Bachelor of Technology (Food Technology)

Programme Code: BTD

Duration – 4 Year Full Time

Programme Structure
And
Curriculum & Scheme of Examination
With
Choice Based Credit System (CBCS)
2017 Batch

AMITY UNIVERSITY RAJASTHAN

JAIPUR

Credit Summary Sheet

B.Tech Food Technology					
Semester	**CC**	**DE**	**VA**	**OE**	**Total**
1	16	3	4	3	26
2	16	3	4	3	26
3	14	3	8	3	28
4	18	3	4	3	28
5	18	3	4	3	28
6	18	3	4	3	28
7	24	3	4	-	31
8	25			-	25
Total	149	21	**32**	**18**	**220**

Minor Track: Food Processing

Course Code	Course Title	Category	Lectures (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Credits
BTD133	Basics in Food Technology and Post Harvest Management	DE	3	-	-	3
BTD233	Confectionary and Sugar Technology	DE	3	-	-	3
BTD 301	Principles of Food Processing	CC	3	1	-	4
BTD432	Enzymes in Food Processing	DE	3	-	-	3
BTD 501	Food Quality- Analysis & Assurance	CC	2	-	2	3
BTD631	Advanced food technology	DE	3	-	-	3
TOTAL						22

Programme Structure

B.Tech Food Technology: I- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD101	Applied Mathematics - I	CC	3	1	-	4
BTD102	Applied Physics - I	CC	2	-	-	2
BTD103	Applied Chemistry - I	CC	2	-	-	2
BTD104	Introduction to Computers	CC	2	-	-	2
BTD105	Life Sciences	CC	2	-	-	2
BTD122	Applied Physics - I -Lab	CC	-	-	2	1
BTD123	Applied Chemistry - I-Lab	CC	-	-	2	1
BTD124	Introduction to Computers-Lab	CC	-	-	2	1
BTD125	Engineering Graphics-Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD130	Term Paper	DE	3	-	-	3
BTD131	Biomolecules: Structure and Function	DE				
BTD132	Basics in Plant Biotechnology	DE				
BTD133	Basics in Food Technology and Post Harvest Management	DE				
OE1	Open Elective-I	OE	3	-	-	3
BCS 101	English	VA	1	-	-	1
BSS 104	Understanding Self for Effectiveness – I	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language - I French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**23**

B.Tech Food Technology: II- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD201	Applied Mathematics - II	CC	3	1	-	4
BTD202	Applied Physics - II	CC	2	-	-	2
BTD203	Applied Chemistry - II	CC	2	-	-	2
BTD204	Object Oriented Programming in C++	CC	2	-	-	2
BTD 205	Thermodynamics	CC	3	-	-	3
BTD222	Applied Physics - II -lab	CC	-	-	2	1
BTD223	Applied Chemistry - II-lab	CC	-	-	2	1
BTD224	Object Oriented Programming in C++ -lab	CC	-	-	2	3
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD230	Term Paper	DE	3	-	-	3
BTD231	Specialty Foods	DE				
BTD232	Plant Resource Utilization	DE				
BTD233	Confectionary and Sugar Technology	DE				
OE	Open Elective-II	OE	3	-	-	3
BCS 201	English	VA	1	-	-	1
BSS 204	Understanding Self for Effectiveness – II	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language - II French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**26**

B.Tech Food Technology: III- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD 301	Principles of Food Processing	CC	3	1	-	4
BTD 302	General Biochemistry	CC	3	1	-	4
BTD 303	General & Applied Microbiology	CC	3	1	-	4
BTD 322	General Biochemistry –Lab	CC	-	-	2	1
BTD 323	General & Applied Microbiology -Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD330	Term Paper	DE	3	-	-	3
BTD331	Food Rheology & Texture	DE				
BTD332	Industrial Crops	DE				
BTD333	Nanotechnology and its application in Food	DE				
OE	Open Elective-III	OE	3	-	-	3
EVS001	Environmental Sciences	VA	4	-	-	4
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Understanding Self for Effectiveness – III	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language - III French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**28**

B.Tech Food Technology: IV- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD 401	Food Chemistry	CC	3	-	-	3
BTD 402	Food Microbiology	CC	3	-	-	3
BTD 403	Principles of Heat & Mass Transfer	CC	3	1	-	4
BTD 404	Mechanics of Fluids	CC	3	1	-	4
BTD 421	Food Chemistry -Lab	CC	-	-	2	1
BTD 422	Food Microbiology-Lab	CC	-	-	2	1
BTD 423	Principles of Heat & Mass Transfer-Lab	CC	-	-	2	1
BTD 424	Mechanics of Fluids-Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD430	Term Paper	DE	3	-	-	3
BTD431	Computer simulation & modeling in food processing	DE				
BTD432	Enzymes in Food Processing	DE				
BTD433	Marketing Management for food	DE				
OE	Open Elective-IV	OE	3			3
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Understanding Self for Effectiveness – IV	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language - IV French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**28**

B.Tech Food Technology: V- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD 501	Food Quality- Analysis & Assurance	CC	2	-	-	2
BTD 502	Processing of Fruits & Vegetables	CC	3	-	-	3
BTD 503	Processing of Milk & Milk Products	CC	3	-	-	3
BTD 504	Food Engineering - I	CC	3	-	-	3
BTD 505	Statistics for Biology	CC	3	-	-	3
BTD 521	Food Quality- Analysis & Assurance -Lab	CC	-	-	2	1
BTD 522	Processing of Fruits & Vegetables -Lab	CC	-	-	2	1
BTD 523	Processing of Milk & Milk Products -Lab	CC	-	-	2	1
BTD 524	Food Engineering - I –Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD530	Term Paper	DE	3	-	-	3
BTD531	Refrigeration & Air Conditioning	DE				
BTD532	Malting & Brewing Technology	DE				
BTD533	Infestation Control and Grain Storage	DE				
OE	Open Elective-V	OE	3			3
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Understanding Self for Effectiveness – V	VA	1	-	-	1
FLT 501 FLG 501 FLS 501 FLC 501	Foreign Language - V French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**28**

B.Tech Food Technology: VI- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD 601	Food Engineering - II	CC	3	1	-	4
BTD 602	Processing of Cereals, Pulses & Oilseeds	CC	3	-	-	3
BTD 603	Processing of Meat, Fish & Poultry Products	CC	3	-	-	3
BTD 604	Food Additives	CC	2	-	-	2
BTD 605	Food Plant Sanitation	CC	2	-	-	2
BTD 621	Food Engineering – II -Lab	CC	-	-	2	1
BTD 622	Processing of Cereals, Pulses & Oilseeds-Lab	CC	-	-	2	1
BTD 623	Processing of Meat, Fish & Poultry Products-Lab	CC	-	-	2	1
BTD 624	Food Additives-Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD630	Term Paper & Industry Visit	DE	3	-	-	3
BTD631	Advanced food technology	DE				
BTD632	Engineering Properties of Food Materials	DE				
BTD633	Food Product Development	DE				
OE	Open Elective-VI	OE	3			3
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Understanding Self for Effectiveness –V I	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language - VI French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**28**

Note: After completion of the End Term Examination the students must compulsorily undergo Industrial Training of 6 weeks. The evaluation of this training would be carried out in VII sem.

For domain elective: BTD630- Term Paper & Industry Visit: In addition to term paper Students must compulsorily undergo Industrial Visit (Cluster of 5-6 Industries) for One week and they will be graded on their learning outcome of the visit for one third component of this Term Paper & Industry Visit.
Evaluation will be as follows;
Term Paper: 2 Credit (70 Marks)
Industry Visit: 1 Credit (30 Marks)

B.Tech Food Technology: VII- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD 701	Principles of Food Biotechnology	CC	2	-	-	2
BTD 702	Packaging of Food Products	CC	2	-	-	2
BTD 703	Principles of Human Nutrition	CC	2	-	-	2
BTD 704	Technology of Spices, Plantation Crops & Flavors	CC	4	-	-	4
BTD 705	Food Equipment and Plant Design	CC	3	1	-	4
BTD750	Industrial Training Evaluation	CC	-	-	-	6
BTD 721	Principles of Food Biotechnology -Lab	CC	-	-	2	1
BTD 722	Packaging of Food Products-Lab	CC	-	-	2	1
BTD 723	Principles of Human Nutrition-Lab	CC	-	-	2	1
BTD 724	Technology of Spices, Plantation Crops & Flavors-Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
BTD730	Term Paper	DE	3	-	-	3
BTD731	Food Adulteration	DE				
BTD732	Management of Food Industry Waste	DE				
BTD733	Food Beverages	DE				
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Understanding Self for Effectiveness – VII	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language - VII French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**34**

B.Tech Food Technology : VIII- SEMESTER						
Course Code	**Course Title**	**Category**	**Lectures (L) Hours Per Week**	**Tutorial (T) Hours Per Week**	**Practical (P) Hours Per Week**	**Credits**
BTD860	Major Project/Dissertation	CC	-	-	-	25
	TOTAL					**25**

APPLIED MATHEMATICS – I

Course Code: BTD101 **Credit Unit: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Differential Calculus

Derivative of a function, Derivatives at a point, Fundamental rules for differentiation: Product Rule, Quotient Rule and Chain Rule, Differentiation of Implicit Functions, Parametric forms and Logarithmic Differentiation, Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's and Maclaurin's Theorem, Asymptote & Curvature, Partial Differentiation, Euler's Theorem, Maxima and Minima

Module II: Integral Calculus

Fundamental Integral Formulae, Methods of Integration: Integration by Substitution, By Parts, Partial Fractions, Definite Integral and its Properties, Reduction Formulae, Application to length, Area and Volume.

Module III: Ordinary Differential Equations

Definition of Order and Degree of differential equation, Formation of ODEs, Solution of Differential Equation of 1st Order and 1st Degree: Variable Separation, Homogeneous Differential Equations, Linear Differential Equations, Exact Differential Equations, General Linear ODE of Second Order, Solution of Homogeneous Equation, Solution of Simple Simultaneous ODE

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text & References:

Text:

- Narayan, S. (2005). Differential Calculus. S. Chand, 30th Revised edition.
- Narayan, S. (2005). Integral Calculus, S. Chand, New Delhi.

References:

- Forsyth, A. R. (2013). A Treatise on Differential Equations, BoD–Books on Demand.
- Dass, H. K. (2008). Advanced Engineering Mathematics , S. Chand, New Delhi.

APPLIED PHYSICS - I

(FIELDS AND WAVES)

Course Code: BTD102 **Credit Unit: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Electrostatics
Brief introduction of Vectors, gradient of a scalar field, divergence and curl of vector field, Electric flux, Gauss's law, Statements of Gauss divergence and Stokes theorem

Module II: Relativity
Michelson-Morley experiment, Inertial & non-inertial frames, Special theory of Relativity, Relativistic space-time transformation, Transformation of velocity, Variation of mass with velocity, Mass-energy equivalence

Module III: Oscillations & Waves
Simple harmonic motion – equation and energy conservation, superposition of two SHMs, Lissajous figures, damped and forced oscillations – equations, amplitude and frequency response, LCR Circuit, resonance, sharpness of resonance, equation of motion for plane progressive waves, superposition of waves

Module IV: Wave Nature of Light
Interference: Conditions of interference, division of wavefront, Fresnel's biprism, division of amplitude, interference due to thin films, Newton's rings
Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, Transmission grating and its resolving power.
Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- French, A. P. (1971). Vibrations and Waves, CRC press.
- William, C., William, C., Elmore., & Mark, A. (1969). Physics of Waves. Courier Corporation Elmore, Heald.
- Griffiths, D. J., Jackson, J. D., & Jackson, J. D. (1962). Introduction to Electrodynamics, Vol. 3, New York etc, Wiley.
- Ghatak, A. K., & Thyagarajan K. (1989). Optical Electronics, Cambridge University Press..

APPLIED CHEMISTRY- I

Course Code: BTD103 **Credit Unit: 03**

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject starting from the very basic bonding mechanism to the application of materials.

Course Contents:

Module I: Chemical Bonding

Types of bond: Ionic, Covalent and Co-ordinate bond; Fajan's rule; Hybridisation; H- bonding ; Valence bond and Molecular orbital theory for diatomic molecule.

Module II: Organic Mechanism

Electronegativity and dipole moment; Electron Displacement Effects: Inductive Effect; Mesomeric Effect; Electromeric Effects; Fission of covalent bonds; Intermediates of Organic reactions; Carbonium, Carbanion, Free Radical and Carbene; Types of organic reactions; Substitution, Elimination, Addition.

Module III: Instrumental method for Analysis

Introduction; Principles of spectroscopy; Law's of Absorbance; IR: Principle Instrumentation; Application; UV: Principle, Instrumentation and Application; NMR Principle and Instrumentation; Application; Chromatography; GC: Principle, Instrumentation and Application; HPLC: Principle, Instrumentation and Application.

Module IV: Thermodynamics

Introduction; Terminology; First Law; Heat Capacity; Calculation of thermodynamic quantities; Adiabatic and Isothermal Process; Reversible and Irreversible Process; Second law of Thermodynamics; Standard State; Gilbb's Helmholtz equation; VantHoff Isotherm and Isochore; Maxwell Relation; Third law of Thermodynamics; Chemical Potential; Activity and Activity Coefficient; Coupled Reactions.

Module V: Chemical Equilibrium

Introduction ; Le Chatelier's Principle; Equilibrium constant from Thermodynamic Constants; Acid-Base Concept; Weak acid and Weak base and their salts; Solubility Product; pH and pOH, Buffer Solution, Buffer Action.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Jain, P. C., & Jain M. (1998). Engineering Chemistry.
- Chawla S. (2002). A Text book of Engineering Chemistry, Dhanpat Rai and Co.(Pvt.) Ltd., Educational and Technical Publishers, Delhi.

References:

- Morrison, R. T., & Boyd, R. N. (1992). Organic Chemistry, 6th.
- Puri, B. R., Sharma, L. R., & Pathania S. M. (1993). Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., New Delhi.
- Finar, I. L. (1973). Organic Chemistry, Vol. 1.

INTRODUCTION TO COMPUTERS

Course Code: BTD: 104 **Credit Unit: 02**

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction

Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C

History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Precedence of Arithmetic operators, Operator precedence of Arithmetic Operators, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C

C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types(automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions

One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations.
Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C

Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structures and Unions. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Kanetkar, Y. (2001). Let us C, BPB Publications, 2nd Edition.
- Balagurusamy, E. (2004). Programming in ANSI C, Tata McGraw-Hill Education.
- Herbert, S. (2002). The Complete Reference, Osbourne Mcgraw Hill, 4th Edition.
- Raja Raman V. (1995). Computer Programming in C , Prentice Hall of India.

LIFE SCIENCES

Course Code: BTD: 105 **Credit Unit: 02**

Course Objective:

The objective of the course is to provide students an understanding of the very basic molecules of life-DNA,RNA, proteins and how these molecules, when form further complex molecules like carbohydrates, vitamins and lipids, then functioning of body takes place. Since technology is advancing in every field, emphasis is also given on the understanding of application of some biotechnological concepts used in our daily life like biofuels, biofertilizers. An introduction to the origin of earth, the environment-air, water and land, origin of life on Earth, how life evolved from a single cell, some environmental problems and measures to be taken to combat them.

Course Contents:

Module I: Cell Biology
Organization of cell (Inorganic-Water and Ions; Organic-Proteins, Lipids and Carbohydrates constituents)
Physical structure of the cell-Brief introduction to the Cell Membrane, Cytoplasm and its Organelles (Nucleus, Mitochondria, Golgi, Endoplasmic Reticulum, Lysosomes, Peroxisomes, Ribosomes, Chloroplasts)
Cell cycle.

Module II: Introduction to Cell Physiology

Transport of substances through the cell membrane- Osmosis, Diffusion and its types, Active transport (Sodium-potassium pump) and Passive transport
Membrane potential, Measuring Membrane Potential, Action Potential
Electrocardiogram (ECG)
Electromyography (EMG)
Electroencephalography (EEG)

Module III: Environmental Biotechnology
Biosensors, Biochips and Biofilms
GMO's and Biofertilizers
Biofuels
Gene Therapy, Stem cell and Nanobiomolecules
Bio Informatics- Introduction and Applications

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Sodhi, G. S. (2005). Fundamental Concepts of Environmental Chemistry, Alpha Science Int'l Ltd.
- Sharma, B. K., & Kaur, H. (2001). An Introduction to Environmental Pollution, Krishna prakashan media (p) Ltd.
- Berg, J. M., Tymoczko, J. L., & Stryer L. (2011). Biochemistry, WH Freeman and Co., New York.
- Lodish, H. (2008). Molecular Cell Biology by. Macmillan, (2008).

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APPLIED PHYSICS – I-Lab

Course Code: BTD: 122 **Credit Unit: 01**

List of Experiments

1. To determine the wavelength of sodium light by Newtons's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Grif/fth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the axis of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ("g") in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

APPLIED CHEMISTRY – I -Lab

Course Code: BTD: 123 **Credit Unit: 01**

List of Experiments

1. Titration of phosphoric acid and sodium hydroxide solution using pH meter.
2. Verification and application of Beer's Law.
3. Spectroscopic analysis of iron in water sample.
4. Conductometric titration.
5. Determination of water modules of crystallization in Mohr's salt.
6. (A) Determination of surface Tension of liquid.
   (B) Application of surface tension method in mixture analysis.
7. Application of distribution law in the determination of equilibrium constant.
8. Analysis of iron ore.
9. Plant pigments separation by paper chromatography.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

INTRODUCTION TO COMPUTERS -Lab

Course Code: BTD: 124 **Credit Unit: 01**

Software Required: Turbo C

Course Contents:

Module I
DOS commands

Module II
Creation of batch files

Module III
C program involving problems like finding the nth value of cosine series, Fibonacci series etc.

Module IV
C programs including user defined function calls

Module V
C programs involving pointers, and solving various problems with the help of those.

Module VI
File handling

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

ENGINEERING GRAPHICS -Lab

Course Code: BTD: 125 **Credit Unit: 01**

Practicals

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point and Lines
Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

Module VI: Development of Surface
Development of simple objects with and without sectioning. Isometric Projection

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

- Engineering drawing by Shah, Mahendrakumar Budhichand, and Bachubhai Chhibubhai Rana Pearson Education India, (2009).
- Geometric Dimensioning & Tolerancing by Gill, Pritam Singh. . Seagull Books Pvt Ltd, (2009).
- Engineering Drawing by Bhatt, N. D. Engineer 4 (1980).

TERM PAPER

Course Code: BTD 130 **Credit Units : 03**

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
c) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

a) Get facts, not just opinions. Compare the facts with author's conclusion.
b) In research studies, notice the methods and procedures, results & conclusions.
c) Check cross references.

4. Outlining the paper

a) Review notes to find main sub-divisions of the subject.
b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper

a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
c) Check for proper spelling, phrasing and sentence construction.
d) Check for proper form on footnotes, quotes, and punctuation.
e) Check to see that quotations serve one of the following purposes:
   (i) Show evidence of what an author has said.
   (ii) Avoid misrepresentation through restatement.
   (iii) Save unnecessary writing when ideas have been well expressed by the original author.
f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:

1) Title page
2) Table of contents
3) Introduction
4) Review
5) Discussion & Conclusion
6) References
7) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

a) summary of question posed
b) summary of findings
c) summary of main limitations of the study at hand
d) details of possibilities for related future research

References

From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions

Monographs

Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles

Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles

McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book

Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles

Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites

Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers

Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations

Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.

Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix

The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

BIOMOLECULES: STRUCTURE AND FUNCTION

Course Code: BTD 131 **Credit Unit: 3**

Course Objective: To give the basic knowledge of structure and functions of various biomolecules including carbohydrates, proteins and various enzymes and their functionality.

Course Content:

Module I

Carbohydrates: Chemical structures, nature, properties of carbohydrates, requirements of carbohydrates, importance of carbohydrates in biological system.

Module II

Proteins and Amino acids: Proteins structures and classification, Zwitterions nature, solubility, primary, secondary and tertiary structure, essential and non-essential amino acids and their importance.

Module III

Enzymes: Classification, Characteristics. Factors affecting enzyme activity. Enzyme kinetics, activation and inhibition. Non- protein enzymes, application of enzymes in biological systems.

Module IV

Lipids: Structure, Classification, Properties and Function of lipids, role of lipids in food processing, fats and oils their properties

Module V

Bioenergetics: Thermodynamic System, I and II law of Thermodynamics. Free energy, standard free energy change. Redox potential. High energy Phosphate compounds. Free energy of Hydrolysis of ATP, and sugar phosphates

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Granner, D. K., Murray, R. K., Mayes, P. A., & Rodwell, V. W. (1988). Harper's Biochemistry (Vol. 21). Appleton & Lange.
- Stryer, L. (2006). Biochemistry by, Publisher Freeman and Company, 3rd Edition.
- Cooper, T.G. (2007). Tools of Biochemistry by Publisher John Wiley and Sons Inc, 3rd edition.

References:

- Thomas F. (1995). Cellular Biophysics I & II. Weiss publisher , MIT Press, 2nd edition.
- Segal, I.H. (2001). Biochemical calculations by Publisher John Wiley and Sons, 3rd edition (2001)
- Lehninger, A.L. Nelson, D.L. Cox, M.M (2008). Principles of Biochemistry, Worth Publishing, 3rd edition.

BASICS IN PLANT BIOTECHNOLOGY

Course Code: BTD 132 **Credit Unit: 3**

Course Objective: The application of Plant Biotechnology covers major areas related to commercial applications. Regeneration of plants through *in vitro* techniques offers a practical strategy for micro propagation. Importance will also be given to areas like *in vitro* fertilization, animal cell and tissue culture, hormone vaccine and important enzyme production through animal biotechnology.

Course Contents:

Module I
Plant Tissue Culture applications – micropropagation, from Callus to plant, somatic embryogenesis, somaclonal variation, valuable germplasm, chemicals from plants, genetically engineered plants.

Module II
Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors.

Module III
Genetic modification in Agriculture – transgenic plants, genetically modified foods, application, future applications, ecological impact of transgenic plants, ethical issues related to GM crops.

Module IV
Genetically modified foods – organic foods, types of organic foods, identifying organic foods, organic food & preservatives.

Module V
Genetic modification in Food industry – background, history, controversies over risks, application, future applications.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Razdan, M.K. (2010). An Introduction to Plant Tissue Culture by Oxford and IBH Publishing 3rd edition.
- Dodds, J.H. & Roberts, L.K. (2006). Experiments in Plant Tissue Culture by publisher Cambridge University Press, 3rd edition.
- Caldenty, K.M.O. Barz, W.H. (2001). Plant Biotechnology and Transgenic Plants Wills, Marcel Dekker, 2nd edition.
- Plant Biotechnology by J. Hammond, P.McGarvy and V. Yusibov publisher Springer Verlag, 3rd edition (2010)
- Fu, T-J., Singh, J and Curtis, W.R. (2008). Plant Cell & Tissue Culture for the Production of Food Ingredients publisher Kluwer Adacemic/Plenum Press 4th edition.

BASICS IN POST HARVEST MANAGEMENT AND FOOD PRESERVATION

Course Code: BTD 133 **Credit Unit: 3**

Course Objective: To acquaint with the proper handling technologies of fruits and vegetables to reduce post harvest losses

Module I
Post Harvest:
Post-harvest technology: Importance of post harvest management of food, post harvest management of fruits and vegetables, cereals and other agricultural produces

Module II
Post harvest losses:
Causes of post-harvest losses; Maturity, ripening and biochemical changes after harvesting in fruits and vegetables, climacteric and non-climacteric fruits and their post harvest handling.

Module III
Reduction of post harvest losses
Post-harvest loss reduction technology including aspects of packaging, storage, post-harvest treatment. MAS, CAS of food commodities.

Module IV
Basics in Food preservation:
General principles and method of preservation; Principles and applications of modern techniques in food processing. Principle of various food preservation methods.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Verma, L. R., & Joshi, V. K. (Eds.). (2000). Postharvest technology of fruits and vegetables: handling, processing, fermentation, and waste management(Vol. 2). Indus Publishing.
- Goel, A.K & Kumar, R. (2007).Post harvest management and value addition by Daya Publishing House 2th edition.

References:

- Kader, A. A. (2002). Postharvest technology of horticultural crops (Vol. 3311). UCANR Publications., 2nd edition.
- Lal, G., Siddappa, G. S., & Tandon, G. L. (2000). Preservation of fruits and vegetables. ICAR, 6th Edition

ENGLISH

Course Code: BCS 101 **Credit Unit: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I

Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II

Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication

The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication

Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I

Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II

Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication

Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman

Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

*** 30 hrs Programme to be continued for Full year**

UNDERSTANDING SELF FOR EFFECTIVENESS - I (UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSS 104 **Credit Unit: 01**

Course Objective:

This course aims at imparting:
Understanding self & process of self exploration

Learning strategies for development of a healthy self esteem

Importance of attitudes and its effective on personality

Building Emotional Competence

Course Contents:

Module I: Self: Core Competency

Understanding of Self

Components of Self – Self identity

Self concept

Self confidence

Self image

Module II: Techniques of Self Awareness

Exploration through Johari Window

Mapping the key characteristics of self

Framing a charter for self

Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness

Meaning and Importance

Components of self esteem

High and low self esteem

Measuring your self esteem

Module IV: Building Positive Attitude

Meaning and nature of attitude

Components and Types of attitude

Importance and relevance of attitude

Module V: Building Emotional Competence

Emotional Intelligence – Meaning, components, Importance and Relevance

Positive and Negative emotions

Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Davis, K. Organizational Behaviour,
- Hoover, Judhith D. (2002). Effective Small Group and Team Communication, Harcourt College Publishers.
- Charles: Team Management, Dick, Mc Cann & Margerison, Edition, viva books (1992)
- Bates, A. P., & Julian, J. Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G. (1985). Oxford Textbook of Public Health, Vol. 4.
- LaFasto & Larson. (2001). When Teams Work Best, Response Books (Sage), New Delhi.
- Pfeiffer J W. (1996). Theories and Models in Applied Understanding Self for Effectiveness, Vol 2, Group Pfeiffer & Company.
- Smither R. D. (1994). The Psychology of Work and Human Performance, Harper Collins College Publishers.

FRENCH - I

Course Code: FLT 101 **Credit Unit: 02**

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1,2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - I

Course Code: FLG 101 **Credit Unit: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction

Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.

All personal pronouns in relation to the verbs taught so far.

Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),

Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel

To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics

Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages

To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles

The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions

To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns

Simple possessive pronouns, the use of my, your, etc.

The family members, family Tree with the help of the verb "to have"

Module VIII: Colours

All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"

The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.

"Wie viel kostet das?"

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: FLS 101 **Credit Unit: 02**

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 101 **Credit Unit: 02**

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader Part I" Lesson 1-10

APPLIED MATHEMATICS – II

Course Code: BTD: 201 **Credit Unit: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from athematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Linear Algebra

Definition of a Matrix, Operations on Matrices Determinants, Elementary Operations, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination and Gauss Jordan – Method, Eigen values and Eigen Vectors of Matrix, Caley-Hamilton theorem, Diagonalization of a matrix.

Module II: Complex Number

Definition of Complex Number, Equality, Conjugate and Modulus of a Complex Number, Polar form of a Complex Number, De-Moivre's Theorem, Roots of a Complex Number, Exponential and Circular function of a Complex Number, Hyperbolic Functions and their inverses.

Module III: Vector Calculus

Scalar and vector field, Gradient, Divergence and Curl, Directional Derivative, Evaluation of a Line Integral, Green's theorem in plain (without proof), Stoke's theorem (without proof) and Gauss Divergence theorem (without proof)

Module IV: Probability and Statistics

Frequency Distribution, Arithmetic Mean, Median, Partition Values, Mode, Variance and Standard Deviation, Curve Fitting, Principle of least squares, Linear regression.

Introduction to Probability, Addition and Multiplication theorem of Probability, Random variables and Probability Distribution,Expected values, Binomial distribution, Poisson distribution and Normal.

Distribution and their Applications.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Dass, H.K. (2011). Higher Engineering Mathematics, S. Chand, Delhi.
- Mishra, S. (2013). Fundamentals of Mathematics Funcations a: Functions and Graphs. Pearson Education, First ed.

APPLIED PHYSICS - II

Course Code: BTD: 202 **Credit Unit: 02**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering.

Course Contents:

Module I: Wave Mechanics

de-Broglie matter waves, wave nature of particles, phase and group velocity, Heisenberg uncertainty principle, wave function and its physics interpretation, Operators, expectation values. Time dependent & time independent SchrÖdinger wave equation for free & bound states, square well potential (rigid wall), Concept of step potential.

Module II: Atomic Physics

Vector atom model, LS and j-j coupling, Zeeman effect & Paschen-Back effect, Bragg's law, X-ray spectra and energy level diagram, Laser – Einstein coefficient, population inversion, condition of light amplification, He-Ne and Ruby laser

Module III: Solid State Physics

Sommerfield's free electron theory of metals, Fermi energy, Energy bands in solids, physics of semi-conductors, doping, intrinsic and extrinsic semiconductors, Depletion layer, characteristics of PN junction, Forward and reverse baising, Breakdown voltage, Superconductivity, Meissner effect, Introduction to Nanomaterials

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Beiser, A. (2002). Concept of Modern Physics, McGraw-Hill Higher Education; 6th edition.
- Agarawal & Goel. (2011). Applied Physics II, Pragati Prakashan.
- Pallai, S. O. (2009). Solid State Physics, New Academic Science Ltd; 6 edition.
- Wehr & Richards. (1984). Physics of Atom, Addison-Wesley, 4 edition.

APPLIED CHEMISTRY - II

Course Code: BTD: 203 **Credit Unit: 02**

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject starting from the very basic bonding mechanism to the application of materials.

Course Contents:

Module I: Water

Hardness of Water; Boiler Feed Water; Scale and Sludge; Softening of Water; External and Internal Treatment of Boiler Water; Domestic Water Treatment; Domestic Water Treatment; Desalination of Brackish Water; Chemical Analysis of Water; Dissolved O_2 (BOD, COD); Estimation of Free Chlorine; TDS.

Module II: Lubricants

Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

Module III: Fuel

Introduction; Characteristics of good Fuel ; Calorific value; Bomb Calorimeter; Proximate and Ultimate analysis of coal; Carbonization of coal; Gasification and Liquification of coal: Fischer Tropsch and Bergius Process; Water Gas and Producer Gas

Module IV: Polymers

Introduction; Polymerization: Addition and Condensation Polymerization; Thermosetting and Thermoplastic Polymers; Molecular Weight of Polymer; Rubber, Plastic and Fiber; Preparation, Properties and uses of PMMA, Polyester, Epoxy Resins and Bakelite, Silicone Polymers.

Module V: Corrosion

Introduction, Mechanism of Dry and Wet Corrosion, Types of Corrosion, Galvanic Corrosion, Concentration Cell Corrosion, Passivity, Underground Soil Corrosion, Pitting Corrosion, Intergranular Corrosion, Waterline Influencing Corrosion, Corrosion Control.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Jain & Jain. (2008). Engineering Chemistry, Dhanpat Roy & Sons eds.
- Chawla, S. (2009). Engineering Chemistry, Dhanpat Roy & Sons eds.

References:

- Dara, S.S. (2004). Engineering Chemistry, S Chand, New Delhi.
- Ratan, S. (2013). Engineering Chemistry, S.K. Kataria & Sons.

OBJECT ORIENTED PROGRAMMING IN C++

Course Code: BTD: 204 **Credit Unit: 02**

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- Venugopal, A.R., & Ravishanker, T. (1997). Mastering C++, TMH Publications.
- Lafore R. (2004). Object Oriented Programming using C++, BPB Publications.
- Balagurusamy E. (2013). Object Oriented Programming with C++, TMH; Sixth edition.

References:

- Parasons. (1999). Object Oriented Programming with C++, BPB Publication.
- Lawlor, S. C. (2002). The Art of Programming Computer Science with C++,Vikas Publication.

THERMODYNAMICS

Course Code: BTD 205 Credit Unit : 03

Course Objective:

Objective of this course is to achieve an understanding of the scientific principles of thermodynamics, and heat transfer. This course also helps students understand the application of basic fluid mechanics, thermodynamic, and heat transfer principles and techniques, including the use of empirical data, to the analysis of representative fluid and thermal energy components and systems encountered in the practice of electrical, electronic, industrial and related disciplines of engineering.

Course Contents:

Module I: Basic concepts
Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth law of Thermodynamics, Work and heat, Flow work.

Module II: First Law of Thermodynamics
Mechnical equivalent of heat, internal energy, Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes.

Module III: Second Law of Thermodynamics and Entropy
Heat Engine, Heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle-Carnot Cycle, Clausius inquality, entropy, entropy change during different processes, Principle of entropy incease, concepts of availability, irreversibility.

Module IV: Air-Cycles
Carnot cycle, Otto cycle, Diesel cycle, Dual cycle; Reversed Carnot cycle.

Module V: Properties of Steam
Use of steam tables, wet steam, superheat steam, different processes of vapor, mollier Diagram.

Module VI: Reciprocating Air Compressors
Single stage compressor, Isothermal efficiency, adiabatic efficiency, clearance volume, volumetric efficiency, multi-stage compression with intercooling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

Text & References:

Text:
- P K Nag, “Engineering Thermodynamics”, Tata McGraw Hill

References:
- Sonntage/ Vanhylene, “Fundamentals of Thermodynamics”, Wiley.
- Rahul Gupta, “Engineering Thermodynamics”, Asian Books P Ltd.
- Gordon Rosers, “Yon Mahew; Engineering Termodynamics”, Addison Wesley.
- Y V C Rao, “Engineering Thermodynamics”, Khanna Publications.
- E Gutra, “Basic Thermodynamics”, Narosa Publications.
- M L Mathur, “Mehtra F.S. Thermal Engineering”, Jain Brothers.
- R K Rajput, “Thermal Engineering”, Laxmi Publications.
- Onkar Singh “Applied Engineering”, New Age Publications.
- Dhomkundwar Kothandaraman, “A Course in Thermal Engineering”, Dhanpat Rai Publications.
- S K Kulshretha, “Engineering Thermodynamics”, Vikas Publications.

N.B: Denoted as BTMME 20301 under B.Tech, Mech & Automation Engineering programme.

APPLIED PHYSICS – II -Lab

Course Code: BTD: 222 **Credit Unit: 01**

Practicals

List of Experiments

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ("g") using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (Solar cell).

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

APPLIED CHEMISTRY – II -Lab

Course Code: BTD: 223 **Credit Unit: 01**

Practicals

Course Contents:

1. Determining the viscosity index of lubricating oil by using Redwood viscometer.
2. Determining the flash point and fire point of lubricating oil.
3. Determination of Hardness of Water.
4. Chemical Analysis of Water like Alkalinity, residual Chlorine.
5. Synthesis of Urea Formaldehyde resin.
6. Determination of Molecular weight of Polymer.
7. Determination of Ion exchange capacity of a region.
8. Determination of dissolved Oxygen in Water.
9. Determination of Iodine value in water.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

OBJECT ORIENTED PROGRAMMING IN C++ -Lab

Course Code: BTD: 224 **Credit Unit: 01**

Practicals

Software Required: Turbo C++

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

TERM PAPER

Course Code: BTD 230 **Credit Units : 03**

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

7. Choosing a subject
8. Finding sources of materials
9. Collecting the notes
10. Outlining the paper
11. Writing the first draft
12. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

d) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
e) Begin by making a list of subject-headings under which you might expect the subject to be listed.
f) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

d) Get facts, not just opinions. Compare the facts with author's conclusion.
e) In research studies, notice the methods and procedures, results & conclusions.
f) Check cross references.

4. Outlining the paper

c) Review notes to find main sub-divisions of the subject.
d) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper

g) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
h) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
i) Check for proper spelling, phrasing and sentence construction.
j) Check for proper form on footnotes, quotes, and punctuation.
k) Check to see that quotations serve one of the following purposes:
   (iv) Show evidence of what an author has said.
   (v) Avoid misrepresentation through restatement.
   (vi) Save unnecessary writing when ideas have been well expressed by the original author.
l) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:

8) Title page
9) Table of contents
10) Introduction
11) Review
12) Discussion & Conclusion
13) References
14) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

e) summary of question posed
f) summary of findings
g) summary of main limitations of the study at hand
h) details of possibilities for related future research

References

From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions

Monographs

Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles

Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles

McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book

Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles

Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites

Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers

Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations

Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.

Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix

The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

SPECILITY FOODS

Course Code: BTD 231 **Credit Unit: 3**

Course Objective: To acquaint the students about special food for specific purpose and with specific nutrients.

Course Content:

Module I:
Introduction
Need and scope of specialty foods

Module II

Specialty food based on ease in preparation for cost health benefits: Functional foods, Convenience food, Health care and medical benefits, Nutritional status, Low cost foods

Module III

Specialty foods based on sources: Cereals and millets, Legumes and pulses, Fruits and vegetables, Animal food sources, By-product based, Non conventional sources.

Module IV
Specialty foods based on process:
Cereals and millets, Innovate process technology, Food additives basis, bioactive components, Novel nutraceuticals products, Packaging techniques, Adaptable technology basis.

Module V
Specialty food based on genetics:
Genetically modified foods, transgenic foods, Biotechnological aspects of detoxification.

Module VI
Therapeutic foods:
Modification of diets in disorders, feeding purposes, Disease oriented of different organs e.g. digestive tract, liver, cardiovascular system, kidney, metabolic disorders, allergy, endocrine disorders, Supplementary foods.

Module VII
Specific consumers oriented foods
Fast foods, Defense persons, Space/astronaut, High altitude mountain climbers, Sports foods.
Module VIII
Specialty foods based on growing/cultivation methods: organic, inorganic farming

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Bamji MS, Rao NP & Reddy V. (2003). Textbook of Human Nutrition 4th ed Publisher Oxford & IBH.
- Joshi SA. (1999). Nutrition and Dietetics 4th ed. Tata McGraw Hill.
- Khanna K, Gupta S,Passi SJ, Seth R & Mahna R. (1997). Nutrition and Dietetics, 4th ed. Phoenix Publ. Essentials of Foods and Nutrition Vol. II by Swaminathan M. Publisher Ganesh & Co. 7th edition (1994)
- Zhao, Y. (2002). Specialty Foods: Processing Technology, Quality, and Safety, 3rd ed Publisher CRC Press

PLANT RESOURCE UTILIZATION

Course Code: BTD 232 **Credit Unit: 3**

Course Objective: To give the knowledge to students about various aspect of plant resource, their importance, utilization and commercialization

Course Content:

Module I: Cereals

Wheat and Rice, Role of dwarf varieties in green revolution; brief account of millets and pseudocereals.

Module II: Legumes

General account, importance to man and ecosystem; chief pulses grown in India.

Module III: Sugars and starches

Ratooning and nobilization of sugarcane, products and by products of sugarcane industry; Potato (Tuber anatomy and propagation methods) and comparative account with cassava

Module IV: Beverages

Tea, coffee and cocoa, their processing and some common adulterants.

Module V: Essential Oils

General account and comparison with fatty oils.

Module VI: Drug Yielding Plants

Therapeutic and habit forming drugs with special reference to Cinchona, Digitalis, Rauvolfia, Papaver and Cannabis.

Module VI: Fibers

Classification based on the origin of fibers, Tetraploid cotton and Jute

Module VII: Fruits

Mango, Papaya, citrus fruits

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Kochhar, S.L. (2002). Economic Botany 3rd ed. Tropic Publisher Macmillan and Co. New Delhi.
- Wickens, G.E. (2004). Economic Botany: Principles and Practices 3rd ed. Publishers Springer.
- Slater, A., Scott, N.W. & Fowler, M.R. (2008). Plant Biotechnology: The Genetic Manipulation of Plants, 4th ed. Publisher Oxford University Press.

SUGAR AND CONFECTIONARY TECHNOLOGY

Course Code: BTD 233 Credit Unit: 3

Course Objective: To impart basic and applied technology of confectionary and acquaint with the manufacturing technology of confectionary products.

Course Content:

Modules I Introduction of sugar and Confectionary, Present status and future scope of sugar and confectionery industries.

Modules II Properties of ingredients Sugar: sugar qualities, physical, chemical, optical properties of sugar. Other Ingredients: Properties of invert sugar, glucose syrup, dextrose, fructose, lactose, caramel, maltose, honey, sorbitol, xylitol, iso malt, soy maltose, polydextrose, lactitol, maltitol, Additives used in confectionery.

Modules III Sugar, Cocoa and Chocolate processing
Sugar : Processing of sugar, Cocoa : cocoa bean processing, roasting, fermentation, production of cocoa butter, cocoa powder, its quality Chocolate : Ingredients, mixing, refining, conching, tempering, moulding, cooling, coating, fat bloom

Modules IV High boiled sweets: Introduction, composition, properties of high boiled sweets, preparation of high boiled sweets, traditional, batch and continuous method of preparation. different types of higher boiled sweets, recipes

Modules V Toffee, Fudge and Caramel: Definition, composition, types of ingredient and their role, batch and continuous method of Toffee, Fudge and Caramel

Modules VI Lozenges, Fondant and Chewing Gums definition recipe, method of manufacture, compositions, factors affecting quality, industrial production, checklist of faults
Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Jackson, E.B. (2002). Sugar Confectionery Recipes and Methods, 4th ed. publisher Jackson Associates.
- Francis, F.J (2000). Wiley Encyclopedia of Food Science & Technology. 3rd ed. Publisher, John Wiley & Sons.
- Lees, R. & Jackson, E.B. (2002). Sugar Confectionery & Chocolate Manufacture. 4th ed. Jackson Associates.

ENGLISH

Course Code: BCS 201 **Credit Unit: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I

Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II

Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication

The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication

Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I

Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II

Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication

Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats

O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

UNDERSTANDING SELF FOR EFFECTIVENESS - II (PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 **Credit Unit: 01**

Course Objective:

To enable the students:
Understand the process of problem solving and creative thinking.
Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving

What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
- Perception
- Expression
- Emotion
- Intellect
- Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
- Convergent and Divergent thinking
- Idea generation and evaluation (Brain Storming)
- Image generation and evaluation
- Debating

The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael S. (1999). How to be a Better Problem Solver, Kogan Page, New Delhi.
- Geoff P. (1999). How to be a Better at creativity; by: Kogan Page, New Delhi, (1999)
- Richard Y. C., & Keith P., (1998). Wheeler Publishing, New Delhi.
- Phil Lowe Koge (1996). Page: Creativity and Problem Solving, New Delhi,
- Pfeiffer, J. W., (1996). Theories and Models in Applied Understanding Self for Effectiveness, Management Pfeiffer & Company.
- Bensley, A. D. (1998). Critical Thinking in Psychology – A Unified Skills Approach, Brooks/Cole Publishing Company.

FRENCH - II

Course Code: FLT 201 **Credit Unit: 02**

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3: Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: **Découvrir son environnement**

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN – II

Course Code: FLG 201 **Credit Unit: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods

Time and times of the day.

Weekdays, months, seasons.

Adverbs of time and time related prepositions

Module II: Irregular verbs

Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs

To comprehend the change in meaning that the verbs undergo when used as such

Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension

Reading and deciphering railway schedules/school time table

Usage of separable verbs in the above context

Module V: Accusative case

Accusative case with the relevant articles

Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns

Nominative and accusative in comparison

Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions

Accusative propositions with their use

Both theoretical and figurative use

Module VIII: Dialogues

Dialogue reading: 'In the market place'

'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: FLS 201 **Credit Unit: 02**

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco)*.
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Posessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201 **Credit Unit: 02**

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji".
"Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb "qu"
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

PRINCIPLES OF FOOD PROCESSING

Course Code: BTD 301 **Credit Units : 03**

Course Objective:

To give students an insight into application of unit operations like heating, cooling, freezing, concentration, drying, irradiation, etc. for processing of foods

Course Contents:

Module I: Introduction

Definition of food technology; Branches of food technology, their definition and significance; Objectives of food technology and role of food technologists in food supply chain ;Brief history of development of food technology; Economic significance of food processing; Factors influencing growth of food processing industry. Major Indian and International bodies associated with food technology.

Module II: Application of Heat for Food Preservation

Definition of thermal processes; Thermal resistance of microorganisms; Factors affecting process requirements; General aspects of canning and bottling, process time evaluation; Thermal processing equipments; Processes for canning of selected foods

Module III: Removal of Heat for Food Preservation

Refrigeration and storage of fresh foods; Requirements of a refrigeration plant; Controlled atmosphere and hypobaric storage; Requirements for refrigerated storage of selected foods and food products; Basic principles of freezing preservation; Freezing point and freezing time: factors affecting them; Freezing processes for selected food products, their storage and thawing methods; Effects of freezing on food quality

Module IV: Food Preservation by Removal of Moisture

Basic principle of preservation, water activity; Concentration processes in food industry; Equipments for concentration food products; Drying characteristics of foods and factors affecting drying rate; Driers and their uses; Effect of drying on quality of food products; Intermediate moisture foods

Module V: Irradiation and Microwave Heating

Principles of microwave heating and its application in food processing; Sources of ionizing radiations and mode of their action in food preservation; Dosimetry and doses of radiation required for food irradiation

Module VI: Preservation by Fermentation and Chemical Preservatives

General principles of fermentation processes and their application to pickling, curing and other processes; Use of chemicals to preserve food products- classification, permitted levels and their effect on quality of food products and consumer health

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text :

- Potter, NN Food Science (1999). AVI Publishing Co.
- Fellow PJ. (2004). Principles of Food Processing.

References

- Ranganna, S. (2004) Handbook of Canning and Aseptic Packing. Tata-Mac Graw Hill Book Co. New Delhi
- Manay, S.N. and Shadaksharaswamy, M. (2006) Food: Facts and Principles. New Age International

GENERAL BIOCHEMISTRY

Course Code: BTD 302 **Credit Units : 03**

Course Objective:

To give an understanding about structure and function of biopolymers, viz., carbohydrates, lipids, proteins, nucleic acid, enzymes, minerals and vitamins

Course Contents:

Module I

Introduction; Chemical components of cell, cellular organization and biological functions of cellular organelles; cellular environment; water, acids, bases and buffers; Non-covalent interactions in biological systems

Module II

Carbohydrates – classification, nomenclature, stereochemistry and properties of mono-, di-, oligo- and polysaccharides. Structure of glycoproteins and protein polysaccharides.

Module III

Lipids – definition, classification and structure; Biological functions of lipids – lipoproteins, lipopolysaccharides.

Module IV

Proteins – classification, amino acids – names and abbreviations, structure and properties; protein structure– primary, secondary, tertiary and quaternary, chemical classification of proteins; peptides of biological importance; nucleic acids structure, minor bases, unusual bases, nucleosides, nucleotides, NAD, FAD, cAMP, rRNA, primary, secondary and tertiary structure, DNA, tRNA, mRNA, supermolecular assemblies

Module V

Enzymes – introduction to kinetic and catalytic mechanisms of enzymes, regulation of enzymic activity; effects of physical parameters on enzymic activity

Module VI

Metabolic pathways – photosynthesis, formation of sucrose and starch, fatty acids and acylglycerols, Kreb's cycle and Electron Transport chain

Module VII

Structure and biological activities of Vitamins, hormones

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text:

- Conn, EE, Stumpf PK, Bruening G and Ray HD. Outlines of Biochemistry. John Wiley &Sons, N. York
- Lehninger AL, Nelson DL and Cox MM. Principles of Biochemistry. Worth Publishing
- Powar, C.B. and Chatwal, G.R. , Biochemistry Handbook, Himalaya publishing House.
- Christopher Matky, Biochemistry, Scientific Publishers.

References:

- Segel JH. Biochemical Calculations. John Wiley & Sons Inc.
- Stryer L. Biochemistry. WH Freeman and Company

GENERAL & APPLIED MICROBIOLOGY

Course Code: BTD 303 **Credit Units : 03**

Course Objective:

To impart knowledge about different types of microorganisms and their influence on human activities

Course Contents:

Module I

Introduction to microorganisms, their distribution and historical developments; Methods in microbiology – microbial nutrition, culture media, sterilization, pure culture techniques, enrichment culture techniques

Module II

Nature of microbial world: eukaryotes, eubacteria, archaebacteria, mollicutes and protists; Classification and phylogeny of bacteria; Relation between structure and function of prokaryotic cells. Morphology of microbial cells

Module III

Nutritional requirements and growth; Microbial metabolism: Fuelling reactions, biosynthesis and regulation

Module IV

Microbial genetics; mutation and gene function, genetic exchange and recombination

Module V

Parasitism and antimicrobial chemicals; Bio-Geochemical cycles and symbiosis; Microbial pathogenesis; The immune system; Exploitation of microbes

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text:

- Atlas RM. Principles of Microbiology, WMC Brown Publishers
- Pelczer, MJ, Chan ECS and Kreig NR. Microbiology. Tata McGraw Hill Book Co.
- Dubey, R.C. and Maheshwari . A Textbook of Microbiology, S. Chand & Co.
- Tortor, G.J., Funke, B.R. and Klac, C.L. Microbiology: An Introduction. Benjamin Cumming Publishers

References:

- Prescott and Dunn. Industrial Microbiology. CBS Publishers
- Stanier RY, Ingraham JL, Weelis ML and Painter PR. General Microbiology. Macmillan
- Tauro, P, Kapoor KK and Yadav KS. An Introduction to Microbiology. Wiley Publishers, New Delhi
- Vanden Mark PV and Batzing BL. The Microbes – An Introduction to their Nature and Importance Benjamin Cummings.

GENERAL BIOCHEMISTRY- LAB

Course Code: BTD 322 **Credit Units : 01**

Course Contents:

1. Preparation of standard solutions, buffer solutions and colloidal solutions
2. Qualitative tests on carbohydrates, lipids, amino acids and proteins
3. Identification of amino acids/sugars by chromatographic technique
4. Isolation and purity determination of DNA
5. Quantification of DNA
6. Quantification of sugars
7. Quantification of proteins

Examination Scheme:

IA				EE		
A	**PR**	**LR**	**V**	**PR**	**WT**	**V**
5	10	10	5	35	15	20

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

- Rameshwar A. Practical Biochemistry. A Basic Course. Kalyani Publication, New Delhi
- Shawhney, S.K. Introductory Practical Biochemistry. Narosa publishers

GENERAL AND APPLIED MICROBIOLOGY-Lab

Course Code: BTD 323 **Credit Units : 01**

Course Contents:

1. Basic requirements in microbiology lab.
2. Enumeration of bacteria by Plate count (TPC & SPC)
3. Enumeration of microbes by serial dilution Agar Plate technique.
4. Microscopic examination of bacteria, yeast and molds.
5. Staining methods:-
    a. Simple and negative staining
    b. Gram stain
    c. Acid fast stain
    d. Staining of bacterial spores
    e. Viability staining technique for bacteria
6. Preparation of basic liquid and solid media for routine cultivation of microorganisms.
7. Isolation and maintenance of organisms by
    a) Pour plate method
    b) Streak plate method
    c) Spread plate method
    d) Sub-culturing technique
8. Storage and maintenance of microorganisms

Examination Scheme:

IA				EE		
A	**PR**	**LR**	**V**	**PR**	**WT**	**V**
5	10	10	5	35	15	20

PR – Performance
WT – Written Test
LR – Lab Record
LR – Lab Record

Text & References:

- Collins, CH, Lyrie PM and Crang J. M. Microbiological Methods. Academic Press, New York
- Aneja,K.R. Experiments in microbiology, Plant pathology and Biotechnology. New Age international publishers.

TERM PAPER

Course Code: BTD 330 **Credit Units : 03**

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject.
The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

13. Choosing a subject
14. Finding sources of materials
15. Collecting the notes
16. Outlining the paper
17. Writing the first draft
18. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

g) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
h) Begin by making a list of subject-headings under which you might expect the subject to be listed.
i) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

g) Get facts, not just opinions. Compare the facts with author's conclusion.
h) In research studies, notice the methods and procedures, results & conclusions.
i) Check cross references.

4. Outlining the paper

e) Review notes to find main sub-divisions of the subject.
f) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper

m) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This

question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.

n) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
o) Check for proper spelling, phrasing and sentence construction.
p) Check for proper form on footnotes, quotes, and punctuation.
q) Check to see that quotations serve one of the following purposes:
   (vii) Show evidence of what an author has said.
   (viii) Avoid misrepresentation through restatement.
   (ix) Save unnecessary writing when ideas have been well expressed by the original author.
r) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:

15) Title page
16) Table of contents
17) Introduction
18) Review
19) Discussion & Conclusion
20) References
21) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

i) summary of question posed
j) summary of findings
k) summary of main limitations of the study at hand
l) details of possibilities for related future research

References

From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions

Monographs

Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter.
[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited Articles

Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan,

China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles
McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers
Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations
Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.
Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

FOOD RHEOLOGY & TEXTURE

Course Code: BTD 331 **Credit Units : 03**

Course Objective:
To give knowledge about various aspects of food rheology including viscosity, dynamic rheology and about the texture of food.

Course Contents:
Module I: Introduction to Rheology
Rheology: definitions; importance in the food field. Rheological tests. Fundamental rheological tests. Fundamental rheology.

Module II Rheology of food
Rheology of suspensions of macromolecules. Rheology of the Newtonian and non-Newtonian flow. The importance of glassy state in food quality and texture preservation.

Module III Application of Rheology
Application of rheology concepts (non-Newtonian fluid behaviour) in plant layout development. The texture viscosity determination in food products.

Module IV Food Microstructure and Quality:
Measurement of Texture, Structural Aspects of Food Texture, Quality and Structure

Module V Food Texture:
Various types of texture; instruments used for texture measurements; importance of texture in food.
Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text:
- M. Anandha Rao (2007). Rheology of fluid and semisolid foods principles and applications. Springer US.
- Moskowitz (1990). Food Texture. CRC Press.

References:
- JM Steffe (1992). Rheological methods in food process engineering. Freeman press

INDUSTRIAL CROPS

Course Code: BTD 332 **Credit Units : 03**

Course Objectives:

- Understand the various food crops and their importance
- Knowing the major vegetable, fruit, herb, and spice plants

Course content:

Module I: Introduction

Importance of plants and plants products; history of food plants countries and centers of origin

Module II: Food Crops-A

Botanical description, origin and food and nutritional values of different cereals including wheat; barley; corn; rice

Module III: Food Crops-B

Botanical description, origin and food and nutritional values of different coarse cereals including millets; sorghum; Legumes and pulses: nutritional profile, origin and legumes based various processed products.

Module IV: Nuts and oil seeds

Botanical description, origin and food and nutritional values of different Cashew nuts; almonds: pistachio; ground nuts; sun flowers.

Module V: Tubers and Root crops

Underground vegetable tuber crops and their origin, nutritional value and importance in food processing including Potato; sweet potato; carrot; tapioca

Module VI: Fruits, spices and beverages

Origin of various fruits, spices and beverages crops and their nutritional value and importance in food processing sector

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text:

-

References:

NANOTECHNOLOGY AND ITS APPLICATION IN FOOD

Course Code: BTD 333 **Credit Units : 03**

Course Objective:
To impart knowledge about different applications of nanotechnology used in food processing including packaging

Course Contents:
Module I:
Nano-material: Definitions, types, manufacturing of nano-material.

Module II:
Nanosensors:
Manufacturing of nanosensors; Application of nanosensors in food processing, packaging.

Module III:
Nano Bioactive compounds:
Manufacturing of bioactive nanomaterials; Bioactive compounds including phytochemicals and vitamins

Modules IV:
Food Quality Monitoring:
Monitoring of food quality using various nanomaterials during processing and storage.

Module V: Nanotechnology-Encapsulation and Delivery of nutrients:
Encapsulation and delivery of various nutrients using nanomaterials; Safety issues related with nanomaterials in foods.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text :
- M.H. Fulekar (2010) Nanotechnology Importance and Application. I. K. International Pvt Ltd
- Q Huang (2012). Nanotechnology in the Food, Beverage and Nutraceutical Industries. Woodhead Publishing

References:
- M. Bagchi, H. Moriyama, F.Shahidi (2013) Wiley-Blackwell

ENVIRONMENTAL SCIENCES

Course Code: EVS001 Crédit Unit: 04

Course Objective:
The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution

Definition

- Causes, effects and control measures of:
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
  e. Noise pollution
  f. Thermal pollution
  g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment

From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment

Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work

Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	CT	HA	S/V/Q	A	EE
Weightage (%)	15	5	5	5	70

Text & References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

COMMUNICATION SKILLS - I

Course Code: BCS 301 **Credit Units : 01**

Course Objective:
To form written communication strategies necessary in the workplace.

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman –Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

UNDERSTANDING SELF FOR EFFECTIVENESS - III
(INTERPERSONAL COMMUNICATION)

Course Code: BSS 304 **Credit Units : 01**

Course Objective:
This course provides practical guidance on:
Enhancing personal effectiveness and performance through effective interpersonal communication
Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction

Importance of Interpersonal Communication

Types – Self and Other Oriented

Rapport Building – NLP, Communication Mode

Steps to improve Interpersonal Communication

Module II: Behavioural Communication

Meaning and Nature of behavioiural communication

Persuasion, Influence, Listening and Questioning

Guidelines for developing Human Communication skills

Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles

Transactional Analysis

Life Position/Script Analysis

Games Analysis

Interactional and Transactional Styles

Module IV: Conflict Management

Meaning and nature of conflicts

Styles and techniques of conflict management

Conflict management and interpersonal communication

Module V: Negotiation Skills

Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - III

Course Code: FLT 301 **Credit Units : 02**

Course Objective:

- To provide the students with the know-how
- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical:

Unité 6: se faire plaisir

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - III

Course Code: FLG 301 **Credit Units : 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,

At the Tourist Information Office,

A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap
Module VIII: Conjunctions

To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 301 **Credit Units : 02**

Course Objective:
To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir*….
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Course Code: FLC 301 **Credit Units : 02**

Course Objective:
Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

FOOD CHEMISTRY

Course Code: BTD 401 **Credit Units: 03**

Course Objective:

To introduce to students food constituents, their physical and chemical properties, and about important chemical changes occurring during processing and storage of food products

Course Contents:

Module I: Water in Foods

Water molecules, hydrogen bonding and physical properties of water; Water activity and its role in processing and storage of food products

Module II: Carbohydrates

Classifications, structure and properties of carbohydrates; Role of carbohydrates (sugars, starch, cellulose, glucans, hemicelluloses, gums, pectic substances, polysaccharides) in food processing industry

Module III: Proteins

Physical and chemical properties of proteins; Protein denaturation and factors affecting it; Functional properties of proteins; Effect of processing and storage on food proteins

Module IV: Lipids

Classifications and physico-chemical properties of food lipids; Hydrolytic and oxidative changes in lipids and their effect on food quality; Effect of frying and irradiation on food lipids; Modification of oils and fats

Module V: Enzymes

Nature, classification and properties of food enzymes; Enzyme activity in different food systems; Use of enzymes in food processing with reference to hydrolyases, pectinases, invertase, isomerase, protease.

Module VI: Vitamins, Minerals, Natural Pigments and Flavour Compounds

Role of vitamins in food industry and effect of processing on them; Role of minerals in processed foods and effect of processing and storage on their bioavailability in products; Natural pigments of foods, their retention in food products during processing and storage; Flavour constituents of food, effect of processing on flavour retention; Bitter constituents and tannins in food.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Fennema, OR. Principles of Food Science – Part I Food Chemistry. Mercel Dekker, New York, USA
- Harris, RS and Loeseke HV. Nutritional Evaluation of Food Processing, The AVI Publication Co. Inc., Westport, USA
- Meyer, LH. Food Chemistry
- Weiss, L. Food Oils and their Uses
- Richardson, T and Finley JW. Chemical Changes in Foods during Processing. The AVI Pub. Co. Inc., Westport USA

FOOD MICROBIOLOGY

Course Code: BTD 402 **Credit Units: 03**

Course Objective:

To introduce to students groups of microorganisms important for food industry with special emphasis on their role in manufacture, preservation, spoilage of foods and in food poisoning

Course Contents:

Module I: Microorganisms Important to Food Industry

The scope of Food Microbiology, Classification and identification of microorganisms important for food industry; Sources of microbial contamination at pre– and post– processing stages; Microbial Growth, Factors which influence growth of microorganisms in foods

Module II: Preservations of Foods

General methods of food preservation; Microbiology of Food preservations, Classification of preservation methods on the basis of action on microorganisms and severity of treatment

Module III: Microorganisms in Food Manufacture

Microbiology of fermented food products- Tempeh, Soy sauce, Sauerkraut, Yoghurt, Kefir, Kumis, Acidophilus milk, Bulgaricus milk, Baker's yeast, Beer, Cider Vinegar, Indigenous food products; Nutritional and therapeutic values of fermented foods

Module IV: Food Spoilage

Microbial spoilage of fruit and vegetable products; Microbial spoilage of cereals based products; Microbial spoilage of milk and milk products; Microbial spoilage of meat, fish and poultry products

Module V: Food Borne Illnesses and Food Poisoning

Growth of pathogens in foods and food borne diseases: Botulism, Salmonellosis, Shigellosis, Enteritis, Gastroenteritis, Listeriosis, Mycotoxins; Prevention of food-borne diseases; Food Hazards.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Adams M R and Moss M O. Food Microbiology
- Banwart, GJ. Basic Food Microbiology. Indian ed. CRAVI Publ. Co. Inc CBS Publ. & Distr., Delhi
- Jay, MJ. Modern Food Microbiology. CBS Publishers & Distributors, Delhi
- Frazier W.C. Food Microbiology. Tata McGraw Hill Publishing Co. Ltd., New Delhi

PRINCIPLES OF HEAT AND MASS TRANSFER

Course Code: BTD403 **Credit Units: 04**

Course Objective:

To impart to students knowledge of heat and mass transfer and about application of these concepts to processing of food products

Course Contents:

Module I

One dimensional steady state conduction through homogeneous and composite plane walls, Cylinders and spheres, Critical thickness of insulation

Module II

Concept of hydrodynamic and thermal boundary layers, Momentum and energy equation for boundary layers on a flat plate, Concept of free and forced heat convection, Application of dimensional analysis to free and force convection, Important dimensionless numbers

Module III

Thermal radiation, Kirchoff's law, Planck's distribution law, Wien's displacement law; Stefan- Boltzmann's relation, Configuration Factors, Radiant interchange between black and grey surfaces

Module IV: Mass Transfer

Steady state molecular diffusion in fluids; Mass heat momentum transfer analysis; unsteady state diffusion; Diffusion in solids, Inter phase mass transfer

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Holman, J.P. (1997) Heat Transfer, 9th edition, McGraw-Hill
- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International
- Cenegel. Heat Transfer. Tata-Mac Graw Hill Book Co. New Delhi
- Incropera, F.P. (1998) Fundamentals of Heat and Mass Transfer. John Weley
- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai & Sons
- Dr D.S. Kumar, Heat and mass transfer, S.K. Kataria Publications
- Nag, P.K. (2002). Heat and Mass Transfer, TMH
- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.

MECHANICS OF FLUIDS

Course Code: BTD 404 **Credit Units: 04**

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics
Newtonian and Non-Newtonian Fluids;, Characteristics of non-Newtonian fluids Kinematics and Dynamic Viscosity; Incompressible and Compressible fluids, compressibility. Forces on plane surfaces, stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion
Steady and unsteady flow; uniform and non-uniform flow; Laminar and Turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, vortex lines, vortex tubes, free and forced vortex.

Module III: Dynamics of Fluid Flow
Euler's equation of motion and its integration to yield Bernoulli's equation, graphical representation of Bernoulli's equation and its practical applications – Pitot tube, Venturi meter; steady flow momentum equation, force exerted by jet against plane surface

Module IV: Dimensional Analysis and Principles of Similarity
Buckingham p-Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow
Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates, measurement of viscosity. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – William's formula.

Module VI: Analysis of Pipe Flow
Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel. Flow rate and pressure drop relationships for Newtonian fluids flowing through pipe.

Module VII: Flow Measurements and compressible flow
Measurement of flow using Venturi meter, orifice meter, Pitot tube, Flow nozzle, measurement of flow in open channels- rectangular, triangular, trapezoidal weir, Cipoeletti weir. Basic thermodynamic relations and thermodynamic processes for Compressible flow. Pumps and pumping systems

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- R K Basal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002
- D S Kumar, "Fluid Mechanics and Fluid Power Engineering", S K Kataria & Sons, 2000
- I H Shames, "Mechanics of Fluids", Tata McGraw Hill\
- V L Streeter and E B Wylie, "Fluid Mechanics", Tata McGraw Hill.
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co.

FOOD CHEMISTRY LAB

Course Code: BTD 421 **Credit Units: 01**

Course Contents:

1. Determination of moisture content
2. Determination of ash content
3. Determination of protein content
4. Determination of fat content
5. Determination of minerals (Ca, P, Fe)
6. Estimations of reducing and total sugars
7. Estimations of starch content
8. Estimation of crude fiber

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References

1. Food Chemistry by L H Meyor (CBS Publisher, Delhi)
2. Food Facts and Principal by N. Shakuntala Manay & M. Shadaksharaswamy (New Age International (P) Ltd. Publishers, New Delhi)

FOOD MICROBIOLOGY LAB

Course Code: BTD 422 **Credit Units: 01**

Course Contents:

1. Total plate count of selected foods.
2. Microbiological examination of Canned / Bottled food products.
3. Microbiological examination of Fruits and vegetables.
4. Microbiological examination of Egg / Egg products
5. Microbiological examination of Cereal products
6. Microbiological examination of Milk and Milk products
7. Microbiological examination of Meat/ Meat products
8. Determination of a milk sample by Methylene Blue Reduction Test.
9. Coliform testing in portable water
10. Examination of microbial count in Production line study.
11. Determination of BOD and COD of food plant effluents.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

- Collins, CH, Lyrie PM and Crang J. M. Microbiological Methods. Academic Press, New York
- Aneja,K.R. Experiments in microbiology, Plant pathology and Biotechnology. New Age international publishers.

PRINCIPLES OF HEAT & MASS TRANSFER LAB

Course Code: BTD 423 **Credit Units: 01**

Course Contents:

1. Conduction - Composite wall experiment
2. Conduction - Composite cylinder experiment
3. Convection - Experiment on heat transfer from tube-natural convection.
4. Convection - Heat Pipe experiment.
5. Heat exchanger - Parallel flow experiment
6. Heat exchanger - Counter flow experiment
7. Experiment on critical insulation thickness.
8. Conduction - Determination of thermal conductivity of fluids.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

MECHANICS OF FLUIDS LAB

Course Code: BTD 424 **Credit Units: 01**

Course Contents:

1. Study of pressure measuring devices
2. Verification of Bernoulli's theorem
3. Studies on rotameter/ orifice meter/venturimeter/V-notch
4. To find major head loss in pipe line (sudden expansion/contraction/bend)
5. Study of friction factor for turbulent flow in smooth and rough pipe
6. Experiment on Reynold's apparatus.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

TERM PAPER

Course Code: BTD 430 **Credit Units : 03**

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

19. Choosing a subject
20. Finding sources of materials
21. Collecting the notes
22. Outlining the paper
23. Writing the first draft
24. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

j) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
k) Begin by making a list of subject-headings under which you might expect the subject to be listed.
l) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

j) Get facts, not just opinions. Compare the facts with author's conclusion.
k) In research studies, notice the methods and procedures, results & conclusions.
l) Check cross references.

4. Outlining the paper

g) Review notes to find main sub-divisions of the subject.
h) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper

s) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
t) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
u) Check for proper spelling, phrasing and sentence construction.
v) Check for proper form on footnotes, quotes, and punctuation.
w) Check to see that quotations serve one of the following purposes:
   (x) Show evidence of what an author has said.
   (xi) Avoid misrepresentation through restatement.
   (xii) Save unnecessary writing when ideas have been well expressed by the original author.
x) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
22) Title page
23) Table of contents
24) Introduction
25) Review
26) Discussion & Conclusion
27) References
28) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

m) summary of question posed
n) summary of findings
o) summary of main limitations of the study at hand
p) details of possibilities for related future research

References

From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions

Monographs
Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles
Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles
McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers
Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations
Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.
Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

COMPUTER SIMULATION & MODELING IN FOOD PROCESSING

Course Code: BTD431 **Credit Unit: 03**

Course Objective:

The key objective ofthe course is to address the food safety and quality aspects of novel food processing technologies through fundamental principles of numerical methods for better understanding of the process/technologies. Students are expected to have sound knowledge of food processing, calculus, numerical methods, MATLAB and computer programming.

Course Contents:

Module I: Modelling and simulations
Introduction to modelling and simulations. Classification of partial differential equations, numerical formulations, grids, Initial and boundary conditions, finite difference equations, finite element methods (FEM)

Module II: Modelling of unit operations-I
Moisture, gas and aroma/odour diffusion in food materials. Modelling of heat exchanges, modelling of aseptic processing of liquid and particulate foods. Modelling of ohmic heating, hydrostatic pressure processing and pulsed electric field.

Module III: Modelling of unit operations-II
Modelling and computational study of UV processing, ozone processing, radio frequency heating, ultrasound processing. Stochastic finite element analysis of food process.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Soojin JunJoseph M. Irudayaraj. (2009). Foodprocessingoperationsmodeling. Design and Analysis. Second edition, CRC press, Boca Raton.
- Kai Knoerzer, Pablo Juliano, Peter Roupas, and Cornelis Versteeg. (2011) Innovative Food Processing Technologies: Advances in Multiphysics Simulation, First Edition. John Wiley & Sons, Ltd., West Sussex, UK.
- Albert Ibarz, Gustavo V. Barbosa-Cánovas, (2003). UnitOperations inFoodEngineering. CRC press, Boca Raton.

ENZYMES IN FOOD PROCESSING

Course Code: BTD 432 **Credit Units: 03**

Course Objective:

To give knowledge about role of different types of enzymes and its application in food industries. On completing this course students should be able to know about Isolation and Purification of enzymes, understand the concept of enzyme immobilization techniques and the application of enzymes in food industries.

Course Contents:

Module I: Introduction
Introduction-Definition-Historical highlights-classification of enzymes- nomenclature- structural features of enzyme-Methods of extraction and purification of enzymes.

Module II: Mechanism of enzyme action
Specificity-types of specificity-role of 3D structure -active site-substrate and enzyme concentration relationships-different effects –pH and temperature.

Module III: Enzyme kinetics
MM equation, Lineweaver Plot, - kinetics. Immobilization-need for immobilization- advantages –disadvantages-immobilization techniques- -effects of pH, temperature, substrate concentration, stability, kinetic properties-role of immobilized enzymes in food processing-commercial food application.

Module IV: Enzymes of food importance
Endogeneous enzymes in food quality- color- lipoxynase, chlorophyllase, polyphenol oxidase ,texture- Pectic enzymes, Amylases, cellulases, proteases, flavour and aroma-nutritional quality.

Module V: Application of enzymes in food industries
Mechanism and application of enzymes in food processing-enzymatic browning.Application of enzyme in meat industry, fruit and vegetable industry, dairy industry- bakery industry.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Price, N. L. and StevenL., “Fundamentals of Enzymology”, Oxford Scientific 2000.
- Godfrey T. West S (Eds), “Industrial Enzymology” 2nd Edition Mac Millan Press, London 1996.
- Robert J.Whitehurst and Barry A. Law. Enzymes in food technology Sheffield packaging technology.
- Asokan, P,“Enzymes”.Chinna publications,Tamil nadu 2003.
- Colowick,S.P.and Kalpan,N.O.(Eds), “Methods of enzymology” Academic press 1977.
- Tauber ph.D and Hentry,“Enzyme technology” 2000.

MARKETING MANAGEMENT FOR FOOD

Course Code: BTD433 **Credit Unit: 03**

Course Objective:

The objective of this course is to have understanding of marketing and management of food and agribusiness. It discusses the various approaches necessary for the students to enhance their capability as efficient mangers in food and agribusiness.

Course Contents:

Module I: Introduction
Introduction to marketing and management. Marketing concepts and marketing systems and its functions. Link between agriculture and food industry, Introduction to marketing boards, co-operatives and others. Market liberalization, its role, strategies, impact and economics.

Module II: Marketing management, strategies, planning and control
Introduction to strategy, policy, planning and control. Marketing planning process, monitoring and evaluation.

Module III: New product development and buyer behavior
Need, objectives and process for new product development. Factors impact buyer behavior and market segmentation.

Module IV: Commodity marketing and Product management
Commodity and its marketing, stages and challenges in commodity marketing, product and its definitions, product line, brand, product management models.

Module V: Pricing management, channel management and physical distribution
Objectives, strategies, types and decisions of commodity, breakeven analysis, pricing, cost, revenue and supply relationship. Channel management, middleman and their role, distribution channels, concept and its technological advancements. Warehouse, inventory, logistics and transport management.

Module VI: Marketing communication, research, cost and margins
Nature, objectives and factors of marketing communication. Advertisement, sales promotion, sales force, agents, promotions and budget for communication of commodity. Purpose and steps involved in market research. Objectives and structure of marketing cost and margins.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

Text:

- David D. Van Fleet, Ella W. Van Fleet, and GeorgeJ. Seperich. (2014), Agribusiness: Principles of Management.Cengage Learning, New York.
- Freddie Barnard, Jay Akridge, Frank Dooley, John Foltz (2012). Agribusiness Management. Fourth edition, Routledge, New York.

- I.M. Crawford. (1997). Agricultural and food marketing management. Food and Agriculture Organization of the United Nations. Rome.ISBN 92-851-1003-7.

COMMUNICATION SKILLS - II

Course Code: BCS 401 **Credit Units: 01**

Course Objective:

To teach the participants strategies for improving academic reading and writing. Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

UNDERSTANDING SELF FOR EFFECTIVENESS - IV (RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 **Credit Units: 01**

Course Objective:

- To understand the basis of interpersonal relationship
- To understand various communication style
- To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - IV

Course Code: FLT 401 **Credit Units: 02**

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical: **Unité 8: Découvrir le passé**

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - IV

Course Code: FLG 401 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language. To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns
Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)
Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Course Code: FLS 401 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, Doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/ business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Course Code: FLC 401 **Credit Units: 02**

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items
Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bu shi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".
Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.
Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?
Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38

FOOD QUALITY – ANALYSIS, ASSURANCE AND ADULTERATION

Course Code: BTD 501 **Credit Units: 02**

Course Objective:

To give knowledge about role of quality control section; food laws; standards and specifications for food products; total quality control; methods for chemical, microbial and sensory evaluation of food products; quality testing and certification procedures for organic food products.

Course Contents:

Module I: Introduction
Definition of food quality, Factors affecting it; Quality attributes; Responsibilities and Role of quality control section.

Module II: Quality Control Systems
Total quality control and role of management; Statistical quality control; Concept of GMP, GHP and HACCP, Components of the HACCP system, Analysing hazards and assessing their severity and risks, Application of the HACCP approach Food Safety Management Systems, Industrial Safety and Hazard Management. Quality Standards like ISO-9000, ISO-14000 and ISO-22000 etc.

Module III: Food Laws and Food Standards
Indian food laws applicable to food products; Statutory and voluntary standards and specification for foods products in India; International standards for food products – Codex Alimentarious; International trade agreements and their impact on Indian food processing industry. FDA Standard for export of processed food products.

Module IV: Food Evaluation Methodologies
Chemical methods for analysis of food quality, modern methods of analysis; Qualitative and quantitative tests for microbiological quality of food products, Index micro-organisms; Sensory evaluation of foods – theoretical aspects, interpretation of sensory data; Instrumental methods for estimation of colour and rheological characteristics of food products; Correlation with sensory data.

Module V: Food adulteration, Test for food adulteration, Preventing food adulteration, Food adulteration act.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Amerine, MA Pangborn RM and Roseller EB. Principles of Sensory Analysis of Foods, Academic Press
- De Man JM. Rheology and Texture in Food Quality
- Ranganna, S. Handbook of Analysis and Quality Control for fruit and vegetable Products. Tata McGraw Hill Book Co. Pvt Ltd.
- Pomeranz, Y. Food Analysis: Theory and Practice.
- Kramer, A. and Twig BA. Quality Control for Food Industry
- BIS. Handbook of Food Analysis and other related Publications

PROCESSING OF FRUITS AND VEGETABLES

Course Code: BTD 502 **Credit Units: 03**

Course Objective:

To impart knowledge about post-harvest handling, storage and transportation of fresh fruits and vegetables; minimal processing; thermal processing, freezing and other methods of processing and processed fruit and vegetable products.

Course Contents:

Module I: Introduction
Difference between fruits and vegetables; Status of Indian fruit and vegetable processing industry; Major fruits and vegetables of India.

Module II: Post Harvest Technology of Fresh Fruits and Vegetables
Fresh fruits and vegetables as living produce; Post harvest handling and transport of fresh commodities; Cold chain management; Storage and packaging of fresh fruits and vegetables.

Module III: Canning and Bottling
Selection and preparation of raw materials; Syrups and brines; Canning and bottling processes with flow charts for fruits and vegetables and factors affecting processing; Effect of thermal processing on quality of canned product.

Module IV: Drying and Freezing of Fruits and Vegetables
Selection of raw materials; Methods of sun drying and dehydration for fruits and vegetables; Factors affecting drying rate; Osmotic drying; Intermediate moisture foods; Packaging and storage of dried products; Process for freezing; Effect of freezing process on quality of frozen products; Packaging and storage requirements for frozen products and their quality standards.

Module V: Sauces, Chutneys and Pickles
Basic principles of preservation; Methods for preparation of sauces, chutneys and pickles; Common defects of products and their control; Quality standards; Vinegar as ingredient – types, methods of preparation, post-production processes, causes of spoilage.

Module VI: Jams, Jellies and other High Sugar Products
Introduction, standards for high sugar products; Principles of jam, jelly and marmalade making, types of pectin required for them; Theories of gel formation; Jelly defects and their control; Preserves, candied fruits, glazed and crystallized fruits and peels – pretreatments of fruits and vegetables and methods for making these products.

Module VII: Tomato and Tomato Products
Selection of tomatoes for processing; Tomato pulp, juice and concentrated products; Methods for production of tomato soup, sauce, ketchup and other tomato products; Defects of tomato sauce / ketchup and their control.

Module VIII: Minimal Processing
Introduction; advantages and limitations of minimally processed products; Quality requirements for raw materials; Methods for minimal processing of fruits and vegetables, their packaging and storage; organic foods and their processing.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Srivastava R.P. and Kumar S. Fruit and vegetable preservation: principles and practices. CBS publishers.
- Morris, TN. Principles of Fruit Preservation. Biotech Books, Delhi.
- Pantastico, E. B. Post Harvest Physiology, Handling and Utilization of Tropical and Subtropical Fruits and Vegetables. AVI Publishing Co. Inc, Westport.
- Rydstm Heele, S, Post Harvest Physiology and Pathology of Vegetables. Marcel Dekker.
- Woodroof JG and Luh BS. Commercial Preservation of Fruits. The AVI Pub. Co. Westport, USA.

PROCESSING OF MILK AND MILK PRODUCTS

Course Code: BTD 503 **Credit Units: 03**

Course Objective:

To give knowledge about special characteristics of milk, collection and processing of fluid milk and manufacturing processes for important dairy products like butter, paneer, cheese, ice cream, khoa, milk powder, etc.

Course Contents:

Module I: Technology of Fluid Milk

Introduction – Definition, composition, physico-chemical and nutritional properties of milk; Collection, chilling and transportation of fluid milk, clean milk production; Standardization, homogenization and pasteurization of milk; Market milk, standards and quality tests for market milk; Sterilized milk and flavoured milk , CIP system and detergency.

Module II: Cream, Butter and Ghee

Types of cream, composition and production methods; Cream separator; Ripening of cream; Types of butter, composition and production methods; Factors affecting churn-ability of cream; Defects of butter; Production of butter, oil / ghee.

Module III: Frozen Milk Products

Classification, composition, manufacture of ice cream; Packaging, storage and marketing of ice cream; Kulfi and other frozen milk products; Defects of frozen products and their control

Module IV: Fermented Milk Products

Methods for manufacture, packaging, storage and marketing of fermented milks, i.e., dahi, cultured butter milk, yoghourt, acidophilus milk, kumiss, kefir, etc, Cheese: classification, method for manufacture of cheddar cheese, defects and their control

Module V: Evaporated, Condensed and Dried Milk

Definition, composition and standards; Manufacturing methods for evaporated and condensed milk; Milk powders, baby foods: methods for manufacture, packaging and storage; Defects and their control

Module VI: Indigenous Milk Products

Principles and practices for manufacture, storage and marketing of khoa, rabri, channa, paneer, shrikhand, milk based sweets.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- De, Sukumar, Outlines of Dairy Technology. Oxford University Press, Oxford.
- Eckles, Combs and Macy. Milk and Milk Products.
- Jensen, RG. Handbook of Milk Composition. Academic Press. California.
- Warner IN. Principles of Dairy Processing.

FOOD ENGINEERING – I

Course Code: BTD 504 **Credit Units: 03**

Course Objective:

To impart knowledge to students about basic engineering concepts, thermodynamics and reaction kinetics, fluid flow, size reduction, separation processes and mixing food textures.

Course Contents:

Module I: Introduction

General concepts and unit operations; Thermodynamics principles applied to food processing; Reaction kinetics for food processing; Mass and energy balance.

Module II: Size Reduction and Mixing

Principles involved in size reduction, energy requirements; Size-reduction equipments; Laws governing mixing operation; Mixing equipments; Measurement of mixing.

Module III: Separation Processes-I

Basic principles, equipments and systems of Mechanical separation process- Screening; Filtrations; Sedimentation processes for low and high concentration suspensions; Centrifugation; Osmotic separation.

Module IV: Separation Processes-II

Solvent extraction, leaching and distillation processes.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Earle, RT. Unit Operations in Food Engineering. Pergamon Press.
- Sahay, KM and Singh, KK. Unit Operations of Agricultural Processing. Vikas Publishing House.
- Singh, RP and Heldman, DR. Introduction to Food Engineering. AVI Publ., Westpott, USA.
- Valentas, K.I., Rostein, E and Singh, RP. Handbook of Food Engineering Practices. CRC Press.
- Watson, EL and Harper, JC. Elements of Food Engineering. AVI Publ. Co, Westport, USA.
- McCabe, W., Smith, Harriot,P. Unit Operations of Chemical Engineering, McGraw-Hill.

STATISTICS FOR BIOLOGY

Course Code: BTD 505 **Credit Units: 03**

Course Objective:

The course aims to develop competency and expertise in the application of statistical methods applied to biological data obtained in experimental techniques, methodology and the safe laboratory practice.

Course Contents:

Module I: Measures of Dispersion

Significance of a good measure of variation, Properties of a good measure of variation, Interquartile range, Moments about mean ,Mean deviation, Standard deviation, Median, Mode, origin and any point, Skewness and Kurtois, Pearson's β and γ coefficients.

Module II: Correlation & Regression

Correlation: Introduction; Importance; Types; Karl Pearson's coefficient of linear correlation and Spearman's Rank correlation. Regression Analysis: Introduction; Two lines of Regression; Regression Coefficient in a bivariate frequency distribution; Standard error of the estimate.

Module III: Sampling and Test of Significance

Population, Sample, Parameter & Statistic, Sampling theory, Methods of sampling: Random sampling: Simple Random, stratified, Systematic and Multi Stage sampling, Non-Random Sampling: Purposive, Cluster, Quota, convenience and Sequential Sampling.

Null hypothesis, Alternative hypothesis, Critical region, Type I Error, Type II Error, Level of significance, Test of significance for large samples: Normal test for sample mean and population mean, normal test for two sample means, Test of significance for small samples: t-distribution, F-distribution, Chi-Square distribution, Test of goodness of fit, Test of independence and Analysis of Variance (ANOVA) – one way classification model.

Module IV: Statistical Quality Control & Analysis of Time Series

Control Charts, $\overline{x}$, R and C charts, Control chart for P(fraction defective), Acceptance sampling.

Utility of Time series analysis, Components of time series, Measurement of Trend: Graphic method, Method of semi-averages, Method of moving averages, the method of least squares, Ratio to Trend Method, Ratio-to-Moving average method, Link relative method.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Publisher: S. Chand & Co.
- Statistical Analysis, Kaushal, T.L. Publisher: Kalyani Publishers.
- Data Analysis and Classification for Bioinformatics, A Jagota, Bioinformatics by the Bay Press.
- Introduction to Probability Theory, PG Hoel, Houghton Mifflin College.
- Introduction to Statistical Theory, PG Hoel, SC Port, CJ Schiller, RA Srinivasan, A. Srivasan, McGraw-Hill Trade.
- Schaum's Outline of Probability, Random Variables and Random processes, hp Hsu, McGraw-Hill Trade.
- Statistical Methods in Bioinformatics: An Introduction, GR Grant, W J Ewens, Springer Verlag
- Fundamental of Biostatistics, Bernard Rosner, Oxford University Press.

FOOD QUALITY – ANALYSIS AND ASSURANCE LAB

Course Code: BTD 521 **Credit Units: 01**

Course Contents:

A. Chemical Analysis

1. Estimations of vitamin C, thiamine and vitamin A in food products
2. Assessment of deterioration in quality of oil – PV, FFA
3. Estimation of carotenoids and chlorophylls in fresh and processed food products
4. Enzymatic and non-enzymatic browning

B. Sensory Evaluation

1. Measurement of detection and recognition of thresholds for four basic tastes
2. Recognition of odorants, natural food color, synthetic colors
3. Relative taste intensity and taste interactions
4. Sensory evaluation of food texture.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

Clifton M & Pomeranz Y. 1988. Food Analysis - Laboratory Experiments. AVI Publ.
Gruenwedel DW & Whitaker JR. 1984. Food Analysis Principles and Techniques. Vol. I. Physical Characterization. Marcel Dekker.
Gruenwedel DW & Whitaker JR. 1984. Food Analysis Principles and Techniques. Vol. II. Physicochemical Techniques. Marcel Dekker.

PROCESSING OF FRUITS AND VEGETABLES LAB

Course Code: BTD 522 **Credit Units: 01**

Course Contents:

1. Canning of fruits and cut-out test for canned fruits
2. Canning of vegetables and cut-out test for canned vegetables
3. Dehydration of fruits / vegetables and evaluation of dried products
4. Freezing of fruits / vegetables and evaluation of frozen products
5. Preparation of jam / jelly / marmalade / preserve and its evaluation
6. Preparation of fruit beverage and its evaluation
7. Preparation of fruit chutney / pickle and its evaluation
8. Preparation and evaluation of tomato sauce / ketchup
9. Testing of vinegar
10. Minimal processing of fruits / vegetables.
11. Visit to food processing industry

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

Food Preservation and Processing, Manoranjan Kalia & Sangita Sood.
Food Science, N. N. Potter, C B S Publishers & Distributors.

PROCESSING OF MILK AND MILK PRODUCTS LAB

Course Code: BTD 523 **Credit Units: 01**

Course Contents:

1. Sampling of milk, platform tests
2. Determination of specific gravity, milk fat, SNF and TS percentage in milk
3. Cream separation and standardization of milk and cream
4. Preparation of toned/humanized/fortified/reconstituted/flavoured milk
5. Preparation and grading of butter
6. Preparation of cheese
7. Preparation of channa and paneer
8. Preparation of Khoa / ghee
9. Preparation of ice-cream .
10. Preparation of indigeneous milk product – shrikhand / kalakand / milk-cake
11. Visit to a dairy plant producing condensed milk / milk powder.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

Sukumar De. Outlines of Dairy Technology. Oxford University Press
Rangappa KS. Indian Dairy Products. Asia Publishing House
Farrall AW. Engineering for Dairy and Food Products. John Wiley and Sons
V. Cheke & A. Sheeprd. Cheese and Butter. Agrobios (India)

FOOD ENGINEERING LAB – I

Course Code: BTD 524 **Credit Units: 01**

Course Contents:

1. Studies on sedimentation / filtration
2. Use of extraction columns
3. Studies on size reduction equipments.
4. Screen/sieve analysis
5. Experiment based on Stoke's law.
6. Calculation of power load for instrutments
7. Calculation of RCF using centrifuge.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

- Deman J.M. Rheology and Texture in Food Quality.
- Valents, KJ, Rostein, E and Singh, RP. Handbook of Food Engineering Practices. CRC Press

TERM PAPER

Course Code: BTD 530 Credit Units: 03

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

m) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
n) Begin by making a list of subject-headings under which you might expect the subject to be listed.
o) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

m) Get facts, not just opinions. Compare the facts with author's conclusion.
n) In research studies, notice the methods and procedures, results & conclusions.
o) Check cross references.

4. Outlining the paper

i) Review notes to find main sub-divisions of the subject.
j) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & preparing the final Paper

y) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
z) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
aa) Check for proper spelling, phrasing and sentence construction.

bb) Check for proper form on footnotes, quotes, and punctuation.
cc) Check to see that quotations serve one of the following purposes:
(xiii) Show evidence of what an author has said.
(xiv) Avoid misrepresentation through restatement.
(xv) Save unnecessary writing when ideas have been well expressed by the original author.
dd) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
29) Title page
30) Table of contents
31) Introduction
32) Review
33) Discussion & Conclusion
34) References
35) Appendix
Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
q) summary of question posed
r) summary of findings
s) summary of main limitations of the study at hand
t) details of possibilities for related future research

References
From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions
Monographs
Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes
Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles
Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles
McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide

Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles

Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites

Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers

Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations

Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.

Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix

The appendix should be used for data collected (e.g. questionnaires, transcripts) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

REFRIGERATION AND AIR CONDITIONING

Course Code: BTD 531 **Credit Units: 03**

Course Objective:

The aim of this course is to provide the students with the understanding of the basic principles of Refrigeration and Air conditioning such that they could build simple mathematical models representing the conditioned space and its components used to control environmental conditions. The application of thermodynamics, heat transfer, and fluid mechanics includes an understanding of refrigerants and refrigeration systems, psychometrics, human confort and air quality, calculation of heating and cooling loads, and heat and mass transfer processes and associated R & AC components and systems.

Course Contents:

Module I: Refrigeration
Air refrigeration systems, various compression refrigeration cycles, basic components of the plant.

Module II
Properties and choice of refrigerants, Eco-friendly refrigerants, multiple compression and evaporation system, cascading.

Module III
Vapour absorption cycle, Electrolux system steam jet refrigeration, vortex tube, application of refrigeration systems cascading, vapour absorption cycle.

Module IV: Air-conditioning
Psychometric processes, applied psychometric, comfort air-conditioning, ventilation requirements, cooling and dehumidification sytem, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- C.P. Arora. Refrigeration and Conditioning. Tata McGraw Hill.
- P. Manohar. Refrigeration and Conditioning. Wiley Eastern Limited.
- Jordan and Priester. Refrigeration and Conditioning. Prentice Hall of India.
- W.F. Stoecker. Refrigeration and Conditioning. McGraw Hill.

MALTING & BREWING TECHNOLOGY

Course Code: BTD 532 **Credit Units: 03**

Course objective:

To provide knowledge of brewing and malting process for production of beer.

Module I Raw materials
Barley, Hops, Water, Yeast, Adjuncts etc.

Module II Malt Production
Intake, cleaning, grading, transfer; Drying and storage of barley; Barley steeping; Barley germination; Malt kilning; Treatment of malt after kilning; Malt evaluation; Special malts and malt from other cereals etc.

Module III Wort and Beer Production
Malt milling, Mashing, Lautering, Wort boiling, Brewhouse yield, Brewhouse equipment, Casting the wort, Removal of the coarse break, Cooling and clarifying the wort, Control and monitoring of wort production processes, Changes during fermentation and maturation, Pure yeast culture propagation, Conventional fermentation and maturation, Fermentation and maturation in cylindroconical tanks (CCVs), Beer filtration, Beer stabilization, Carbonisation of the beer, Special methods for beer production, packaging of the Beer.

Module IV Cleaning and disinfection, Finished beer
Cleaning agents, Disinfecting agents, Cleaning and disinfecting using a CIP system, Cleaning procedure, Mechanical cleaning, Beer composition, Components of beer, Beer and health, Beer types and their special features, Quality examination, Process measurement and analysis technology.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Wolfgang Kunze. Technology Brewing & Malting.

INFESTATION CONTROL AND GRAIN STORAGE

Course Code: BTD 533 **Credit Units: 03**

Course Objective:

To provide knowledge of methods of food grains storage, causes of deterioration during storage, types of insect infestation and their control, storage structures used and storage of organic food grains.

Course Contents:

Module I: Introduction
Post-harvest losses of food grains and its economic significance; Requirements for safe storage, Pre- storage operations

Module II: Storage Deterioration in Food Grains
Types of storage deterioration; Causes of spoilage; Detection and determination of the type and extent of damage

Module III: Infestation Control
Sources of infestation in stored food grains and their detection; Chemical, non-chemical and integrated methods of controlling insect infestation; Controlled atmosphere storage of food grains; Vertebrate pests and their control

Module IV: Toxic Contaminations
Toxic contamination in food grains and their ill effects; Permitted pesticides and their limits; Pesticide residues; Methods of safe handling of pesticides

Module V: Storage Structures
Traditional methods of bag storage; Methods for transit and bulk storage of food grains; Cleaning, aeration and drying of stored grains at farm and commercial levels; Role of moisture in storability of food grains; Categorization of grains for storage, loss measurement and disposal; Principles of godown sanitation and hygiene.

Module VI: Refrigerated vans for storage and transportation of raw and processed food materials.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- AACC. Insect Management for Food Storage and Processing
- AACC. Managing Stored Grains
- Atwal AS. Agricultural Pests of India and South-East Asia, Kalyani Publishers, New Delhi.
- Boumans, G. Grain Handling and Storage. Elseivier Science Publishers, Amsterdam
- Chakravarty. Post Harvest Technology of Cereals, Pulses and Oilseeds. Oxford and IBH Publishing Co Pvt Ltd, Delhi
- Kachru, Bright and Patil. Storage. CIAE, Bhopal
- Kent NL and Evers AD. Technology of Cereals. Woodhead Publishing Limited, Cambridge, UK Mollan. Pesticides and Pollution
- Pingale, S.V Handling and Storage of Food Grains. I CAR, New Delhi
- Sahay KM and Singh KK. Unit Operations in Agricultural Processing. Vikas Publishing House Pvt Ltd, New Delhi
- Sauer DB. Storage of Cereal Grains and their Products. American Association of Cereal Chemists Inc, St. Paul MN

COMMUNICATION SKILLS - III

Course Code: **BCS 501** **Credit Units: 01**

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I
Reading Comprehension

Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

UNDERSTANDING SELF FOR EFFECTIVENESS - V (GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS 504 **Credit Units: 01**

Course Objective:

- To inculcate in the students an elementary level of understanding of group/team functions
- To develop team spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of behavioral change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Understanding Self for Effectiveness, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - V

Course Code: FLT 501 **Credit Units: 02**

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical:

Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - V

Course Code: FLG 501 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Course Code: FLS501 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: FLC501 Credit Units: 02

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader " Part-II Lesson 39-46

FOOD ENGINEERING – II

Course Code: BTD 601 **Credit Units: 04**

Course Objective:

To give knowledge about food applications of heat exchangers and other such devices, evaporators, driers, crystallizers, extruders, etc

Course Contents:

Module I: Heating Operations
Modes of heat transfer in food products; Heat exchangers and their selection for processing food products, Efficiency of heat exchangers.

Module II: Thermal Processing
Thermal death kinetics of microorganisms and enzymes; Thermal process time calculations and optimization techniques.

Module III: Psychometrics and Steam
Dry and wet bulb temperature and specific and adiabatic saturation; Psychometric chart and it's use; Enthalpy and latent heat; Steam generation systems; Boilers for food processing industry.

Module IV: Evaporation and concentration of Foods
Heat transfer during evaporation; Evaporation systems – characteristics, applications and selection; Evaporation efficiency

Module V: Food Dehydration
Basic principles, drying rate curves and equilibrium moisture content; drying time calculations; Dehydration systems including solar driers – characteristics, applications and selection

Module VI: Crystallization and Fluidization Processes in Food Industry
Crystallization – equilibrium yield, theories of crystallization; Crystallization and their application; Mechanism of fluidization and its application in food processing

Module VII: Extrusion Processing of Foods & Nutraceuticals
Introduction; Theories of cold extrusion and extrusion cooking; Extruders – characteristics, classification and food application, Nutraceutical and its example ,Market and demand , Food as medicine, Classification of nutraceuticals Dietary supplements, Functional foods, Medical foods, Farmaceuticals, Effectiveness and safety, natural nutraceutical, nutraceutical products.

Module VIII: Pasteurization technique, Methods of Pasteurization, Batch method, Continuous method, HTST, plate heat exchanger, Basic Component Equipment of HTST Pasteurizer, Pasteurization of milk.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- R. L. Earle , Unit Operations in Food Processing
- Brennan, J.G., Butters, J.R., Cowell, ND and Lilly, AEV. Food Engineering Operations
- Sahay KM and Singh KK. Unit Operation of Agricultural Processing Vikas Publishing House
- Singh, RP and Heldman, DR. Introduction to Food Engineering
- Toledo R.T. Fundamentals of Food Engineering
- Watson, EL and Harper, JC. Elements of Food Engineering

PROCESSING OF CEREALS, PULSES AND OILSEEDS

Course Code: BTD 602 **Credit Units: 03**

Course Objective:

To impart knowledge about physical structure and chemical composition of major food grains of India, milling of cereals and pulses, bakery products and processing of oil seeds for oil and proteins and their utilization

Course Contents:

Module I: Introduction
Major food grains of India, their physical structure and chemical composition; Post harvest practices for safe storage of food grains

Module II: Technology of Wheat and Barley
Quality characteristics of wheat for milling, flour milling, turbo grinding and air classification, flour grades; Ingredients, technology and quality parameters for bakery products; Milling of Durum wheat, pasta products; Pearling and malting of barley

Module III: Rice Technology
Rice milling, its effect on nutritive value; Parboiling of paddy; Curling and ageing of rice, processed rice products

Module IV: Technology of Corn and Millets
Dry and wet milling of corn; Corn starches and its conversion products; Refining methods and milling of millets

Module V: Technology of Pulses
Nutritive value of legumes, anti-nutritional factors present in them; Milling of pulses

Module VI: Oilseed Technology
Processing of oilseeds for direct use; Extraction of oil and processing of extracted oil; Refining, utilization of de-oiled cake and preparation of peanut butter, margarine and spread

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- AACC. Rice Chemistry and Technology. AACC
- Chakravarty and De. Post Harvest Technology of Cereals and Pulses
- CFTRI, Manual of Rice and its Processing
- Hui, YH. Bakery Products Science and Technology
- Kent, NL. Principles of Cereal Technology
- Lawson H. Food oils and Fats
- Matz SA. Bakery Technology and Engineering
- Matz SA. Cereal Technology
- Pomeranz, Y. Wheat C Chemistry and Technology. Vol. II and I. AACC
- Rachie, K. The Millet: Importance, Utilization and Outlook. International Crop Research Institute for Semi-Arid Tropics, Hyderabad
- Siegel and Faweatt Food Legumes – Processing and Utilization

PROCESSING OF MEAT, FISH AND POULTRY PRODUCTS

Course Code: BTD 603 **Credit Units: 03**

Course Objective:

To give knowledge about structure, composition and nutritive value of meat, fish, egg and poultry; scientific slaughtering of animals, post mortem changes in them; handling, storage and transportation of fish, and processing of meat, fish and poultry products.

Course Contents:

Module I: Introduction

Overview of Meat, Fish and Poultry Industry in India; Structure, composition and nutritive value of meat, fish and poultry products

Module II: Meat Technology

Slaughter – house layout and management; Pre-slaughter practices for meat animals, pre-mortem and post-mortem examination; Scientific slaughter, handling and evaluation of carcass; Post-mortem changes and eating qualities of meat tissues, cutting and packaging meat; Refrigeration, freezing, canning and freeze drying of meat; curing and smoking of meat, changes during cooking of meat.

Module III: Fish Technology

Types of fish; post-mortem changes; Handling storage and transportation of fish; Curing, smoking, drying, freezing and canning of fish and marine products

Module IV: Technology of Egg and Poultry Products

Pre-slaughter care and handling of birds; ante- and post – mortem examination of birds; Scientific slaughter; Preparation of poultry products and their preservation; Interior qualities of eggs- grading,, handling, packaging and transportation; Functional properties of eggs; Microbial spoilage; Preservation and maintenance of eggs; Freezing, dehydration and pickling of eggs

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Jhari Sahoo , Textbook on Meat, Poultry and Fish Technology
- NPCS Board of Consultants & Engineers, The Complete Technology Book on Meat, Poultry and Fish Processing.
- Gracy, JF. Thornton's Meat Hygiene. ELBS Publishers, London
- Lawrie, RA. Meat Science
- Levie A. Meat Hand Book. AVI Publishing Co.
- Mountney, GJ. Poultry Products Technology. AVI Publishing Co.
- Park Hurst, CR and Mountney GJ. Poultry Meat and Egg Production
- Price JF and Schweigest. Sciences of Meat and Meat Products. American Meat Institute Foundation
- Roman, JR and Zieglan, PT. The Meat We Eat
- Slansby, Industrial Fishery Technology
- Stadelman, WJ. Egg Science and Technology
- Zaitsev, V and associates. Fish Curing and Preserving

FOOD ADDITIVES

Course Code: BTD 604 **Credit Units: 02**

Course Objective:

To impart knowledge of role of food additives in food processing, methods employed for their selection for food uses, classification and properties of food additives, regulations for use of food additives

Course Contents:

Module I
Definitions; role of food additives in preservation and processing of food and food products, classification of food additives.

Module II
Enzymes, Vitamins and Amino Acids as food additives.

Module III
Anti-microbial food additives, preservatives.

Module IV
Antioxidants, emulsifying and stabilizing agents, surfactants, anticaking agents, thickeners, firming agents, flour improvers and bleaching agents.

Module V
Acidulants, sequestering agents, masticatory substances and low calorie and non-nutritive sweeteners.

Module VI
Colourants, flavouring agents and related substances, clarifying agents, gases and propellants and other additives.

Module VII
Legal Considerations in food additives.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- BIS: Various ISI standards related to food additives
- Fennema OR, Food Chemistry. Marcel Dekker Inc
- Furia TE, Handbook of Food Additive- Vol I. CRC Press
- Furia TE. Handbook of Food Additive- Vol II. CRC Press
- Joint FAO / WHO Expert Committee. Food Additives
- Mannay, Food Acts and Principles
- Mohindra SN, Food Additives

FOOD PLANT SANITATION

Course Code: BTD 605 **Credit Units: 02**

Course Objective:

To impart knowledge about principles of hygiene, hygienic handling of foods, cleaning and sanitation of processing equipments and food plants

Course Contents:

Module I: Introduction
Significance of personal hygiene and plant sanitation in food industry; Definitions; Principles of personal hygiene, hygienic handling of foods and food plant sanitations

Module II: Food Plant Sanitation
Sanitary practices in food plants; sanitary evaluation of food plants; Sanitary aspects of equipments and buildings – plant layout and design, sanitary design considerations for food processing equipment; Safe and effective control of insects and pests; Control of microorganisms – microorganisms important in food sanitation; Factors affecting growth of these microorganisms.

Module III: Sanitary Aspects of Water Supply
Sources of water; Characteristics of water; Water supply to food processing industry; Water treatment for ensuring supply of potable water to industry

Module IV: Food Plant Cleaning and Sanitation
Effective detergents and cleaning practices and importance of cleaning technology; types of detergents and sanitizers and their formulation; CIP systems; Sanitary aspects of waste treatment and disposal.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Y. H. Hui, Food Plant Sanitation Food Science and Technology
- Atherton HV and Newlander JA. Chemistry and Testing of Dairy Products. CBS Publishers Delhi
- Forsythe SJ. Microbiology of Safe Foods. Blackwell Science Publications, London
- Longree K and Ambruster G. Quantity Food Sanitation. John Wiley & Sons, USA
- Marriot NG. Principles of Food Sanitation. AVI Publishing Co. Inc, Westport USA
- Roday S. Food Hygiene and Sanitation

FOOD ENGINEERING LAB – II

Course Code: BTD 621 **Credit Units: 01**

Course Contents:

1. Estimation of thermal efficiency and capacity of heat exchangers.
2. Determination of thermal process time for canned products.
3. Establishment of freezing time
4. Studies on single effect / multiple effect evaporators
5. Determination of equilibrium moisture content and water activity
6. Establishing drying behavior of foods and calculation of drying rate
7. Studies on extrusion cooking characteristics of food products
8. Use of psychometric charts

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

1. Unit operations of chemical engineering by McCabe and Smith. McGraw-Hill
2. Chemical engineering handbook by Perry RH. McGraw-Hill
3. Dairy plant engineering and management by Tufail Ahmad, Kitab Mahal Publications
4. Engineering for dairy and food product by Farrall AW. John Wiley and Sons
5. Milk Pasteurization by Hall CW. The AVI Publication
6. Introduction to Chemical Engineering By Salil K Ghosal, Shyamal K Sanyal, Siddhartha Datta, Tata Mcgraw Hill

PROCESSING OF CEREALS, PULSES AND OILSEEDS LAB

Course Code: BFT 622 **Credit Units: 01**

Course Contents:

1) Physico–chemical characteristics like test-weight, gluten content, etc
2) Milling of wheat
3) Milling characteristics of corn
4) Preparation of bread / test-baking
5) Preparation of buns / cakes / pizza, etc
6) Preparation of biscuits / cookies etc
7) Cooking quality of rice
8) Pre-treatment and milling of pulses
9) Extraction of oil from oilseeds
10) Preparation of breakfast cereals

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

- Altschul. Processed Plant Food Stuffs
- Matz, MA. Cookie and Cracker Technology
- Dubey, SC. Basic Baking: Science and Craft
- Pyler, EJ. Baking Science and Technology
- Scott. Flour Milling Process

PROCESSING OF MEAT, FISH AND POULTRY PRODUCTS LAB

Course Code: BTD 623 **Credit Units: 01**

Course Contents:

1. Preparation of meat cuts, determination of yield of meat
2. Canning / curing of meat / freezing of meat / poultry / fish
3. Preparation of meat / poultry / fish product
4. Evaluation of external and internal quality of eggs
5. Grading, coating and thermos-stabilization of eggs
6. Visit to a slaughter house.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

Processed Meats; Pearson AM & Gillett TA; 1996, CBS Publishers. 2. Meat; Cole DJA & Lawrie RA; 1975, AVI Pub.
Egg and poultry meat processing; Stadelman WJ, Olson VM, Shemwell GA & Pasch S; 1988, Elliswood Ltd.

FOOD ADDITIVES LAB

Course Code: BTD 624 **Credit Units: 01**

Course Contents:

1. Detection of coal-tar dyes in food products
2. Determination of sulphur dioxide
3. Estimation of benzoic acid
4. Detection / estimation of a non-nutritive sweetener
5. Estimation of a vitamin used as food additive
6. Estimation of an amino acid used as food additive
7. Estimation of a mineral used as food additive
8. Estimation of antioxidant in food product

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text Books/References.

1. Food Science (5th Edn.) by Potter & Hotchkiss, CBS Publishers & Distributors.
2. Food process Technology by Fellows (Woodhead Publishing Ltd).

Term Paper & Industry Visit

Course Code: BFT 630 Credit Units: 03

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

7. Choosing a subject
8. Finding sources of materials
9. Collecting the notes
10. Outlining the paper
11. Writing the first draft
12. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

p) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
q) Begin by making a list of subject-headings under which you might expect the subject to be listed.
r) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

p) Get facts, not just opinions. Compare the facts with author's conclusion.
q) In research studies, notice the methods and procedures, results & conclusions.
r) Check cross references.

4. Outlining the paper

k) Review notes to find main sub-divisions of the subject.
l) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper

ee) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/

analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.

ff) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
gg) Check for proper spelling, phrasing and sentence construction.
hh) Check for proper form on footnotes, quotes, and punctuation.
ii) Check to see that quotations serve one of the following purposes:
  (xvi) Show evidence of what an author has said.
  (xvii) Avoid misrepresentation through restatement.
  (xviii) Save unnecessary writing when ideas have been well expressed by the original author.
jj) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:

36) Title page
37) Table of contents
38) Introduction
39) Review
40) Discussion & Conclusion
41) References
42) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

u) summary of question posed
v) summary of findings
w) summary of main limitations of the study at hand
x) details of possibilities for related future research

References

From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions

Monographs
Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles

Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles

McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric.

Journal of consumer research 19, 180-197.

Electronic Book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers
Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations
Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.
Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.
Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

BTD630- Term Paper & Industry Visit: In addition to term paper Students must compulsorily undergo Industrial Visit (Cluster of 5-6 Industries) for One week and they will be graded on their learning outcome of the visit for one third component of this Term Paper & Industry Visit.
Evaluation will be as follows;
Term Paper: 2 Credit (70 Marks)
Industry Visit: 1 Credit (30 Marks)

ADVANCED FOOD TECHNOLOGY

Course Code: BTD 631 **Credit Units: 03**

Course Objective:

To give knowledge on the recent technologies and developments in Food processing.

Module I
Principles and application of High pressure processing

Module II
Food irradiation - advantages and applications

Module III
Principles and application of Ohmic heating and pulsed electric field processing

Module IV
Microwave and infrared processing and application

Module V
Smart packaging and supercritical fluid extraction technologies.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Da-Wen Sun. Emerging Technologies for Food Processing.
- Christopher J Doona. Case studies in novel food processing technologies.
- Jose L. Martinez. Supercritical Fluid Extraction of Nutraceuticals and Bioactive Compounds.
- Joseph Kerry. Smart Packaging Technologies for Fast Moving Consumer Goods

ENGINEERING PROPERTIES OF FOOD MATERIALS

Course Code: BFT 632 **Credit Units: 03**

Course Objective:

To give knowledge about sphericity, frictional properties, thermal, electrical and optical properties, other engineering properties of food materials, their rheological characteristics and flow behaviour

Course Contents:

Module I: Physical Properties
Shape and size, bulk density, true density and specific gravity, aero- and hydro- dynamic properties, ultrasonic properties, Gas exchange properties of fresh fruits and vegetables

Module II: Frictional Properties
Static and kinetic friction; Rolling resistance; Angle of response

Module III: Rheological Properties
Elastic and Plastic behaviour of fresh and processed foods; Flow characteristics of liquid foods

Module IV: Electrical and Optical Properties
Electrical properties like electrical conductivity, dielectric behaviour, resistivity, etc.; Colorimetric properties

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Baianu, IC and Pesson, H. Physical Chemistry of Food processes Vol I
- Baianu, IC and Pesson, H. Physical Chemistry of Food processes Vol II
- Lewis MJ. Physical Properties of Foods and Food Processing Systems
- Mohsenin NN. Physical Properties of Biological Materials. Gordon & Breach Science Publisher, New York
- Pomeranz Y. Food Analysis. Theory and Practice. Chapman and Hall, New York
- Sahay KM and Singh KK. Unit Operations in Agricultural Processing, Vikas Publishing House Pvt. Ltd., New Delhi

FOOD PRODUCT DEVELOPMENT

Course Code: BTD 633 Credit Units: 03

Course Objective:

To give knowledge about strategies involved in development of new food products, testing their acceptability, production trail, test marketing, product launching, legal aspects and patenting process

Course Contents:

Module I

Concept of product and product development; Objectives, needs and importance of product development; Product life cycle and its role in product development; Role of creativity and strategy in product development

Module II

Forecasting of raw materials, ingredients, and product needs; Use of input – output analysis in forecasting; Techniques of weighing and probability to forecast product opportunity

Module III

Product development process indulging opportunity analysis; Generation and evaluation of ideas; Testing of concept v/s product; Prototype product; Positioning of product and market research; Planning product development project using job progress bar chart and PERT technique

Module IV

Planning production trails and test market and conducting them; Evaluation of test results; Various quality control techniques (viz. total quality assurance, SQC, HACCP & ISO – 9000) applicable to product development; Product launching; Advertisement and marketing plans

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Arlington. Food Product Development
- Desrosier NW and Desrosier JN. Economics of New Product Development
- Graf, E and Israel SS. Food Product Development from Concept to Market Place
- Hilton P. New Product Development
- Holt K. Product Innovation
- Panek C. Problems of Product Design and Development

COMMUNICATION SKILLS - IV

Course Code: BCS 601 **Credit Units: 01**

Course Objective:

To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualized pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

UNDERSTANDING SELF FOR EFFECTIVENESS - VI (STRESS AND COPING STRATEGIES)

Course Code: BSS 604 **Credit Units: 01**

Course Objective:

- To develop an understanding the concept of stress its causes, symptoms and consequences.
- To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course Contents:

Module I: Stress

Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress

Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress

Personal
Organizational
Environmental

Module IV: Consequences of stress

Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management

Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

FRENCH - VI

Course Code: FLT 601 **Credit Units: 02**

Course Objective:

To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events ;
iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - VI

Course Code: FLG601 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu + infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – VI

Course Code: FLS601 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – VI

Course Code: FLC601 **Credit Units: 02**

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?
- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter is Shanghai very cold?

Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

PRINCIPLES OF FOOD BIOTECHNOLOGY

Course Code: BTD 701 **Credit Units: 02**

Course Objective:

To give an understanding of micro-propagation techniques, genetic engineering and gene technology, and their application to improve productivity of food crops and for production of single cell proteins, food flavours, vitamins, etc and regulatory aspects of food biotechnology

Course Contents:

Module I
Historical development, scope and economic significance of food biotechnology

Module II
DNA replication, transcription, translation and post translation technology.

Module III
Fermentation biotechnology, biofermentors, basic design of a fermentor, fermentation processes for food ingredients like ethanol, enzymes, antibiotics, organic acids, flavours etc. using genetically superior microorganisms.

Module IV
Single cell proteins, yeasts and other new sources of foods, basic concepts of genetic engineering , genetically modified foods/ transgenetics; Immobilization of enzymes, and microorganisms .

Module V Biosensors and their applications to food processing.

Module VI
Regulatory and safety aspects of food biotechnology, biotechnology and Intellectual Property Rights

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Byong HL. Fundamentals of Food Biotechnology. Wiley – VCH
- Joshi VK and Pandey A. Biotechnology: Food Fermentation, Microbiology, Biochemistry and Technology Vol I & II, Education Publishers and Distributors
- Maheshwari DK, Dubey RC and Kang SC. Biotechnological Application of Microorganisms. A Techno – Commerical Approach. J K Int. Publishers Hans Pvt. Ltd. New Delhi
- Mittal GS. Food Biotechnology- Techniques and Applications. Food Press
- Perry JG. Introduction to Food Biotechnology. CRC Press
- Roller S and Harlander S. Genetic Modification in the Food Industry-A Strategy for Food Quality Improvement. Aspen Press
- Thakur, IS. Industrial Biotechnology: Problems and Remedies. IK Int Publ. House Pvt Ltd, New Delhi

PACKAGING OF FOOD PRODUCTS

Course Code: BTD 702 **Credit Units: 02**

Course Objective:

To impart knowledge about functions and types of packages, packaging materials for fresh and processed food products, food containers, special methods of packaging specific foods, bar coding, package standards and regulations, performance evaluation and shelf-life evaluation. The objective to be restricted to the introductory level to understand the basic scope of food products, include packaging for food products , fresh and processed foods.

Course Contents:

Module I: Introduction
Functions of a food package; Classification of packing; History of packaging practices; Status of current packaging

Module II: Packaging Materials
Properties of material required for packaging of food products; Chemistry and technology of packaging materials for food products.

Module III: Packaging Forms
Concept of package designs for primary packaging of foods and food products and evaluation of its performance, Forms of paper/wooden containers for fresh and processed foods; Characteristics of foil, polymeric and laminates containers; Glass and metal containers.

Module IV: Packaging Machinery and Packaging Operations
Important packaging machines used for food products and their operations; Aseptic packing – advantages, machinery and operation, Inert gas packaging; Active / Smart packaging, edible films and other new developments, MAP & CAP.

Module V: Shelf – Life Assessment
Prediction of shelf life of packaged food products, Equilibrium moisture isotherms.

Module VI: Packaging Standards and Regulations
Safety aspects of packaging materials, Bar coding and legal requirements of packaging materials and product information.
Module VII : Packaging of spices to preserve flavor and aroma of spices.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Crospy, MT, Food Packaging Materials
- Griffin, RC and Sacharow, S. Principles of Package Development. The AVI Publishing Co. Inc
- Heiss, R. Principles of Food Packaging. P. Keppler Verlag KG, Germany
- Institute of Packaging. Food Packaging and Health. Migration and Legislation. Institute of Packaging, London.
- Paine, FA and Paine HY. A Handbook of Packaging
- Mahadeviah, M and Gowramma RV. Food Packaging Materials
- Sacharow, S. Food Packaging

PRINCIPLES OF HUMAN NUTRITION

Course Code: BFT 703 Credit Units: 02

Course Objective:

To impart knowledge about nutritional requirements of human body, effects of deficiency / excess nutrients, digestion and absorption of nutrients, recommended daily allowances and balanced diets, meal planning, prevention of physiological and metabolic anomalies and food fortification

Course Contents:

Module I: Introduction
Definitions and Scope; Functions of foods; Important foods consumed in India (Food habits and their effect on regional imbalances) ; Classification of foods and their nutritional contribution.

Module II: Specific Nutrients
Water balance, energy balance; Digestion, absorption, metabolism and importance of major nutrients (Carbohydrates, Proteins, Fats) in body; Recommended daily allowances of nutrients for different groups of people

Module III: Balanced Diets and Meal Planning
Diet-structure and its possible modification / improvements (Normal Diet, Parental and Enteral Nutrition); Meal planning and planning of balanced diets for different groups of people.

Module IV: Nutritional Problems and Therapeutic Nutrition
Types of nutritional problems and causes; Common nutritional deficiencies.; Nutritional and non-nutritional considerations of the life cycle- infants, geriatric and others: Importance of therapeutic nutrition, planning diet for patients suffering from diseases like GIT diseases, CV diseases, liver disorder, renal disorders, Nutritional programmes in India; Toxicants naturally present in foods

Module V: Food Fortification
Food fortification , Food Supplementation and Food enrichment.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Gopal C, Ramasastri BV and Balsubramanian SC. Nutritive Value of Indian Foods. National Institute of Nutrition, Hyderabad
- Howe PS. Basic Nutrition in Health
- Joshi, SA. Nutrition and Dietetics. Tata McGraw Hill Book Co. Ltd, New Delhi
- Mathew S. Practical Mannual of Introductory Foods
- Sharma, S and Wadhwa, A. Public Health Nutrition, Elite Publishers, New Delhi
- Srilakshmi, B. Dietetics. New Age International (P) Ltd, New Delhi.
- Swaminathan, M. Food Nutrition, Vol I
- Swaminathan, M. Food Nutrition, Vol II
- Krause and Mahan – Food and Nutrition
- Emma S., Weigley, D.H., Muller, Corinn, H. Robinson – Robinson's Basic Nutrition and Diet Therapy, Merill, Printice Hall.
- F.P. Anita and Phillip Abraham – Clinical Nutrition and Dietetics

TECHNOLOGY OF SPICES, PLANTATION CROPS AND FLAVOURS

Course Code: BTD 704 **Credit Units: 04**

Course Objective:

To impart knowledge about economic importance, dietary significance and chemical composition of major Indian spices and plantation crops, packaging and storage requirements and natural food flavourings and general methods of their evaluations.

Course Contents:

Module I: Introduction
Brief history and economic importance of spices and plantation crop products; Major Indian spices and plantation crops for food applications, general composition and importance constituents

Module II: Post Harvest Technology of Spices
Post harvest technology for major spices (black pepper, cardamom, coriander, cinnamon, ginger, onion and garlic, paprika, saffron, turmeric), their post harvest diseases and storage pests and their management; Packaging and storage of spices and spice powders

Module III: Post Harvest Technology of Plantation Crops
Post harvest technology of important plantation crops (Coconut, oil palm, cashew, cocoa, coffee, tea and vanilla), their post harvest diseases and storage pests and their management

Module IV: Value – Added Products
Value – added products like essential oils and oleoresins from spices, instant coffee etc.

Module V: Flavour Technology
Introduction to flavours; Major compounds of various food flavourings; Flavour encapsulation; Flavour application in food products

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Pruthy JS. Spices and Condiments. National Book Trust

FOOD EQUIPMENT AND PLANT DESIGN

Course Code: BTD 705 **Credit Units: 04**

Course Objective:

To give knowledge about materials of construction for food equipments / accessories, design consideration and design of some food processing equipments. To impart knowledge about plant design considerations, feasibility study, plant location, food plant lay out, process selection, facilities and aggregate planning, financial analysis, process flow analysis and decision analysis.

Course Contents:

Module I: Materials for fabrication
Material selection in design of food processing equipments – their classification and properties; Creep phenomenon; Corrosion and its effect on material properties

Module II: Design of Food Handling and Processing Equipments
Application of design engineering to food processing equipments; Design parameters, codes and material selection., Design of equipments used in handling of foods; Design of heat exchangers; Design of pressure vessels, extruders and other food processing equipments.

Module III: Design Optimization
Optimization of designs for process efficiency, energy and cost.

Module IV: Plant Design Concepts and Plant Location
Food plant design concepts and general design considerations; Plant location – location factors and their interaction with plant location, location theory models, computer aided selection of location.

Module V: Feasibility Report and Process Flow Chart
Feasibility analysis and preparation of feasibility report; Factors affecting plant size and their interactions, estimation of break-even and economic plant size; Process design – process flow charts, computer – aided development of flow charts; Equipment selection including economic analysis of equipment alternatives.

Module VI: Food Plant Layout
Layout of food plants (including computer aided) and evaluation; Layout symbols; Planning and design of service facilities, human resources, product packaging and marketing systems; Hygienic design aspects and workers' safety; Functional design of plant building and selection of building materials.

Module VII: Plant Design Report
Estimation of capital investment; Analysis of plant costs and profitabilities; Management techniques in plant design including application of network analysis; Preparation of plant design report

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Chemical Engineers' Handbook. McGraw Hill Book Co. Inc, New York.
- O.P. Khanna, Production Engineering, and Industrial Management.
- Moore, Plant Layout and Design
- Peterse and Timmerhaus, Plant Design for Chemical Engineering.
- Rase and Barrow, Project Engineering, of Process Plant.
- Farrall, Engineering For Dairy and Food Products.

INDUSTRIAL TRAINING EVALUATION

Course Code: BTD 750 **Credit Units: 01**

The objectives of the Industrial Training include:

1. To give students the opportunity to apply the knowledge and skills they have acquired on campus in a real-life work situation.
2. To provide students with opportunities for practical, hands-on learning from practitioners in the students' areas of specialization.
3. To expose students to a work environment, common practices, employment opportunities and work ethics in their relevant field.
4. To enhance the employability skills of the students.
5. To provide opportunities for students to be offered jobs in the organizations in which they undergo their Industrial Training.

STUDENT

The student is responsible to ensure that all matters relating to the Industrial Training Programme are conducted in an ethical, conscientious, trustworthy and committed manner.

A) Before Industrial Training

1. To apply for a suitable Industrial Training, submit an application form through the Officer (Training/ Training and placement) to the organization concerned one semester before the Industrial Training Programme commences.
2. Submit one copy of the offer letter for the Industrial Training to the Head of the department or Faculty coordinator (Industrial Training). Students are not allowed to change their Industrial Training after obtaining the approval and confirmation from the Industry.
3. To complete the Industrial Training placement process within the specified time based on the Industrial Training Programme schedule.
4. To ensure that the Industrial Training is not performed in a family-owned company so as to avoid conflict of interest.

B) During Industrial Training

1. Once the student has reached the training place, he / she must send a mail to the Faculty coordinator (Industrial Training / Department) / Head of the department or Officer (Training/ Training and placement) that he / she has joined the training from _____ in the industry (Name) _____ and forward his / her contact nos., E-mail ID and the contact nos. of the company representative.
2. During the training, students will be given 3-4 practical problems by the industry in which they are undergoing training. In case the industry do not give them the problems, the students will themselves formulate minimum three problems and maximum four problems and carry out detailed study on them and recommend the optimum solution based on their theory knowledge.
3. To maintain discipline and abide by all rules and regulations enforced by the organization and to ensure FULL attendance during the Industrial Training duration.
4. To carry out the Industrial Training in an ethical and professional manner and to uphold the reputation of Amity University, Rajasthan at all times.
5. To maintain confidentiality and to not disseminate / share any information related to the organization to third parties.
6. To be responsible for maintaining the security of properties belonging to the organization.

ASSESSMENT COMPONENTS

Assessment within the Industrial Training context aims to evaluate the student's work quality and appropriateness to the field of study with reference to the learning outcomes of the Industrial Training Programme. Students should be evaluated by Faculty coordinator (Industrial Training/ Department). Evaluation methods used may consist of the following:

- Industrial Training report
- Presentation by the student

DISCIPLINARY PROCEDURES DURING INDUSTRIAL TRAINING PROGRAMME

Within the training period, the student is wholly responsible to the organisation where he or she has been placed. This means that the student must observe specified office hours, and must adhere to all rules and regulations of the organisation, just like the other staff within the organisation, during the entire training period.

DEPARTMENTAL REPORT

When the training of the student in a particular department/ section/ shop of an industry is completed, he / she should write departmental report. Report should include description of the department/ Section/ Shop, the processes and procedures followed in it. Individual items of equipment, special attachment, indigenously adopted tools should be described. Personnel & any other human resource features should be highlighted. Drawings, sketches, specification of equipment, used, should be given wherever essential. The report should also contain entire studies & discussions carried out by the students in addition to what he/ she has observed during his / her day to day work. The departmental report should be signed by the student and also by his officer-in-charge of that department/ section/ shop.

The report must include the following:
(a) The basic history/introduction of the industry.
(b) The sequence of operations followed/ systems introduced for the production.
(c) The layout of various workshop/floors or the labs and admin section of the industry.
(d) The major equipment used for the production/ computer configuration required for the loading the used software's.
(e) The infrastructure available.
(f) The movement of material (raw, semi-finished and finished product), not applicable in case of software industry.
(g) The formulation of 3 to 4 practical problems.
(h) Data required to formulate the problems.
(i) Analysis of the data, steps required and commands used in case of software industry.
(j) Suggestions made based on the analysis of the data.
(k) Recommendations.
(l) Certificate from the industry for the period of training undergone.

The final report must be at-least 25 to 30 pages for the student undergoing 45 days training. In case no. of students undergoing training in the same industry are more than one, each student will prepare his/ her report separately.

The Layout Guidelines for the Project File & Project Report

A4 size Paper
Font: Arial (10 points) or Times New Roman (12 points)
Line spacing: 1.5
Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

FORMAT OF INDUSTRIAL TRAINING REPORT

The following titles must be incorporated in the final industrial training report:

1. Preface/Acknowledgement

2. Certificate with Signatures and Seal of the Industry Person

3. Contents/Index

4. Introduction about the Industry

5. Training Schedule

6. Work Done / Observations

7. Specific Assignment / Project Handled

8. Learning after Training

9. Summary

EVALUATION THROUGH SEMINAR PRESENTATION

The students will present his report though seminar, which will be held by an expert committee constituted by the concerned department as per norms of the institute. The evaluation through seminar presentation will be based on the following criteria.

a) Quality of material presented.

b) Effectiveness of presentation.

c) Depth of knowledge and skills.

Upon completion of these programmes, students are expected to demonstrate the following graduates attributes:

- Engineering Knowledge
- Problem analysis
- Design/ development of solutions
- Conduct investigations of complex problems
- Modern tool usage, The engineer and society
- Individual and Team Work
- Communication and Project Management and Finance.

Text & References:

Industrial Microbiology by Brinton M miller & Warren Litsky. MGH.

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**

Principles of Food Biotechnology- LAB

Course Code: BTD 721 **Credit Units : 01**

Course Contents:

1. Operation of fermenter for production of microbial metabolites
2. Isolation of DNA
3. Commercial application of enzymes into products/process
4. Production of wine by yeast fermentation
5. Production of yoghurt: downstream process control and product optimization
6. Solid state fermentation: Sauerkraut/Tempeh/Kimchi
7. Development of a fermented food/drink utilizing plant /animal/byproduct as substrate.
8. Operation and handling of PCR machine for amplification of DNA.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

PR – Performance
WT – Written Test
LR – Lab Record

Text & References:

1. Joshi V.K. and Pandey A.(1999). Biotechnology- Food Fermentation, Vol 1 and 2, Educational publishers and distributors.
2. Garbutt J (1997), Essentials of Food Microbiology, second edition, Hodder Arnold Publication
3. Wood B.J. (1997), Microbiology of Fermented Foods. Volume I and II, Elsivier Applied a. Science Publication.
4. Stanbury, P.F., Whitekar A. and Hall. 1995., Principles of Fermentation Technology a. Butterworth-Heinenmann, Elsevier Science.
5. Lee B.H.(1996), Fundamentals of Food Biotechnology, VCH publishers.
6. Tombs M.P. (1991), Biotechnology in Food Industry, Open University Press,
7. Schwartzberg S and Rao M.A. (1990), Biotechnology and Food Process Engineering, Marcel Dekker, INC, New York.

PACKAGING OF FOOD PRODUCTS - LAB

Course Code: BTD 722 **Credit Units: 01**

Course Contents:

1. Strength properties of packaging materials
2. Operating can double seamers
3. Testing of can seams
4. Measurement of tin-coatings over tin plates
5. Sulphide-stain resistance porosity and crystal size of tin plates.
6. Global Migration of plastic films
7. Puncture-resistance of corrugated box
8. Shrink packaging of foods
9. Determination of water activity of dry food product

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

Handbook of Packaging by Paine and Paine
Manual of Analyzing for Fruits and Vegetables Products by S Ranganna

PRINCIPLES OF HUMAN NUTRITION LAB

Course Code: BTD 723 **Credit Units: 01**

Course Contents:

1) Determination of calorific value of foods
2) Determination of anti-nutritional factors (trypsin inhibitor)
3) Study of symptoms of nutritional deficiencies / disorders on human health
4) Case studies for diagnosis of nutritional deficiencies / disorders in human beings
5) Dietary survey of selected group of people, assessment of protein-calorie status of their diet
6) Planning and preparation of therapeutic diets for species group of people.

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text & References:

- Raghuramulu N, Nair KM and Kalyanasundara S Am S. A Manual of Laboratory Techniques. NIN (ICMR), Hyderabad

TECHNOLOGY OF SPICES, PLANTATION CROPS & FLAVORS-LAB

Course Code: BTD 724 **Credit Units: 01**

Course Contents:

1. Identification and characterization of flavouring compounds of spices
2. Oil determination
3. Extraction of oil from clove, pepper, cardamom and chilli
4. Extraction of oleoresins-Turmeric, ginger, pepper, clove
5. Piperine estimation in pepper oleoresin
6. Steam distillation of spices
7. Determination of curcumin content in turmeric
8. Chemical analysis of spices : moisture, volatile oil, specific gravity, refractive index, acid value
9. Study of standard specification of spices
10. Packaging study of spices
11. Preparation of curry powder
12. Preparation of Indian Masala for different foods

Examination Scheme:

IA			EE			
Class Test (Practical Based)	**Mid Term Viva**	**Attendance**	**Major Experiment**	**Minor Experiment/Spotting**	**Practical Record**	**Viva**
15	10	05	35	15	10	10

Text Book:

1. K. V. Peter. Handbook of herbs and spices. Second edition. Volume 1. 2012. Woodhead Publishing.
2. K. V. Peter. Handbook of herbs and spices. Second edition. Volume 2. 2012. Woodhead Publishing.
3. Handbook on Modern Packaging Industries (2nd Edition) By NIIR Board.
4. Kenji Hirasa, Mitsuo Takemasa. Spice Science and Technology. 1998, CRC Press, Boca Raton.
5. P.R. Ashurst. Food Flavourings. 1991. Blackie and Son Ltd.
6. K. Hüsnü Can Baser, Gerhard Buchbauer. Handbook of Essential oils Science, Technology, and Applications. Second Edition. CRC Press, Boca Raton.

Reference Book:

1. Pruthy JS. Spices and Condiments. National Book Trust.

TERM PAPER

Course Code: BTD 730 Credit Units: 03

METHODOLOGY

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:

13. Choosing a subject
14. Finding sources of materials
15. Collecting the notes
16. Outlining the paper
17. Writing the first draft
18. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of materials

s) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.

t) Begin by making a list of subject-headings under which you might expect the subject to be listed.

u) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

s) Get facts, not just opinions. Compare the facts with author's conclusion.

t) In research studies, notice the methods and procedures, results & conclusions.

u) Check cross references.

4. Outlining the paper

m) Review notes to find main sub-divisions of the subject.

n) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & preparing the final Paper

kk) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.

ll) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
mm) Check for proper spelling, phrasing and sentence construction.
nn) Check for proper form on footnotes, quotes, and punctuation.
oo) Check to see that quotations serve one of the following purposes:
(xix) Show evidence of what an author has said.
(xx) Avoid misrepresentation through restatement.
(xxi) Save unnecessary writing when ideas have been well expressed by the original author.
pp) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
43) Title page
44) Table of contents
45) Introduction
46) Review
47) Discussion & Conclusion
48) References
49) Appendix
Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
y) summary of question posed
z) summary of findings
aa) summary of main limitations of the study at hand
bb) details of possibilities for related future research

References
From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Bibliographical conventions
Monographs
Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited Volumes
Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

EditedArticles
Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal Articles
McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic Book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic Journal Articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other Websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished Papers
Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished Theses/ Dissertations
Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.
Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

FOOD ADULTERATION

Course Code: BTD 731 **Credit Units: 03**

Course Objective:

To give knowledge about food adulteration and its impact on food safety and quality. Also, brief introduction to identification of adulterated food products.

Course Contents:

Module I: Introduction and ingredients used for food adulteration
Introduction to food adulteration. Definition according to various laws. Risk of adulteration, Preventive and corrective actions of adulteration.

Module II: Food Adulteration and Fraud in food chain
Food adulteration and fraud related to food chain, labelling, ingredients, components and the shelf life of food articles. Common adulterants used for preparation of adulterated and fraudulent food articles. Reasons and characteristics of adulterants behind their use.

Module III: Regulations and recommendations related to food adulteration

FSSA, EFSA, USFDA clauses related to food adulteration and fraud. Recommendation from various regulatory and federal agencies towards prevention and identification of food adulterants and fraudulent items.
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Module IV: Resources regarding monitoring of food adulteration
Library and information related to monitoring of food adulteration at the global level, Agencies monitoring the food adulteration such as FSSA, EFSA, RASFF, NSF etc.,

Module V: Recent cases of adulteration
Recent adulteration cases across the globe. Adulteration in spices, dairy, cereals, pulse and aminal based products. Adulteration in western countries such as German Ham and English Pickles. Basmati Rice and Baby Milk. Pink Margarine and Pure Ketchup and etc.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Darell. T Braden. Food Fraud and Adulterated, Ingredients, Background, Issues, and Federal Action (2014). Nova Science Publishers, Inc. New York.
- John M. Ryan. Food Fraud (2016). Academic Press. 125, London Wall, EC2Y 5AS.
- Bee Wilson. Swindled. The dark history of food fraud, from poisoned candy to counterfeit coffee (2008). Princeton university press, Princeton and Oxford.
- Food safety and standards act 2006. FSSAI website.

MANAGEMENT OF FOOD INDUSTRY WASTE

Course Code: BTD 732 **Credit Units: 03**

Course Objective:

To give knowledge about types of food industry wastes and their special characteristics, important by-products from various food processing industries, treatment of food industry effluent and waste-water treatment systems

Course Contents:

Module I: Introduction
Definitions, sources and types of wastes and their special characteristics; Waste generation in India and its impact on environment, natural resources and human health

Module II: Waste from Food Processing Industries
Statutory standards for emissions of environmental pollutants from food processing industries; Necessity of efficient management of food industry wastes; Characterization of food industry effluents – physico – chemical parameters, oxygen demands and their inter-relationship; Unit concept of treatment of food-industry effluent

Module III: By products from Food Processing Industry Waste
Characterization of waste from food processing industry for by-products; Processes for important by-products from wastes of processing industries for fruits and vegetables, food grains, milk and milk products, and meat, fish and poultry products etc.

Module IV: Waste Treatment
Biological oxidations; Aeration devices systems; Physico-chemical, biological analysis of waste water, primary, secondary and tertiary treatments including anaerobic waste water treatments; Advanced waste – water treatment systems like microstrainers, filters, ultrafiltration and reverse osmosis etc; Handling and disposal of sludge of food industry.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- David A and Stapton NF. Principles and Practices for Safe Processing of Foods
- Green, JH. Food Processing Waste Management AFST (I) and CFTRI. Proceedings of Symposium on By-Products from Food Industries: Utilization and Disposal
- Kramer, G. Food Processing Waste Management
- Ockerman HW and Hansen CL. Animal By Product Processing. The AVI Publishing Co. Inc Westport USA
- Whitter EO and Webb BH. By-products from Milk. Reinhold Publishing Corp, New York

FOOD BEVERAGES

Course Code: BTD 733 **Credit Units: 03**

Course Objective:

To impart knowledge about types of and ingredients required for production of food beverages, their special characteristics, packaging requirements, quality control and quality standards

Course Contents:

Module I: Introduction
History of growth; Economic importance; Classification; Dietary significance

Module II: Ingredients for Food Beverages
Water, sugar, food additives and other ingredients required for production; Quality of water required and effect of dissolved constituents on beverage; Water treatment.

Module III: Fruit and Vegetable Juices and Beverages
Juice extraction equipments; Juice clarification, preservation and packing; Concentration and drying; Modified juice beverages; Fortified beverages

Module IV: Synthetic Beverages
Non-carbonated and carbonated beverages; Source of carbon dioxide and its physico – chemical properties; Carbonating process; Packaging of carbonated beverages

Module V: Alcoholic Beverages
Method for manufacture of Alcoholic beverages, methods for extraction of juice pulp; Concentration and drying of juices / pulp; Fortified fruit juices and beverages

Module VI: Quality Control
Quality standards; Chemical, sensory and microbial evaluation; Product shelf – life

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Text & References:

- Green LR. Developments in Soft Drink Technology. Applied Science Publishers Ltd, London
- Wood roof JG and Phillips GF. Beverages: Carbonated and Non-Carbonated. The AVI Publishing Co. Inc, Westport

COMMUNICATION SKILLS - V

Course Code: BCS 701 **Credit Units: 01**

Course Objective:

To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice,

UNDERSTANDING SELF FOR EFFECTIVENESS - VII (INDIVIDUAL, SOCIETY AND NATION)

Course Code: BSS 704 **Credit Units: 01**

Course Objective:

This course aims at enabling students towards:
Understand the importance of individual differences
Better understanding of self in relation to society and nation
Facilitation for a meaningful existence and adjustment in society
Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition & Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Davis, K. Organizational Behaviour
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen; Organizational Behaviour

FRENCH - VII

Course Code: FLT 701 **Credit Units: 02**

Course Objective:

Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical:

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

Le passé : passé composé/imparfait
Pronoms compléments directs/indirects, y/en (idées/choses)
Propositons relatives introduites par qui, que, où
Comparatif et superlatif
Le conditionnel présent
Situer dans le temps
Féminin des adjectifs
La prise de paroles : expressions
Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 2

GERMAN - VII

Course Code: FLG 701 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: Indirekte Fragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - VII

Course Code: FLS 701 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Español En Directo I A, 1B
Español Sin Fronteras
Material provided by the teacher from various sources

CHINESE – VII

Course Code: FLC 701 **Credit Units: 02**

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1,2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tu shuo hua" Part-I Lesson 1-7

MAJOR PROJECT/ DISSERTATION

Course Code: BTD 860 **Credit Units: 25**

Course Objective:

To utilize scheduled periods by students by undertaking a project that would be completed during the semester.

Methodology

Every student shall undertake major project. The major Project shall be undertaken in some food processing industry or laboratory of repute engaged in food analysis. Each student shall be assigned to a faculty who shall continuously monitor the progress of the Project in the concerned industry unit or laboratory.

The faculty in consultation with the concerned scientist of the industry / laboratory shall select the topic of the project. At the conclusion of the project the students shall present a seminar and submit a dissertation. The dissertation shall be evaluated by the internal faculty / examiner. The students then shall have to appear for the Viva Voce.

GUIDELINES FOR PROJECT FILE AND PROJECT REPORT

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.
Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critically analyzed by the faculty guide and corrected by the student at each stage.

PROJECT FILE

The Project File may be a very useful tool for undertaking an assignment along-with a normal semester, an exploratory study, sponsored projects, a project undertaken during summer period or any other period where the researcher is not working with a company/organization. The project/ assignment may also be a part of the bigger research agenda being pursued by a faculty/ institution/ department
The Project File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation. This file may be considered in continuous assessment.

In general, the File should be comprehensive and include:

A short account of the activities that were undertaken as part of the project;
A statement about the extent to which the project has achieved its stated objectives;
A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
Any problems that have arisen and may be useful to document for future reference.

PROJECT REPORT

The Project Report is the final research report that the student prepares on the project assigned to him. In case of sponsored project the lay out of the project could be as prescribed by the sponsoring organization. However, in other cases the following components should be included in the project report:

Title or Cover Page

The title page should contain Project Title; Student's Name; Programme; Year and Semester and Name of the Faculty Guide.

Acknowledgement(s)

Acknowledgment to any advisory or financial assistance received in the course of work may be given. It is incomplete without student's signature.

Abstract

A good "Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project. It should not exceed more than 1000 words.

Table of Contents

Titles and subtitles are to correspond exactly with those in the text.

Introduction

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

Materials and Methods

This section should aim at experimental designs, materials used (wherever applicable). Methodology should be mentioned in details including modifications undertaken, if any. It includes organization site(s), sample, instruments used with its validation, procedures followed and precautions.

Results and Discussion

Present results, discuss and compare these with those from other workers, etc. In writing this section, emphasis should be laid on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary, do not write in "point" form.

While presenting the results, write at length about the the various statistical tools used in the data interpretation. The result interpretation should be simple but full of data and statistical analysis. This data interpretation should be in congruence with the written objectives and the inferences should be drawn on data and not on impression. Avoid writing straight forward conclusion rather, it should lead to generalization of data on the chosen sample.

Results and its discussion should be supporting/contradicting with the previous research work in the given area. Usually one should not use more than two researches in either case of supporing or contradicting the present case of research.

Conclusion(s) & Recommendations

A conclusion should be the final section in which the outcome of the work is mentioned briefly.

Check that your work answers the following questions:
Did the research project meet its aims (check back to introduction for stated aims)?
What are the main findings of the research?
Are there any recommendations?
Do you have any conclusion on the research process itself?

Implications for Future Research
This should bring out further prospects for the study either thrown open by the present work or with the purpose of making it more comprehensive.

Appendices
The Appendices contain material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

References
References should include papers, books etc. referred to in the body of the report. These should be written in the alphabetical order of the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples
For research article
Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, **8** (suppl 1): 116–117.

For book
Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

The Layout Guidelines for the Project File & Project Report

A4 size Paper
Font: Arial (10 points) or Times New Roman (12 points)
Line spacing: 1.5
Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

ASSESSMENT OF THE PROJECT FILE AND THE PROJECT REPORT

Essentially, the assessment will be based on the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The Project should fulfill the following ***assessment objectives:***

Range of Research Methods used to obtain information
Execution of Research
Data Analysis (Analyze Quantitative/ Qualitative information)
Quality Control
Conclusions

In case of industrial training, following format can be followed for preparation of training report:

- Title or Cover Page
- Copy of training certificate and institutional certificate
- Acknowledgement

- Table of contents
- Introduction
- Detailed section-wise report
- Bibliography(if required)

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**