-6B	Food Microbiology	03	45	2
CCFT-7B	Fluid Mecahanics and Hydraulics	03	45	2
CCFT-8B	Heat and Mass transfer	03	45	2
CCFTP- 1B	Practical's based on CCFT-2 & 6B	03	60	2
CCFTP- 2B	Practical's based on CCFT-4 & 5B	03	60	2
CCFTP- 3B	Practical's based on CCFT-7 & 8B	03	60	2
Total Credits				22

Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc Second Year

Third Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	**Course title**	**Periods/ Week**	**Total Period**	**Credits**
CCFT-1C	Fruit and vegetable processing	03	45	2
CCFT-2C	Wheat milling and baking technology	03	45	2
CCFT-3C	*Meat, poultry and fish technology	03	45	2
CCFT-4C	Food packaging	03	45	2
CCFT-5C	Fermentation and Industrial Microbiology	03	45	2
CCFT-6C	Techniques in food analysis	03	45	2
CCFT-7C	Confectionary technology	03	45	2
CCFT-8C	Food processing equipments-I	03	45	2
CCFTP-1C	Practical's based on CCFT-1,2 & 4C	03	30	2
CCFTP-2C	Practical's based on CCFT-3, 5 & 7C	03	30	2
CCFTP-3C	Practical's based on CCFT- 6 & 8C	03	30	2
CCFTP-4C	SEC-I **Skill enhanced Course-1	03	45	2
Total Credits				24

Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc Second Year

Fourth Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	**Course title**	**Periods/ Week**	**Total Period**	**Credits**
CCFT-1D	Legumes and oil-seed technology	03	45	2
CCFT-2D	Processing of milk & milk products	03	45	2
CCFT-3D	Spice and flavor technology	03	45	2
CCFT-4D	Food hygiene and sanitation	03	45	2
CCFT-5D	Food safety and Microbial Standards	03	45	2
CCFT-6D	Food additives	03	45	2
CCFT-7D	Food processing equipments-II	03	45	2
CCFT-8D	Instrumentation and process control	03	45	2
CCFTP- 1D	Practical's based on CCFT-1 ,2 and 3 D	03	30	2
CCFTP- 2D	Practical's based on CCFT-4, 5 & 6D	03	30	2
CCFTP- 3D	Practical's based on CCFT-7& 8D	03	30	2
CCFTP- 4D	SEC-II **Skill enhanced Course-2	03	45	2
Total Credits				24

Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc Third Year

Fifth Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	**Course title**	**Periods/ Week**	**Total Period**	**Credits**
CCFT-1E	Food industry by-products & waste utilization	03	45	2
CCFT-2E	Carbonated and alcoholic beverage technology	03	45	2
CCFT-3E	*Food Biotechnology	03	45	2
CCFT-4E	Refrigeration Engineering and Cold chain	03	45	2
CCFT-5E	Biochemical Engineering	03	45	2
CCFT-6E	Co-operation, Marketing & Finance	03	45	2
CCFT-7E	Business management & international food trade	03	45	2
CCFT-8E	Food quality	03	45	2
CCFTP- 1E	Practical's based on CCFT-4,5,6 & 7E	03	60	2
CCFTP- 2E	Practical's based on CCFT-1,2,3 &8 E	03	60	2
CCFTP- 3E	SEC-III **Skill enhanced Course-3	03	45	2
CCFTP- 4E	Industrial Training (Min. 1 Week)	----	----	2
Total Credits				24

Swami Ramanand Teerth Marathwada University, Nanded

Choice Base Credit System (CBCS) Course Structure

Faculty of Science

B.Sc Third Year

Sixth Semester Food Technology Syllabus

Effective from June 2016

Core Course /Code No.	Course title	Periods/ Week	Total Period	Credits
CCFT-1F	Speciality foods	03	45	2
CCFT-2F	Extrusion Technology	03	45	2
CCFT-3F	* Food Plant design and Layout	03	45	2
CCFT-4F	Food Laws and Regulations	03	45	2
CCFT-5F	Entrepreneurship Development and communication skills	03	45	2
CCFT-6F	Product development and formulations	03	45	2
CCFT-7F	Food quality assurance and certification	03	45	2
CCFT-8F	Environmental Science	03	45	***
CCFTP- 1F	Practical's based on CCFT-2& 7F	03	60	2
CCFTP- 2F	Practical's based on CCFT-5 & 8F	03	60	2
CCFTP- 3F	Practical's based on CCFT-3& 4F	03	60	2
CCFTP- 4F	Project/ Dissertation	03	60	2
CCFTP- 5F	SEC-IV**Skill enhanced Course-4	03	45	2
Total Credits				24
Total credits of B.Sc. I, II and III year				44+ 48+ 48= 140.

Syllabus of Food Technology (Semester –I)

CCFT-1A - English Communication skills-I

A) Language and communication

Definition of language, characteristics of language, human and animal communication, non-verbal communication barriers in communications, formal & informal language.

B) (Spoken Communication)

1) Meeting People , Exchanging Greeting and Taking Leave.
2) Introducing Yourself .
3) Introducing People to Others.
4) Giving Personal Information.
5) Talking about People , Animals ,and Places.
6) Answering the Telephone and Asking for Someone .
7) Dealing with Wrong Number.
8) Taking and Leaving Massages.
9) Making Inquiries on the Phone.
10) Calling for help in an Emergency.
11) Getting Peoples Attention and Interrupting .
12) Asking for Directions and Giving Directions.
13) Thanking someone and Responding to Thanks.

C) Writing Communication.

1)Summarising
2) Note making and Note taking .

D) Oral Communication

The art of public speaking , situational English, (Various formal and informal situations to be understood and practices), group discussion, Debates, Interview technique, seminar and paper reading.

REFERENCE BOOKS :

1) **EFFECTIVE COMMUNICATION SKILL**, OMKAR N. KOUL AND KAMALA K. SHARMA, CREATIVE BOOKS – 1995
2) **DEVELOPING COMMUNICATION SKILLS** SRISHNA MOHAN AND FLEERA BANERJI BIRLA, Institute of Technology and Science, PILANI, MACMILLAN-2002
3) **ENGILISH IN SITUATIONS.**, R.O.NEILL, OXFORD UNIVERSITY PRESS.
4) **PRACTICAL ENGLISH USAGE**, SUSAN, OXFORD
5) **SPOKEN ENGLISH**, V. SHANSHIKUMAR, P.V.DHAMIJA, TMH, NEW DELHI.
6) **REMEDIAL ENGLISH GRAMMAR FOR FOREIGN STUDENTS**, F.T.WOOD
7) **WRITTEN COMMUNICATION IN ENGLISH**, SARAH FREEMAN.
8) **COMMUNICATION SKILLS IN ENGLISH**, ED.BY THE DEPT OF ENGLISH, OSMANIA, University, HYDERABAD.
9) **WORD POWER MADE EASY**, NORMAN LEWIS
10) **A STUDENTS GRAMMAR OF THE ENGLISH LANGUAGE** – GREENBAUM PEARSON EDUCATION
11) LONGMAN LANGUAGE ACTIVATOR – BY LONGMAN – PERSON EDUCATION.

CCFT-2A - PRINCIPLES OF FOOD PROCESSING

Sr. No.	Topics
1	Introduction, sources of food, scope and benefit of industrial food preservation, perishable non perishable food, causes of food spoilage
2	Preservation by salt and sugar- Principle, method, equipment and effect on food quality
3	Thermal proce3ssing methods of preservation-Principle and equipments : Canning, blanching, pasteurization, sterilization, evaporation
4	Use of low temperature- Principal, equipment and effect on food quality, chilling, cold storage, freezing
5	Preservation by drying dehydration and concentration – principle, Methods equipment and effect on quality: Difference and importance of drying and dehydration, equipments and machineries, physical and chemical changes in food during drying and dehydration Need and principle of concentration, methods of concentration- thermal concentration, freeze concentration, membrane concentration, changes in food quality by concentration.
6	Preservation by radiation, chemicals and preservatives Definition, methods of irradiation, direct and indirect effect, measurement of radiation dose,. Dose, distribution, effect on microorganisms. Deterioration of irradiated foods. Physical, chemical and biological, effects on quality of foods
7	Recent methods in preservation : Pulsed electric field processing. High pressure processing. Processing using ultrasound, dielectric, ohmic and infrared heating. Theory, equipments and effect on food quality

Practicals CCFT-2A :

Number of Units	Topics
1	Study of preservation of food by heat treatment canning – Canning of fruits and vegetables
2	Preservation of food by high concentration of sugar i.e. preparation of j am
3	Preservation of food by using slat- Pickle
4	Preservation of food by using chemicals
5	Preservation of bread, cake using mold inhibitors
6	Drying of pineapple slices, apple slices in cabinet drier
7	Demonstration on drying of green leafy vegetables
8	Study of Processing foods using fermentation technique i.e. preparation of sauerkraut

REFERENCE BOOKS

1. Technology of food preservation — N.W. Desroiser and N.W.Desrosier
2. Introduction to food science and technology — G.P. Stewart amd M.A. Amerine.
3. Food processing operations vol. III — M.A. Joslyn and J. J. Heild
4. Preservation of fruits and vegetables — Giridhari Lal, G. S. Siddappa & G. L. Tondon

CCFT-3A - FOOD PRODUCTION TRENDS AND PROGRAMMES

Sr. No.	Topics
1	Food demand and supply – Qualitative and quantitative requirements
2	Expected technological advances to meet the needs
3	Future priorities in food production needs status of food i9ndustry in India and abroad
4	Magnitude and interdependence of food production and processing agencies.
5	Food availability production – types of foods like processed semi processe3d, ready to eat foods, fast foods, pet foods
6	Food characteristics and nutritional significance of major food groups
7	Present trends of consumption and further requirements
8	Consumers change of aptitude in food products consumption
9	New food products developed programmes aimed for making more food availability to increasing population and their prospects merits and drawbacks, prospects for future growth in India
10	National and international trends and programmes in food handing, processing and marketing
11	Potentials and prospects of developing food industry in India
12	Food losses – factors affecting – programmes and strategies to eliminate the looses and meet the required demand
13	Global demand for food
14	World food Day – Importance and action plans

REFERENCE BOOKS

1. Food Science III edn — N.N. Potter, AVI Publishing Co Lnc west post. USA
2. Caned Foods Thermal Processing and Microbiology — AC Herson & A.D. Null and J. A. Churchill Ltd
3. Agricultural administration in India — K. Vijayaraghavan
4. Modern Techniques field crops of — Chidda Singh, Oxford & IBH pub. Co Raising
5. Agriculture Research systems & 21 st management in the a — KV Raman m.M. Anwer & R.B. Gaddagimeth, NAARAM Alumini Association National Academy of Agril, Research Management,. Rajendranagar Hyderabad
6. Food Processing Industries — B. M. Desai, V. K. Gupta, N.V. Namboodri. Oxford & IBH Publishing Company, Pvt. Ltd. 66 janpath, New Delhi.

CCFT-4A -BIOCHEMITRY

Number of Units	Topics
1	Biochemistry & it's scope
2	Cellular Biochemistry Cell-structure - plant & animal, composition & function of cell organelle
3	Carbohydrates Occurrence, Classification and Structures Physicochemical & Metabolic functions Metabolism - glycolysis, TCA cycle, HMP pathway, ETC, oxidative phosporylation & Gluconeogenesis.
4	Proteins Occurrence, Classification & Structures Physicochemical & Metabolic functions Metabolism –Transamination, deamination and decarboxilation, amino acids – classification, structure biosynthesis of amino acids.
6	Lipids Occurrence, Classification & Structures Physicochemical & metabolic functions Metabolism -degradation of fats, ß-oxidation,
7	Nucleic Acids Classification Structure & Biosynthesis of Nucleic acid-RNA and DNA Metabolism.
8	Vitamins - Sources and Classification, Chemistry & Metabolic functions, efficiency diseases syndromes
9	Enzymes : Chemical nature & nomenclature Classification , Sources & properties Mechanism of action, coenzyme & prosthetic groups

Practicals CCFT-4A

Number of Units	Topics
1	Qualitative & quantitative determination of carbohydrates
2	Qualitative & quantitative determination of Amino acids
3	Qualitative & Quantitative determination of Proteins
4	Qualitative & Quantitative determination of Lipids
5	Qualitative & quantitative determination of vitamins - Riboflavin, Thiamine, Vitamin-A, Vitamin-C
6	Isolation of enzymes from various sources

REFERENCE BOOKS

1	Osner Hawk's Practical Physiological Chemistry	Hawk
2	Principles of Biochemistry	L ehninger
3	Principles of Biochemistry	Voet
4	Practical Biochemistry	Thamiah

CCFT-5A - FOOD CHEMISTRY-I

Theory

Number of Units	Topics
1	Nature scope & development of food chemistry role of food chemist.
2	**Moisture in foods** i) Role and type of water in foods Ii) Functional properties of wter, role of water in food spoilage. Iii) Water activity & sorption isotherm iv) Molecular mobility & foods stability
3	**Dispersed systems of foods** i) Physicochemical aspects of food dispersion system a) Sol b) Gel c) Foam d) Emulations ii) Rhology of diphase systems
4	**Carbohydrates** i) Functional characteristics of different carbohydrates (Sugar - Water relationship, sweetness) ii) Maillard reaction, caramelization, methodds to control non enzymatic reactions. iii) Modification of carbohydrates- unmodified & Modifies starches, modified celluloses iv) Dietary fibres NDF, ADF, cellulose, hemicellulose, pectin & carbohydrates digestibility-sugars & starch & their energy values. v) Functional properties of polysaccharides, natural vegetable gums, carbohydrate composition of various natural foods.
5	**Proteins in foods** i) Physicochemical properties - ionic properties, denaturation, gelation & hydrolysis ii) Protein content & composition in various foods-cereal grains, legumes & oilseed Proteins, proteins of meat, milk, egg & fish. iii) Functional properties of proteins in foods - water and oil binding, foaming, gelation, emulsification. iv) Effects of processing on functional properties of proteins-heat processing on functional properties of proteins-heat processing, alkali treatments, chilling, freezing, dehydration & radiations. v) Unconventional sources of proteins - SCP, fish protein concentrates, leaf proteins.
6	**Lipids of Foods** i) Role & use of lipids / fat- occurrence, fat group classification, ii) Physicochemical aspects of fatty acids in polymorphism & its application. iii) Chemical aspects of lipolysis, autooxidation, antioxidants, iv) Technology of fat & oiul processing a) Refining b) Hydrogenation c) Interesterification d) Safety use of oils & fats in food formulation
7	**Enzymes in food industry** Carbohydrases (Amylases, Celluases, Pectinases, Invertases) Proteasase, Lipases & Oxidases in food processing.
	Total

Practicals CCFT-5A

Number of Units	Topics
2	Studies of sorption isotherms of different foods
3	Study ofSwelling & solubility characteristics of starches
4	Study of Rheological properties of diphase systems
5	Determination of crude proteins by microkjeldhal methods.
6	Determination of essential amino acids i.e. Lysine, Tryptophan, Methionine etc.
7	Isolation of egg and milk protein
8	Preparation of protein isolate and concentrate of plant proteins
9	Determination of acid value, saponification value and iodine number of fat / oil
10	Assay of amylases, papain and lipases.

REFERENCE BOOKS

1 Food Chemistry Vol-1 Fennama O. R.

2 Food Chemistry Mayer L. H.

CCFT-6A - FUNDAMENTALS OF MICROBIOLOGY

Theory

Number of Units	Topics
1	Evolution and scope of Microbiology
2	General morphological, cultural characteristics & reproduction of bacteria, yeasts, molds, actinomycetes, algae, protozoa,& rickettsia
3	Nutrient transport phenomenon & physiology of micro-organisms
4	Genetic recombination, transduction, transformation & bacterial conjugation, mutation & mutagenesis
5	Growth curve : Physical & chemical factors influencing growth and destruction of microorganisms (including thermal death time, Z,F & D values)
6	Viruses: Structure & replication with particular reference to food borne viruses.
7	Control of Microorganisms by physical & chemicals, antibiotics & other chemotherapeutic agents
8	Preservation of microbial cultures

Practicals **CCFT-6A**

Number of Units	Topics
3	Cleaning & Sterilization of glassware
4	Preparation of nutrient agar media & techniques of inoculation
5	Staining methods (monochrome staining, negative staining, capsule-staining, flagella staining & endo spore staining)
6	Pure culture techniques (streak plate / pour plate)
7	Introduction to identification procedures (morphology & cultural characteristics)
8	Growth characteristics of bacteria : Determination of microbial numbers, direct plate count, generation time
10	Study of methods of microbial culture preservation (bacteria & yeasts)
11	Study of anaerobic culture methods

REFERENCE BOOKS

1. Biology of Microorganisms — T. D. Brock
2. Microbiology : Fundamentals & Applications — Purohit SS.
3. Microbiology

CCFT-7A - Database Management Systems **Total Periods - 45**

Contents : Theory

Chapter	Name of the Topic
01	Database System Concept & Data Modeling
	1.1 Basic concepts. Advantages of DBMS over file processing systems, Data Abstraction, Database 1.2 Components of DBMS and overall structure of a DBMS 1.3 Data Modes : Network Model Hierarchical Model E.R. Model 1.4 Client Server Architecture :
02	**Relational Data Model and Security and Integrity Specification**
	2.1 Relational Model: Basic concepts, Attributes and domains, Keys concept : Candidate and primary key, Integrity constraints: Domain, Entity Integrity constraints and On delete cascade. 2.2 Security and Authorization. 2.3 Query Languages: Relational Algebra, Relational Claus Views.

03	**SQL and PL-SQL**
	3.1 Introduction to SQL queries, Creating, Inserting, Updating and deleting tables and using constrains, Set operations & operators, Aggregate functions string functions and date, time functions Null values, Nested sub queries, Complex queries, Join concepts. 3.2 PL/SQL Introduction, PL/SQL block structure variables, SQL statements in PL/SQL,PL/SQL control Structures, Cursors, Triggers, Functions, Packages, procedures. Error handling in PL/SQL
04	**Relational Database Design, Storage and File Systems**
	4.1 Purpose of Normalization, Data redundancy and updating anomalies, Functional Dependencies and Decomposition, Process of Normalization using 1NF,2NF,3NF,Multivalued dependencies and BCNF **4.2** E-R Model details. **4.3** File organization, Organization of records in files, Storage of object oriented databases, Basic concept of Indexing and Hashing.
05	**Query Processing and Transaction Processing**
	5.1 General Strategies for query processing, Equivalence expressions, Selection & join operation. **5.2** Concept of transaction, States of transactions Concurrent Executions, Serializability Recoverability, Transaction Definition in SQL. **5.3** Lock based protocols : share & exclusive models, Protocols : phase locking Time-Stamp based Multiple granularity **5.4** Deadlock handling, Deadlock prevention, detection & recovery
	Total

Practical : CCFT-7A

Skills to developed :

1. Develop the field of database
2. Decide proper specifications
3. Query Processing and transaction processing

Motor Skills :

1. Prepare appropriate data tables
2. Sequential writing of steps

List of Practical

1) Creating * Executing DDL in SQL
2) Creating & Executing Integrity constrains in SQL
3) Creating & Executing DML in SQL
4) Executing relational, logical and mathematical set operators using SQL
5) Executing group functions
6) Executing Date & Time functions
7) Executing Data conversion function
8) Executing sequences and synonyms in SQL
9) Execute 50 SQL queries (operator, functions, clause, join concepts)

Learning Resources :

Books :

Sr. No.	Author	Title	Publisher
01	Korth	Database System Concepts	Sudarshan
02	2006 ISRD Group	Introduction to Database	Tata McGrawHill.
03	Bipin Desai	An Introduction to Database System	Galgotia Publication
04	C.J. Date	An Introduction to Database System	
05	Allen	Introduction to Relational Database and SQL programming	Tata McgrawHill

CCFT-8A – FUNDAMENTALS OF COMPUTER APPLICATIONS

Chapter 1 Computer Fundamentals

1.1 Feauters of Computer System
1.2 Block Diagram
1.3 Hardware & Software
1.4 Operating System (Overview = DOS, Windows)
1.5 Application Software
1.6 Viruses & their Types, Precautions to take – e.g. Trojans Worms, (Names of Anti-virus software) etc.
1.7 Networking Concepts –Advantages, Topologies Types.

Chapter 2 DOS (Disk Operating System)

2.1 Introduction, Features
2.2 Internal Commands – (DIR,CLS,CD,MD,RD,COPY,DEL,REN,TYPE,VER,VOL,DATE,TIME)
2.3 Wildcards (?,*), directory code (., .. and \ )
2.4 External Commands – FORMAT, ATTRIB, SCANDISK, etc

Chapter 3 **WINDOWS**

3.1 Features
3.2 Terminologies-Desktop, Windows, Icons etc
3.3 Explorer – (Assignment with files, folders)
3.4 Accessories –Plant, Notepad.

Chapter 4 **MS – WORD**

4.1 File Commands, Print, Page Setup
4.2 Editing- Cut, Copy, Paste, Find, Replace, etc
4.3 Formatting Commands, Spell Ceck
4.4 Tables, Columns, Drawing Options
4.5 Hyperlinks, Templates

Chapter 5 **MS-EXCEL**

Features rows, columns, sheets, Auto Fill etc
5.1 Formulae, Functions (Math/Stats, IF)
5.2 Charts
5.3 Database (Create, Sort, Auto Filter, Sub Total)

Chapter 6 **MS-POWERPOINT**

Layouts, Templates, Clip Arts
6.1 Custom Animations, Transitions, etc

Chapter 7 **INTERNAT/ E-MAIL**

History Dial Up, Domains, Browsers, etc
7.1 Services, Email, Outlook Express
7.2 4 hours Surfing by students

Chapter 8 **DBMS- (Data Base Management Systems)**

8.1 Data ,Data types, Tables Record, Fields
8.2 Creating tables
8.3 Working with the table, adding, editing, deleting, recalling records

Chapter 9 **FOXPRO (DOS / WINDOW based)**

9.1 Simple table creation commands
9.2 Editing Browsing, Deleting records
9.3 Reports

Chapter 10 **MS- ACCESS**

10.1 Table Creation, Editing, Deleting records
10.2 Forms

Note : Glossary of Terms

Students should be familiar with the glossary of terms pertaining to above mentioned topics

Students should maintain a Log Book, which has all Notes, Pictures form the Internet and all Assignment (which will be marked as part of practical Exams)

SUGGESTED PRACTICAL ASSIGNMENTS CCFT-8A :

1 To create files, directories, to make changes in existing files (DOS)
2 Create Folders, change date/time, Change desktop settings (WINDOWS)
3 KOT, Logo, Students' Resumes (WORD)
4 KOT Report Card, Pass /Fail Result, Bills Hotel Rooms, Charts, Database of Employees, (EXCEL)
5 To download information from the internet as a topic (INTERNET)
6 To present the above information as a presentation (POWEPOINT)
7 Create a database , EDIT, DELETE, RECALL & APPEND records (FOXPRO)
8 Create a FORM where all records can be displayed/ edited (ACCESS)

Note :- Practical examinations will be on practical commands and Viva.

RECOMMENDED BOOKS :

1 Computer Fundamentals – P.K. Sinha
2 A First Course In Computers- Sanjay Saxena
3 DOS Guide –Peter Norton
4 Mastering MS-OFFICE- Lonnie E. Moseley & David M. Boodey (BPB Publication)
Mastering FOXPRO –Charles Siegel (BPB Publication

B.Sc. Food Technology (Semester II)

CCFT-1B- Communication skills-II

A) Prose and Short Fiction.
1)With the Photographer- Stephen Leacock.
2) Socrates and the school Master –F.L.Brayne
3) Speech on Indian Independence – Jawaharlal Nehru.
4) An Astrologer's Day –R.K.Narayan.

B) Poetry .
1) On Television – Roald Dhal
2) The felling of the Banyan Tree – Dilip Chitre
3) Stay Calm – Grenville Kleisor
4) Abou Ben Adhem – James Leigh Hunt .

C) Remedial English grammar
Tense,aspects, voice, mood, use of tenses , transformation, acceptability and uses, from & meaning , clauses and sentences.

D) Vocabulary
Word formation, suffixes, prefixes, roots, synonyms and antonyms, one word substituision.

REFERENCE BOOKS :

1) **EFFECTIVE COMMUNICATION SKILL**, OMKAR N. KOUL AND KAMALA K. SHARMA, CREATIVE BOOKS – 1995
2) **DEVELOPING COMMUNICATION SKILLS** SRISHNA MOHAN AND FLEERA BANERJI BIRLA, Institute of Technology and Science, PILANI, MACMILLAN-2002
3) **ENGILISH IN SITUATIONS.**, R.O.NEILL, OXFORD UNIVERSITY PRESS.
4) **PRACTICAL ENGLISH USAGE**, SUSAN, OXFORD
5) **SPOKEN ENGLISH**, V. SHANSHIKUMAR, P.V.DHAMIJA, TMH, NEW DELHI.
6) **REMEDIAL ENGLISH GRAMMAR FOR FOREIGN STUDENTS**, F.T.WOOD

7) **WRITTEN COMMUNICATION IN ENGLISH**, SARAH FREEMAN.
8) **COMMUNICATION SKILLS IN ENGLISH**, ED.BY THE DEPT OF ENGLISH, OSMANIA, University, HYDERABAD.
9) **WORD POWER MADE EASY**, NORMAN LEWIS
10) **A STUDENTS GRAMMAR OF THE ENGLISH LANGUAGE** – GREENBAUM PEARSON EDUCATION
11) **LONGMAN LANGUAGE ACTIVATOR** – BY LONGMAN – PERSON EDUCATION.

CCFT-2B - FOOD CHEMISTRY – II

Number of Units	Topics
1	Chemistry of food flavour 1) Functional characteristics of different 2) Philosophy & definitions of flavour 3) Flavourmatics / flavouring compounds 4) Sensory assessment of flavour 5) Technology for flavour retention
2	Food additives & Technology i) General attributes ii) Buffer systems / salts / acids iii) Chelating agents & sequestrants iv) Antioxidants v) Antimicrobial agents vi) Non-nutritive & low calorie sweeteners vii) Stabilizer & thickeners viii) Fat replacers ix) Texturizers & Improvers
3	Pigments in animal & plants kingdoms i) Heme pigments ii) Chlorophyll iii) Carotenoids iv) Phenolic & flavonoids v) Betalins vi) Effect of processing on pigment behavior vii) Technology for retention of natural colours of food stuffs
4	Food Colorants i) Regulatory aspects - Natural & synthetic permitted food colours. Ii) Properties of certified dyes iii) Use of regulatory dyes iv) Colour losses during thermal processing

5	Vitamins & Minerals i) Dietary sources & requirements ii) Allowances iii) Enrichment iv) Restorations v) Fortifications vi) Losses of vitamins & minerals
6	Food toxicology i) Inherent toxicants - antinutritional factors, their occurrence, effects & methods of elimination of inactivation - protease inhibitions, lectins, lathyrogens, phytates & flatulence factors ii) Terms in toxicology ii) Safety evaluation using traditional & modern approach iv) Food contaminants v) Pesticide residues - permitted limits vi) Toxicology & public health
7	Enzymes in foods i) Role of endogenous enzymes in maturation and ripening ii) Enzymatic browning - mechanism, methods of regulation control.

Practicals **CCFT-2B**

Number of Units	**Topics**
1	Determination of food colors
2	Estimation of calcium
3	Determination of iron
4	Determination of vit. A (Total carotenoids)
5	Determination of ascorbic acid by dye method
6	Study of estimation of trypsin inhibitor activity.
7	Study of tannins and phytic acid from food

REFERENCE BOOKS

1. Food Chemistry Vol .1 Fennama O. R.
2. Food Chemistry Mayer L.H.

CCFT-3B - HUMAN NUTRITION

Number of Units	Topics
1	Concepts & content of nutrition Nutrition agencies Nutrition of community Nutritional policies & their implementation Metabolic function of nutrients
2	Water & energy balance Water intake & losses Basal metabolism – BMR Body surface area & factors affecting BMR
3	Formulation of diets Classification of balanced diet Preparation of balanced diet for various groups Diets & disorders
4	Recommended dietary allowances For various age groups According physiological status Athletic & sports man Geriatric persons
5	Malnutrition Type of Malnutrition Multi-factorial causes Epidemiology of under nutrition & over nutrition Nutrition infection & immunity Nutrition education
6	Assessment of nutritional status based on Diet surveys Anthropometry Clinical examination Biochemical assessment Additional medical information
7	In-born errors of metabolism related to Blood constituents Nutrients Hormones & enzymes Miscellaneous disorders
8	Food fad & faddism
9	Potentially toxic substance in human food

Practicals CCFT-3B

Number of Units	Topics
1	Role of various National & International Agencies in field of human nutrition
2	Study of calculation of BMR & body surface area
3	Preparation of balance diets, evaluation of energy value & techno economical feasibility
4	Anthropometric measurements
5	Techniques in animal feeding experiments
6	Biochemical analysis of urine & blood
7	Nutritional survey
8	Determination of energy value by Bomb Calorimeter
9	Study of c omputation of energy requirements On the basis of physical activity & ACU unit

REFERENCE BOOKS

1. Community Nutrition — Mc. Laren
2. ICMR Publications — ICMR
3. Food & Nutrition — M. Swaminathan
4. Assessment of Nutritional Status of the — D. B. Jelliffee Community

CCFT-4B - CEREAL PROCESSING TECHNOLOGY

Theory

Number of Units	Topics
1	Present status and future prospects of cereals (Rice, Wheat,/Corn, Sorghum, Rye)
	Morphology of Rice: Physical properties: Density Bulk density, Angle of repose.- Hardness, asperity, porosity, Stack of milling and moisture on physical properties Chemical composition-Distribution of nutrients and Aroma of rice. Drying of paddy –General principles and methods of drying batch type, continuous type driers
2	Parboiling of rice : Milling of rice : i) Conventional Milling ii) Modern Milling iii) Advantages & Disadvantages of milling machineries iv) By products of rice milling Aging of rice, Enrichment –Need of Enrichment Methods of Enrichment, Enrichment levels fortification of amino acids-Processed Foods from rice-Breakfast cereals, Flakes, Puffing, Canning and Instant rice
3	Corn Morphology, Physico-chemical properties corn Milling fractions and preparations of modifications of modified starches Barley-Morphology- Physico- chemical properties and processing (Malting)
4	Sqrghum –Morphology, Physico-chemical properties Milling, Malting, Pearling and Industrial Utilization
5	Millets –Oat /Rye –Importance of Millet Composition, Processing of millets for Food uses.

Practicals **CCFT-4B**

Number of Units	Topics
	Study of Cooking quality of rice
	Study of Milling of Rice
	Study of Conditioning of Wheat
	Study of Production of sorghum flakes
	Production of popcorns
	Study of Preparation of sorghum malt
	Determination of gelatinization temperature by amylograph

REFERENCE BOOKS

1	Technology of Cereals	Kent
2	Post Harvest Technology of Cereals Pulses Pulses and Oil seeds	A. Chakrawarthy
3	Modern Cereal Science and Technology	Y. Pomeranz
4	Utilization of Rice	Luh
5	Post Harvest Bio Technology of Cereals	D.K. Salunkhe
6	Hand Book of Cereal Science and Technology	O.R. Fennema, Markus Karel

CCFT-5B - POST HARVEST MANAGEMENT OF FRUITS AND VEGETABLES

Theory

Number of Units	Topics
1	Post harvest technology of fruits and vegetables : An over view concept and science, importance of loss reduction, role in export, economy & employment generation
2	Morphology, structure and composition of fruit and vegetable – physical, textural characteristics, structure and composition
3	Maturity standards - Importance, method of maturity determinations maturity indices for selected fruits and vegetables
4	Harvesting of important fruits and vegetable
5	Fruits ripening – chemical changes, regulations, methods
6	Storage practices : controlled atmospheric, Bead atmosphere, hypobaric storage, cool store, zero energy cool chamber
7	Commodity pretreatments – chemicals, wax coating, prepacking
8	Physiological post harvest diseases, Chilling injury and diseases
9	Handling and packaging of fruits and vegetable - post harvest handling system for citrus, mango, banana, pomegranate, tomato, papaya, and carrot packaging house operations
10	Principles of transport and commercial transport operations

Practicals CCFT-5B

Number of Units	Topics
1	Studies on harvesting of fruits and vegetables
2	Studies on wax coating on apples, papaya, citrus, mango, aonla
3	Studies on precooling and storage of fruits and vegetables
4	Studies on regulations of ripening of banana, mango, papaya,
5	Studies on various storage systems and structures
6	Studies on prepackaging of fruits
7	Studies on physiological disorders – chilling injury of banana and custard apple
8	Visit to commercial packing house-grape/mango/pomegranate/banana
9	Visit to commercial storage structures onion, garlic, potato

Reference books

1. Post harvest Physiology, Handling and Utilization of Tropical and Subtropical Fruits and vegetable. — Er. B. Pantastico ,
2. Post Harvest : An Introduction to be physiology and Handling of Fruits and Vegetables. — R. B. Wills,
Post Harvest Technology of Fruits and Vegetables – Vol. I — M.B. Mc Glasson, D. Graham, T. L. Lee and E.G. Hall. L. R. Verma, and V. K. Joshi.
3. Hi-tech Horticulture — D. K. Singh
4. Biochemistry of Foods — Eskin, Henderson and Townsend Duckworth.
5. Fruit and vegetable Technology

CCFT-6B- FOOD MICROBIOLOGY

Theory

Number of Units	Topics
1	Microbial spoilage of foods
2	Chemical changes caused by microorganisms
3	Principles of food preservation
4	Control of microorganisms by use of low & high temperature
5	Asepsis, water activity, drying, preservatives, radiation & pressure for control of microorganisms
6	Microbiology of milk and milk products
7	Microbiology of fruits and vegetables Sources of contamination, spoilage and prevention
8	Microbiology of cereal &Cereal products. Sources of contamination. Spoilage & prevention
9	Microbiology of meat and meat products. Sources of contamination, spoilage and prevention
10	Microbiology of fish and other sea foods Sources of contamination, spoilage and prevention
11	Microbiology of poultry and eggs

12	Microbiology of sugar and sugar products Sources of contamination, spoilage and prevention
13	Microbiology of salts and spices Sources of contamination, spoilage and prevention
14	Microbiology of canned foods Sources of contamination, spoilage and prevention

Practicals CCFT-6B

Number of Units	Topics
1	Study of Isolation of molds from foods
2	Microbial examination of cereal & cereal products Identification, isolation & confirmation of *R. nigricans*
3	Study of microbial examination of vegetable and fruits Identification, isolation and confirmation of *R. Nigricans / Erwinia carotovora*
4	microbial examination of meat and meat products Identification, Isolation & confirmation of *Coliform bacteria / P. fluorescens*
5	microbial examination of fish and other sea foods identification, isolation and confirmation of Proteus
6	Study of microbial examination of eggs and poultry identification, isolation and confirmation of *Pseudomonas fluorescens*
7	Study of microbial examination of milk and milk products identification, isolation and confirmation of *S. thermophilus*
8	Study of microbial examination of sugar, salts and spices Identification, isolation and confirmation of *L. Measenteroides / L. dextranicum*

REFERENCE BOOKS

2. Modern Food Microbiology — James M. Jay.
3. Basic Food Microbiology — G. J. Banwart.
4. Applied Microbiology — Singh B. D., Nallariu P. , Kavikishore p. B. & Singh R. P.
6. Food Microbiology & Lab Practice — Bell

CCFT-7B -FLUID MECHANICS AND HYDRAULICS

Theory

Number of Units	Topics
1	Properties of fluids
2	Static pressure of liquids: Hydraulic pressure, absolute and gauge pressure, pressure head of liquid. Pressure on vertical rectangular surface. Compressible and non compressible and non compressible fluids. Surface tension
3	Pressure measuring devices : simple, differential, micro, inclined manometer and mechanical gauges,
4	Floating bodies : Archimede's principle, stability of floating bodies, Equilibrium of floating bodies
5	Fluid flow : Classification –steady, uniform and non-uniform laminar and turbulent, Bernoulli's theorem and its applications
6	Flow through pipes : Loss of Head
7	Flow through orifices, discharge losses Time for emptying a tank, Venturi meter Pitot tube, Rota meter, Water level point gauge, Hook gauge. Reynold's number.
8	Pumps : Classification, reciprocating, Centrifugal pump, pressure variation, work efficiency Types of chambers, selection and sizing

Practicals **CCFT-7B**

Number of Units	Topics
1	Study of different tools and fittings
2	To plot flow rate versus pressure drop with U-tube manometer
3	Verification Bernoulli's Theorem
4	Determination of discharge co-efficient for Venturi Orifice, V-Notch
5	Verification of emptying time formula for a tank
6	Determination of critical Reynold' number by Reynold' apparatus
7	Study of reciprocating, centrifugal and gear pump
8	Calibration of Rotameter
9	Study of different types of Valves

REFERENCE BOOKS

1 Fluid Mechanics — V.L. Streeter (1983), McGraw Hill, New York

2 Fluid Mechanics — R.S. Khurmi (1994) Sultan Chand Publishers Delhi

3 Hydraulics — Jagdish Lal (1987) Metropolitan Publishers, Delhi

CCFT-8B HEAT AND MASS TRANSFER

Theory

Number of Units	Topics
1	Basic heat transfer process, thermal conductivity Overall heat transfer co-efficient, physical properties related to heat transfer
2	One-dimensional steady state conduction: Theory of heat conduction, Fourier's law Derivation of Fourier's equation in Cartesian co-ordinates, Heat flow through slab, cylinder and sphere with non-uniform thermal conductivity
3	Heat transfer through composite walls and insulated pipelines
4	Steady state heat conduction with heat dissipation to environment: Introduction to extended surfaces (FINS) of uniform area of cross-section. Education of temperature distribution with different boundary conditions. Introduction to unsteady state heat conduction
5	Convection : Forced and free convection, use of dimensional analysis for correlating variables affecting convection heat transfer, Concept of Nusselt number, Prandtl number, Reynolds number,
6	Radiation : emissivity, absorptivity, transmissivity, Radiation through black and grey surfaces determination of shape factors
7	Heat Exchanggers : General discussion, Fouling factors, jacketed kettles, LMTD, parallel and plate heat exchangers.
8	Application of different types of heat exchangers in dairy and food industry
9	Mass transfer : Fick's law of diffusion, steady state diffusion of gases and liquids through solids, isothermal evaporation of water into air, mass transfer coefficient, applications in Dairy and Food industry.

Practicals **CCFT-8B**

Number of Units	Topics
1	To steady various types of heat exchangers used in Dairy Food Industry
2	Preparation and calibration of thermocouples
3	Determination of thermal conductivity : milk, solid dairy food products
4	Determination of overall heat transfer co-efficient of : Shell and tube, plate heat exchangers Jacketted kettle used in Dairy Food Industry
5	Studies on heat transfer through extended surfaces
6	Studies on temperature distribution and heat transfer in HTST pasteurizer
7	Design problems on heat exchangers

REFERENCE BOOKS

1 A Course in Heat Mass Transfer — S. Domkundwar (1993) Danpat Rai and Sons, New Delhi.

2 Heat Transfer — C.P. Gupta (1964) Prentice hall of India, New Delhi.

3 Principles of Heat Transfer — F. Kretith, and M.S. Bohn (1986) Harper and Row Publishers New Yor