



# AMITY UNIVERSITY

— R A J A S T H A N —

**Bachelor of Technology (Food Technology)**

**Programme Code: BTD**

**12126**

**Duration – 4 Year Full Time**

**Programme Structure  
And  
Curriculum & Scheme of Examination  
With  
Choice Based Credit System (CBCS)  
2021 Batch**

**AMITY UNIVERSITY RAJASTHAN**

**JAIPUR**

## PROGRAMME LEARNING OUTCOMES

1. Graduates will be trained in soft skills and business communication to maintain good professional and personal relationship.
2. Graduates will have laboratory technical skills to measure, control and modify chemical and physical properties of foods and processed food products and ensure the quality and safety of food products.
3. Graduates will be able to understand biochemical processes during post-harvest storage of food materials. They will also be able to develop new food products e.g. nutraceuticals.
4. Graduates will understand engineering principles of unit operations and unit processes. They will be able to transform raw materials into food products/ processed food products for value addition.
5. Graduates will be able to understand processing, packaging and product technology for fruits, vegetables, dairy, meat, sea-foods (fish and prawns) and cereals as also of fermented food products.

### Credit Summary Sheet

B. Tech Food Technology							
Semester	CC	DE	VA	OE	NTCC	Anandam	Total
<b>1</b>	<b>16</b>	<b>3</b>	<b>4</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>25</b>
<b>2</b>	<b>16</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>28</b>
<b>3</b>	<b>17</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>29</b>
<b>4</b>	<b>18</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>30</b>
<b>5</b>	<b>18</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>30</b>
<b>6</b>	<b>18</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>30</b>
<b>7</b>	<b>24</b>	<b>3</b>	<b>4</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>33</b>
<b>8</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>20</b>	<b>-</b>	<b>20</b>
<b>Total</b>	<b>127</b>	<b>21</b>	<b>28</b>	<b>15</b>	<b>20</b>	<b>14</b>	<b>225</b>

**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
BTD233	Confectionary and Sugar Technology	DE	3	-	-	3
BTD 301	Principles of Food Processing	CC	3	-	-	3
BTD432	Enzymes in Food Processing	DE	3	-	-	3
BTD 501	Food Quality- Analysis & Assurance	CC	2	-	-	3
BTD631	Advanced food technology	DE	3	-	-	3
TOTAL						15

## Programme Structure

<b>B. Tech. Food Technology: I- SEMESTER</b>						
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
<b>DE Electives: Student must select 1 course from the list of following DE electives</b>						
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				
BCS 101	English	VA	1	-	-	1
<b>AND001</b>	<b>ANANDAM-I</b>	<b>NTCC</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
BSS 104	Behavioral Science I (Self Development and Interpersonal Skills)	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language - I French German Spanish Chinese	VA	2	-	-	2
<b>TOTAL</b>						<b>25</b>

<b>B.Tech Food Technology: II- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
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	1
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
BTD230	Term Paper	DE	3	-	-	3
BTD231	Specialty Foods	DE				
BTD232	Plant Resource Utilization	DE				
BTD233	Confectionary and Sugar Technology	DE				
OE	Open Elective-I	OE	3	-	-	3
BCS 201	English	VA	1	-	-	1
AND002	ANANDAM-II	NTCC	-	-	-	2
BSS 204	Behavioral Science - II (Problem Solving and Creative Thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language - II French German Spanish Chinese	VA	2	-	-	2
	<b>TOTAL</b>					<b>28</b>

<b>B.Tech Food Technology: III- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
<b>BTD 301</b>	<b>Principles of Food Processing</b>	<b>CC</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>4</b>
BTD 302	General Biochemistry	CC	3	-	-	3
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
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
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	CC	4	-	-	4
BCS 301	Communication Skills – I	VA	1	-	-	1
<b>AND003</b>	<b>ANANDAM-III</b>	<b>NTCC</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>BSS 304</b>	<b>Behavioral Science III (Interpersonal Communication)</b>	<b>VA</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language - III French German Spanish Chinese	VA	2	-	-	2
	<b>TOTAL</b>					<b>29</b>

<b>B.Tech Food Technology: IV- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
BTD 401	Food Chemistry	CC	3	-	-	3
BTD 402	Food Microbiology	CC	3	-	-	3
BTD 403	Principles of Heat & Mass Transfer	CC	3	-	-	4
BTD 404	Mechanics of Fluids	CC	3	-	-	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
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
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
<b>AND004</b>	<b>ANANDAM-IV</b>	<b>NTCC</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
BSS 404	<b>Behavioral Science-IV (Relationship Management)</b>	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language - IV French German Spanish Chinese	VA	2	-	-	2
	<b>TOTAL</b>					<b>30</b>

<b>B. Tech Food Technology: V- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
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
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
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
AND005	ANANDAM-V	NTCC	-	-	-	2
BSS 505	Behavioral Science – V (Group Dynamics & Team Building)	VA	1	-	-	1
FLT 501	Foreign Language - V French	VA	2	-	-	2
FLG 501	German					
FLS 501	Spanish					
FLC 501	Chinese					
	<b>TOTAL</b>					<b>30</b>

<b>B. Tech Food Technology: VI- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
BTD 601	Food Engineering - II	CC	3	-	-	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
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
BTD630	Term Paper & Industry Visit	DE	3	-	-	3
BTD631	Advance 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
AND006	ANANDAM-VI	NTCC	1	-	-	2
BSS 604	Behavioral Science-VI (Stress and Coping Strategies)	VA	1	-	-	1
FLT 601	Foreign Language - VI French	VA	2	-	-	2
FLG 601	German					
FLS 601	Spanish					
FLC 601	Chinese					
	<b>TOTAL</b>					<b>30</b>

**Note:** After completion of the End Term Examination the students must compulsorily undergo Industrial Training of 1 month. 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>B.Tech Food Technology: VII- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
BTD 701	Principles of Food Biotechnology	CC	2	1	-	3
BTD 702	Packaging of Food Products	CC	2	1	-	3
BTD 703	Principles of Human Nutrition	CC	2	1	-	3
BTD 704	Technology of Spices, Plantation Crops & Flavors	CC	4	-	-	4
<b>BTD 705</b>	<b>Food Equipment and Plant Design</b>	CC	3	1	-	4
BTD750	Industrial Training Evaluation	CC	-	-	-	3
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
<b>DE Electives: Student has to select 1 course from the list of following DE electives</b>						
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
<b>AND007</b>	<b>ANANDAM-VII</b>	<b>NTCC</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>
<b>BSS 704</b>	<b>Behavioral Science-VII (Individual, Society and Nation)</b>	<b>VA</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>
<b>FLN701</b>	<b>Foreign Language - VII French</b>	<b>VA</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>
FLG 701	German					
FLS 701	Spanish					
FLC 701	Chinese					
<b>TOTAL</b>						<b>33</b>

<b>B.Tech Food Technology : VIII- SEMESTER</b>						
<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Lectures (L) Hours Per Week</b>	<b>Tutorial (T) Hours Per Week</b>	<b>Practical (P) Hours Per Week</b>	<b>Credits</b>
BTD860	Major Project/Dissertation	NTCC	-	-	-	20
	<b>TOTAL</b>					<b>20</b>

**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 1<sup>st</sup> 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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****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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### Text & References:

#### Text:

- Kanetkar, Y. (2001). Let us C, BPB Publications, 2<sup>nd</sup> Edition.
- Balagurusamy, E. (2004). Programming in ANSI C, Tata McGraw-Hill Education.
- Herbert, S. (2002). The Complete Reference, Osbourne Mcgraw Hill, 4<sup>th</sup> 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

Introduction to 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### 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).

**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/ft'h'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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	10

## ENGINEERING GRAPHICS -Lab

**Course Code: BTD: 125**

**Credit Unit: 01**

### Practical's

#### 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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	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:** 50%  
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:** 50%  
(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.)

## 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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, 3<sup>rd</sup> Edition.
- Cooper, T.G. (2007). Tools of Biochemistry by Publisher John Wiley and Sons Inc, 3<sup>rd</sup> edition.

**References:**

- Thomas F. (1995). Cellular Biophysics I & II. Weiss publisher , MIT Press, 2<sup>nd</sup> edition.
- Segal, I.H. (2001). Biochemical calculations by Publisher John Wiley and Sons, 3<sup>rd</sup> edition (2001)
- Lehninger, A.L. Nelson, D.L. Cox, M.M (2008). Principles of Biochemistry, Worth Publishing, 3<sup>rd</sup> 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text & References:**

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

## **BASICS IN POST HARVEST MANAGEMENT AND FOOD TECHNOLOGY**

**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**

Introduction to 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 changes**

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. MAP, CAS of food commodities.

### **Module IV: Basics in Food Technology**

Introduction to food science and technology, Historical evolution of food processing technology, General principles, and methods of food processing

### **Module V: Food preservation**

General introduction to food preservation, principles, and methods of food preservation

### **Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### **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., 2<sup>nd</sup> edition.
- Lal, G., Siddappa, G. S., & Tandon, G. L. (2000). Preservation of fruits and vegetables. ICAR, 6<sup>th</sup> 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  
O! Captain, My Captain.  
Where the Mind is Without Fear  
Psalm of Life

Keats  
Walt Whitman  
Rabindranath Tagore  
H.W. Longfellow

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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.

## **Behavioral Science I (Self Development and Interpersonnel Skills)**

**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:**

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

**Text & References:**

- Davis, K. Organizational Behaviour,
- Hoover, Judith 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

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 Diphthongs

### **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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

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 3<sup>rd</sup> 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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 mathematics, 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text & References:**

- Dass, H.K. (2011). Higher Engineering Mathematics, S. Chand, Delhi.
- Mishra, S. (2013). Fundamentals of Mathematics Functions 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 biasing, Breakdown voltage, Superconductivity, Meissner effect, Introduction to Nanomaterials

### Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### Text & References:

- Beiser, A. (2002). Concept of Modern Physics, McGraw-Hill Higher Education; 6<sup>th</sup> 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; Desalination of Brackish Water; Chemical Analysis of Water; Dissolved O<sub>2</sub> (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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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 hierarchies, 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text & References:**

*Text:*

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

*References:*

- Parsons. (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

Mechanical 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 inequality, entropy, entropy change during different processes, Principle of entropy increase, 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### Text & References:

#### Text:

- P K Nag, "Engineering Thermodynamics", Tata McGraw Hill

#### References:

- Sonntag/ Vanhyllene, "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.
- Onkar Singh "Applied Engineering", New Age Publications.
- Dhombkudwar Kothandaraman, "A Course in Thermal Engineering", Dhanpat Rai Publications.
- S K Kulshretha, "Engineering Thermodynamics", Vikas Publications.

**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 tuning 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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	10

**OBJECT ORIENTED PROGRAMMING IN C++ -Lab****Course Code: BTD: 224****Credit Unit: 01****Practical****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/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	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:** 50%  
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:** 50%  
(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.)

## SPECIALITY 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, 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 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 and process:** Cereals and millets, Legumes and pulses, Fruits and vegetables, Animal food sources, By-product based, Non-conventional sources, organic, inorganic farming, Innovate process technology, Food additives basis, bioactive components, Novel nutraceuticals products, Packaging techniques.

**Module IV**

**Specialty food based on genetics:**

Genetically modified foods, transgenic foods, Biotechnological aspects of detoxification.

**Module V**

**Specific consumers oriented foods**

Fast foods, Defense persons, Space/astronaut, High altitude mountain climbers, Sports foods.

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text & References:**

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

Wheat and Rice, Role of dwarf varieties in green revolution; brief account of millets and pseudocereals. General account of legumes, importance to man and ecosystem; chief pulses grown in India. Mango, Papaya, citrus fruits etc.

**Module II: 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 III: Beverages**

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

**Module IV: Essential Oils**

General account and comparison with fatty oils.

**Module V: Drug Yielding Plants and Fibers**

Therapeutic and habit forming drugs with special reference to Cinchona, Digitalis, Rauwolfia, Papaver and Cannabis. Classification based on the origin of fibers, Tetraploid cotton and Jute

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text & References:**

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

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

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

### **Examination Scheme:**

<b>Components</b>	<b>CT</b>	<b>Attendance</b>	<b>Assignment/ Project/Seminar/Quiz</b>	<b>Presentation/case study</b>	<b>EE</b>
<b>Weightage (%)</b>	15	5	15	15	50

### **Text & References:**

- Jackson, E.B. (2002). Sugar Confectionery Recipes and Methods, 4<sup>th</sup> ed. publisher Jackson Associates.
- Francis, F.J (2000). Wiley Encyclopedia of Food Science & Technology. 3<sup>rd</sup> ed. Publisher, John Wiley & Sons.
- Lees, R. & Jackson, E.B. (2002). Sugar Confectionery & Chocolate Manufacture. 4<sup>th</sup> 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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:**

<b>Components</b>	<b>SAP</b>	<b>A</b>	<b>Mid Term Test (CT)</b>	<b>VIVA</b>	<b>Journal for Success (JOS)</b>
<b>Weightage (%)</b>	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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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 prepositions with their use

Both theoretical and figurative use

#### **Module VIII: Dialogues**

Dialogue reading: ‘In the market place’

‘At the Hotel’

### **Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### **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**

Possessive 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### **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:**

<b>Components</b>	<b>CT</b>	<b>Attendance</b>	<b>Assignment/ Project/Seminar/Quiz</b>	<b>Presentation/case study</b>	<b>EE</b>
<b>Weightage (%)</b>	15	5	15	15	50

**Text & References:**

- “Elementary Chinese Reader Part I” Lesson 11-20

## PRINCIPLES OF FOOD PROCESSING

**Course Code: BTD 301**

**Credit Units : 04**

### 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: 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### 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, Subcellular organelles, Nucleus, Endoplasmic reticulum, Golgi apparatus, Lysosomes, Peroxisomes, Mitochondria cellular organization and biological functions of cellular organelles. Chemical foundations of Biology -Properties of water, acids, bases and buffers, covalent bonds, 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. Lipids – definition, classification and structure; Biological functions of lipids – lipoproteins, lipopolysaccharides.

**Module III**

Nucleic acids structure, minor bases, unusual bases, nucleosides, nucleotides, NAD, FAD, cAMP, rRNA, primary, secondary and tertiary structure, DNA, tRNA, mRNA, super molecular assemblies

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

**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; Structure and biological activities of Vitamins, hormones

**Module V**

Metabolic pathways: Glycolysis pathway and reactions, Citric acid cycle - Overview, Metabolic sources of Acetyl Co-A, enzymes and regulation and Electron Transport chain, Lipid digestion, absorption and transport, fatty acid oxidation, ketone bodies, fatty acid biosynthesis, regulation of fatty acid metabolism.

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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 : 04**

### 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

### 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			
Class Test (Practical Based)	Mid Term Viva/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	10

### **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			
Class Test (Practical Based)	Mid Term Viva/Presentation/performance	Attendance	Major Experiment	Minor Experiment/Spotting	Practical Record	Viva
15	30	05	25	10	5	10

### 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:**

<b>Continuous Evaluation:</b> (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	50%
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<b>Final Evaluation:</b> (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.)	50%
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## 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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, Tubers and Root crops**

Botanical description, origin and food and nutritional values of different Cashew nuts; almonds: pistachio; ground nuts; sun flowers. Underground vegetable tuber crops and their origin, nutritional value and importance in food processing including Potato; sweet potato; carrot; tapioca

**Module V: 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**Text:**

- Handbook of Industrial Crops – CRC Press Book

**References:**

- Industrial Crops and Uses (9781845936167): Bharat P. Singh

## 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	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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.

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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, Clarendon 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)

## 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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

## **Behavioral Science III (Interpersonnel 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 behavioural 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 1<sup>st</sup> Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1<sup>st</sup> Edition, Cassell

## 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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

## 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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
<b>Weightage (%)</b>	15	5	15	15	50

**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 pronunciation 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 “hi” and “neng”, “key”.

**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	CT	Attendance	Assignment/ Project/Seminar/Quiz	Presentation/case study	EE
Weightage (%)	15	5	15	15	50

**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: Carbohydrates**

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

**Module II: 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 III: 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 IV: 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 V: Vitamins, Minerals, Natural Pigments and Flavour Compounds and Water activity**

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. Water activity and its role in processing and storage of food products

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
<b>Weightage (%)</b>	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: 03**

**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 forced 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
<b>Weightage (%)</b>	15	5	10	70

**Text & References:**

- Holman, J.P. (1997) Heat Transfer, 9<sup>th</sup> edition, McGraw-Hill
- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International
- Cengel. 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: 03**

### 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, Cipoletti 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.

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### **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*.

## B. Tech. Food Technology Program Structure (updated in BOS May 2021)

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:**

<b>Continuous Evaluation:</b> (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	50%
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<b>Final Evaluation:</b> (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.)	50%
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## COMPUTER SIMULATION & MODELING IN FOOD PROCESSING

**Course Code: BTD431**

**Credit Unit: 03**

### Course Objective:

The key objective of the 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.

#### Module III:

Modelling of ohmic heating, hydrostatic pressure processing and pulsed electric field.

#### Module IV: 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 Jun, Joseph M. Irudayaraj. (2009). Food processing operations modeling. 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). Unit Operations in Food Engineering. 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 managers 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. Need, objectives and process for new product development. Factors impact buyer behavior and market segmentation.

#### Module III: 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 IV: 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 V: 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 George J. 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

## **BEHAVIORAL SCIENCE-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 1<sup>st</sup> Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1<sup>st</sup> 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 prepositions 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

#### 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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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 control, Quality assurance and safety, Factors affecting it; Quality attributes; Responsibilities and Role of quality control section. Food Adulteration and contamination, recent food safety issues

#### Module II: Quality Control Systems

Food safety Hazards, Hazard Analysis and Critical Control Points (HACCP), Risk management, Good Practices (GMP, GLP, GHP)

#### Module III: Food Laws and Food Standards

Food Safety Standards Act, FSSAI, FSSAI Initiatives, Pre- FSSAI acts and Orders (PFA, FPO, MMPO etc.), BIS, International Organization for Standardization (ISO) and ISO standards (ISO 9000, ISO 22000), Codex

### 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: Post Harvest Technology of Fresh Fruits and Vegetables**

Difference between fruits and vegetables; Status of Indian fruit and vegetable processing industry; Major fruits and vegetables of India. 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 II: Canning, Drying and Freezing of Fruits and Vegetables**

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, 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 III: Sauces, Chutney, Pickles, Tomato and Tomato Products**

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

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 IV 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 V: Module II: Minimal Processing**

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

**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: Fermented Milk Products

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

#### Module IV: 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 V: Module III: Frozen and Indigenous 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, 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;

#### **Module II Kinetics**

Reaction kinetics for food processing; Mass and energy balance.

#### **Module III: Size Reduction and Mixing**

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

#### **Module IV: 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 V: 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 Kurtosis, Pearson's  $\beta$  and  $\gamma$  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**

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

**Module V Analysis of Time Series**

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:

1. HACCP plan for bakery industry
2. HACCP plan for the fruit and vegetable industry
3. HACCP plan for the dairy industry
4. Construting the decision chart for the HACCP implementstion
5. Common tests for detection of food adulteration
6. Internal Audit of food premises
7. Implementation of clean street food hub
8. Food hygiene rating for food premises

### 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:**

9. Canning of fruits and cut-out test for canned fruits
10. Canning of vegetables and cut-out test for canned vegetables
11. Dehydration of fruits / vegetables and evaluation of dried products
12. Freezing of fruits / vegetables and evaluation of frozen products
13. Preparation of jam / jelly / marmalade / preserve and its evaluation
14. Preparation of fruit beverage and its evaluation
15. Preparation of fruit chutney / pickle and its evaluation
16. Preparation and evaluation of tomato sauce / ketchup
17. Testing of vinegar
18. Minimal processing of fruits / vegetables.
19. 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:** 40%  
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:** 60%  
(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.)

## 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 comfort 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:**

Psychometric processes, applied psychometric, comfort air-conditioning, ventilation requirements,

**Module V:**

Cooling and dehumidification system, 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**

Cleaning agents, Disinfecting agents, Cleaning and disinfecting using a CIP system, Cleaning procedure, Mechanical cleaning,

#### **Module V Finished beer**

Beer composition, Components of beer, Beer and health, Beer types and their special features, Quality examination, Process measurement and analysis technology.

### **Examination Scheme:**

<b>Components</b>	<b>CT</b>	<b>Attendance</b>	<b>Assignment/ Project/Seminar/Quiz</b>	<b>EE</b>
<b>Weightage (%)</b>	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., Refrigerated vans for storage and transportation of raw and processed food materials.

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
<b>Weightage (%)</b>	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. Elsevier 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 prepositions 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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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 are ginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'ai 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, good 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 using it.  
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 about 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: 03**

### 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 its 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, crystallization and Fluidization Processes in Food Industry

Basic principles, drying rate curves and equilibrium moisture content; drying time calculations; Dehydration systems including solar driers – characteristics, applications and selection  
Crystallization – equilibrium yield, theories of crystallization; Crystallization and their application; Mechanism of fluidization and its application in food processing

### 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, 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: 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;

#### Module V: Technology of Egg

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 Ziegler, 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, 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. Colourants, flavouring agents and related substances, clarifying agents, gases and propellants and other additives., 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, 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:** 40%  
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:** 60%  
(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.)

**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:**

<b>Components</b>	<b>CT</b>	<b>Attendance</b>	<b>Assignment/ Project/Seminar/Quiz</b>	<b>EE</b>
<b>Weightage (%)</b>	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

#### Module V Optical Properties

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 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**

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 III**

Planning production trails and test market and conducting them; Evaluation of test results; Various quality control techniques (viz. total quality assurance, HACCP & ISO – 9000) applicable to product development; Product launching; Advertisement and marketing plans

**Module IV**

Concept and types of Entrepreneurships, entrepreneurship opportunities in food sector, start-up ideas and their implementation, strategic planning, fund raising.

**Module V**

Feasibility report and estimation of break-even points, Licensing, and registration requirements for startups, recent start-ups in food sector

**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 interactional 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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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 in 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: 03**

### 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, 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: 03**

**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**

Introduction to Food Packaging –status of packaging industry in World and in India, Definition of Packaging - Package, Packaging, Packing, Functions of food 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 plastics, 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; Smart packaging, edible films and other new developments, MAP & CAP.

**Module V: Packaging Standards and Regulations**

Safety aspects of packaging materials, Bar coding and legal requirements of packaging materials and product information, Recycling of packaging material.

**Examination Scheme:**

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

**Text & References:**

- Crosby, 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: 03**

### 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 Manual 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, Merrill, 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;

**Module III: 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 IV: 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 V: 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.

**Examination Scheme:**

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
<b>Weightage (%)</b>	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: 03**

**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 through 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
<b>Total</b>	<b>100</b>

## 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:** 40%  
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:** 60%  
(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.)

## 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.

#### 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 animal 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.

#### Module V: Advanced waste – water treatment systems

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, Quality standards; Chemical, sensory and microbial evaluation; Product shelf – life

#### 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: Carbonated and Non-carbonated Beverages

Non-carbonated and carbonated beverages; Source of carbon dioxide and its physico – chemical properties; Carbonating process; Packaging of carbonated beverages, tea and coffee

#### Module V: Alcoholic Beverages

Method for manufacture of Alcoholic beverages, Classification of alcoholic beverages, Selection of ingredients for the production of whiskey, beer, wine, rum, brandy. Storage of alcoholic beverages

### 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)  
Propositions 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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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 vice-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: 20**

### **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.

## B. Tech. Food Technology Program Structure (updated in BOS May 2021)

### **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 sections, 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 supporting 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.

## B. Tech. Food Technology Program Structure (updated in BOS May 2021)

### 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

<b>Total</b>	<b>100</b>
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