

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

## II B.Tech, II Semester COURSE STRUCTURE

Subject	Code	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Internal Exam	External Exam	Total
Mass Transfer and Separation	10BT42301	4	1	-	4	30	70	100
Managerial Economics and Principles of Accountancy	10BT4HS01	4	-	-	4	30	70	100
Analytical Techniques in Biotechnology	10BT42302	4	-	-	4	30	70	100
Molecular Biology and Genetics	10BT42303	4	1	-	4	30	70	100
Biochemical Thermodynamics	10BT42304	4	1	-	4	30	70	100
Bioprocess Engineering	10BT42305	4	-	-	4	30	70	100
Bioprocess Engineering lab	10BT42311	-	-	3	2	25	50	75
Analytical Techniques Lab	10BT42312	-	-	3	2	25	50	75
*Advanced English Communication Skills	10BT4HS02	-	3	-	-	-	-	-
<b>Total</b>		<b>24</b>	<b>6</b>	<b>6</b>	<b>28</b>	<b>230</b>	<b>520</b>	<b>750</b>

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

(10BT42301) MASS TRANSFER AND SEPARATION

L	T	P	C
4	1	-	4

## UNIT I

**Introduction to Mass Transfer and Diffusion:** Introduction to Mass Transfer Operations, Fick's first law of diffusion, Gas diffusion and Liquid diffusion (one component transferring to non – transferring component and equimolar counter diffusion), Estimation of diffusivity (Stefan's experiment), Distribution of gas and liquid components through solid, Diffusion of biological solutes in liquids, Diffusion in biological gels.

## UNIT II

**Interphase Mass Transfer and Mass Transfer Coefficients:** Interphase mass transfer with special reference to gas absorption, Convective mass transfer Coefficient ( $K_L$ ), Evaluation of  $K_L$  using Sherwood number, Stanton number, Schmidt number and  $J_D$  factor, Theories of mass transfer – Film theory, Penetration theory and Surface renewal theory, Case study-Oxygen mass transfer in production of penicillin.

## UNIT III

**Gas - Liquid Operations:** Absorption- Definition, Solubilities of gases in liquids, Single stage (one component transferring) operation. Distillation-VLE, Single stage equilibrium system, Flash distillation, Differential distillation, Steam distillation, Continuous distillation (McCabe-Thiele method only). Azeotropic and extractive distillation.

## UNIT IV

**Liquid-Liquid Operations:** Characteristics of solvent, Types of equilibrium systems, Single stage extraction, Multistage cross and counter current operations, Case study-Extraction of penicillin using butyl acetate/amyl acetate.

## UNIT V

**Solid-Liquid Operations:** Leaching- Single stage leaching, Biological applications, Adsorption- Physical adsorption, Chemisorption, Adsorption hysteresis, Adsorption isotherm, Single stage operation, Fixed-bed adsorption.

## **UNIT VI**

**Gas–Solid Operations:** Drying, Theory and principles of drying, Drying Kinetics, Drying rate, Mechanism of Batch drying – constant rate and falling rate periods, Various drying operations, Drying equipment, Criteria for selection of dryers, Case study-Drying of baker's yeast.

## **UNIT VII**

**Membrane Separation Processes:** Dialysis, Hemodialysis, Gas permeation process, Introduction to types of flow in gas permeation, Equipment – Flat membrane module, Hollow – fiber separation assembly, Reverse osmosis, Applications of reverse osmosis, Introduction to ultrafiltration and micro filtration.

## **UNIT VIII**

**Crystallization:** Introduction to crystallization, Theory and principles, Various crystallization equipment, Case study Crystallization of citric acid.

### **TEXT BOOKS:**

1. Robert E.Treybal, *Mass Transfer Operations*, 3<sup>rd</sup> edition, Mc.Graw Hill International, 1981.
2. Christi J. Geankoplis, *Transport processes & Unit operations*, 4<sup>th</sup> edition, Prentice Hall India Pvt.Ltd, 2003.
3. Mc Cabe, W.L, Smith J.C., and Harriot P., *Unit operations of Chemical Engineering*, 7<sup>th</sup> edition, Mc-Graw Hill, 2007.

### **REFERENCES:**

1. Philip C. Wankat, Chapman and Hall, *Rate Controlled Separations*, 1985.
2. P.M. Doran, *Bioprocess Engineering Principles*, Academic Press 1995.
3. Judson King, *Separation Processes*, 2<sup>nd</sup> Edition, Mc Graw Hill Chemical Engineering series.
4. Philip A.Schweitzer, *Handbook of Separation Techniques for chemical Engineering*, 3<sup>rd</sup> edition, Mc Graw Hill.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

## (AUTONOMOUS)

II B.Tech, II Semester

### (10BT4HS01) MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

L	T	P	C
4	-	-	4

#### **UNIT-I : Introduction to Managerial Economics and Demand Analysis.**

Definition, Nature and scope of managerial economics. **Demand Analysis:** Determinants of demand – Demand Function-Law of demand and its exceptions. Elasticity of demand. Types, Measurement and significance of Elasticity of demand. Demand forecasting and methods of demand forecasting.

#### **UNIT-II : Theory of Production and cost analysis.**

**Production Function:** isoquants and isocosts. Input – output relationship. Law of returns, internal and external economies of scale. **cost concepts:** opportunity Vs out lay costs, Fixed Vs Variable costs, Explicit Vs implicit costs, out of pocket Vs inputted costs. Break Even Analysis (BEA), Determination of break even point (Simple problems).

#### **UNIT-III : Introduction to Markets and Pricing.**

**Market Structure:**Types of Markets. Features of Perfect competition. Monopoly and Monopolistic competition. Price and Output determination in Perfect competition and Monopoly. **Pricing:** Objectives and policies of Pricing – Sealed bid pricing, Marginal cost pricing, Cost plus pricing, Going rate pricing, Limit Pricing, Market Penetration, Market Skimming, Block pricing, Bundling, Peak load pricing, Cross subsidization, Duel Pricing, Administrated pricing.

#### **UNIT-IV : Business and New Economic Environment.**

Characteristic features of Business, features and evolution of Sole proprietorship, Partnership, Joint stock Company, New Economic policy 1991.

#### **UNIT-V : Introduction and Principles of Accounting.**

**Accountancy:** Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping, Journal, Ledger, Trial Balance (Simple Problems).

#### **UNIT – VI : Final Accounts.**

Introduction to Final Accounts. Trading Account, Profit and Loss Account, and Balance Sheet with simple adjustments (Simple Problems).

### **UNIT – VII : Capital and Capital Budgeting.**

**Capital:** Significance, Types of capital. **Capital Budgeting:** Nature and scope of capital budgeting. Features and Methods of capital budgeting. Pay Back Period Method, Accounting Rate of Return Method, Internal Rate of Return Method, Net present Value Method and Profitability Index (Simple Problems).

### **UNIT – VIII : Computerization of Accountancy System.**

Manual Accounting Vs Computerized Accounting – Advantages and Disadvantages of Computerized Accounting – Using Accounting Software. **Tally:** Tally features – Company Creation – Account Groups – Group Creation – Ledger Creation.

### **TEXT BOOKS:**

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, 3rd Edition, Tata MC-Graw Hill, New Delhi, 2007.
2. R. Cauvery, U.K.Sudhanayak, M.Girija and R. Meenakshi, *Managerial Economics*, 1st edition, S. Chand and company, New Delhi, 1997.

### **REFERENCES:**

1. Ms. Samba Lalita, *Computer Accounting Lab Work*, 1st edition, Kalyani Publishers, Ludhiana, 2009.
2. Vershaney and Maheswari, *Managerial Economics*, 19th edition Sultan Chand and Sons, New Delhi, 2005.
3. H.Craig Petersen and W.Cris Levis, *Managerial Economics*, 4th edition, Pearson, 2009.
4. Lipy and Chrystel, *Economics*, 4th edition, Oxford University Press, New Delhi, 2008.
5. S.N.Maheswari and S.K.Maheswari, *Financial Accounting*, 4th edition, Vikas Publishing House, 2005.
6. S.P. Jain and K.L. Narang, *Financial Accounting*, 5th edition, Kalyani Publishers, Ludhiana, 2000.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

## (10BT42302) ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY

L T P C

4 - - 4

### UNIT I

**Introduction:** Types of analytical methods – instruments for analysis – uncertainties in instrumental measurements – signal to noise ratio, types of errors, significant figures, precision and accuracy, sensitivity and detection limit for instruments. Advantages and limitations of analytical techniques.

### UNIT II

**Microscopy:** Bright field, Dark field, Fluorescent, Phase contrast, Confocal microscopy, Electron microscopy – Scanning and Transmission electron microscopy.

### UNIT III

**Spectroscopy:** Beer-Lambert's law and apparent deviations, UV Visible spectrophotometer, Spectrofluorimeter, FTIR spectroscopy, principle and applications of Atomic absorption, Atomic emission spectroscopy and Mass spectroscopy.

### UNIT IV

**Centrifugation:** Sedimentation, sedimentation velocity. Centrifugation - general principles. Types of centrifugation – Differential, Density gradient and Ultracentrifugation.

### UNIT V

**Electrophoresis:** Electrophoresis - principle, separation of proteins and nucleic acids by electrophoresis, isoelectric focusing, 1-D and 2-D gels. Types – Capillary and Pulsed field electrophoresis.

### UNIT VI

**Chromatography:** Paper, TLC, Column, GC, HPLC and GPC – Principle and applications, capillary columns, the stationary liquid phase, Bonded phase, sample injection, Solid samples, Detectors - first family detectors, second family detectors, detector scavenging, dual detection, temperature programming, commercial gas chromatographs, qualitative analysis, simulated distillation, quantitative analysis.

## **UNIT VII**

**Structural determination methods:** X-ray diffraction, Optical rotatory dispersion, Circular dichroism, Principle and applications of NMR and ESR spectroscopies. Amino acid and Nucleic acid sequencing.

## **UNIT VIII**

**Monitoring and control devices:** pH, Temperature, Dissolved oxygen, BOD, COD, Biosensors and their operation.

### **TEXT BOOKS:**

1. Douglas A. Skoog and Donald M. West, *Fundamentals of Analytical Chemistry*, 8<sup>th</sup> edition, Saunders College Publishing, New York, NY, 2004.
2. Gurudeep R. Chatwal, Sham K. Anand, *Instrumental methods of chemical analysis*, 5<sup>th</sup> edition, Himalya Publishing House, 2002.

### **REFERENCES:**

1. Robert H. Willard, D.L. Merritt & J.R.J.A. Dean, *Instrumental Methods of Analysis*, 7<sup>th</sup> edition, CBS Publishers & Distributors, 1992.
2. Vogel, *Text Book of Quantitative Inorganic Analysis*, 4<sup>th</sup> edition, Longman Sc & Tech, 2004.
3. F. Settle., *Hand book of Instrumental techniques for Analytical Chemistry*, 5<sup>th</sup> edition, Prentice Hall, 1997.

**SREE VIDYANIKETHAN ENGINEERING COLLEGE**  
**(AUTONOMOUS)**

II B.Tech, II Semester

**(10BT42303) MOLECULAR BIOLOGY AND GENETICS**

L	T	P	C
4	1	-	4

**UNIT I**

**DNA structure and replication:** Structure and forms of Nucleic Acids – DNA & RNA, DNA denaturation and melting curves, replication of DNA, Structure and functions of DNA polymerases, models of replication in Prokaryotes - E.coli (bi-directional), Viral DNA (Rolling circle, single stranded DNA phages M13, Ø174,) Eukaryotic DNA replication, DNA damage and repair.

**UNIT II**

**Transcription:** Structure and functions of RNA polymerases (prokaryotic and eukaryotic). Mechanism of transcription in pro & eukaryotes. Transcriptional inhibitors.

**UNIT III**

**Structure and processing of RNAs':** Structures of mRNA, tRNA, and rRNA, and post transcriptional processing of RNAs'.

**UNIT IV**

**Translation and protein synthesis:** Mechanism of translation, initiation, and termination of protein synthesis (prokaryotic & eukaryotic). Translational inhibitors, post-translational modifications.

**UNIT V**

**Introduction to genetics:** Nature of genetic material, Mendelian laws of inheritance, monohybrid and dihybrid inheritance, law of segregation & independent assortment, gene interactions, identification of genetic material, classical experiments – Hershey & Chase, Avery, McLeod etc., Multiple alleles and group antigens.

**UNIT VI**

**Chromosomes structure and organization:** The organ of heredity - chromosomes, morphology, classification. Structure- Centriole, telomere, chemical composition of chromatin, structural organization of nucleosome, heterochromatin, polytene and lampbrush chromosomes.

**UNIT VII**

**Sex chromosomes and inherited diseases:** Sex determination in plants & animals. Chromosomal disorders, sex linked inheritance, sex linked

diseases, fragile X chromosome syndrome, Duchenne muscular dystrophy, color blindness, hemophilia. Non-disjunction as a proof of chromosomal theory of inheritance.

### **UNIT VIII**

**Linkage, crossing over and mapping:** Chromosomal inheritance, the concept of linkage, cytological basis of crossing over. Mechanism of recombination, transduction phenomena, methods of transduction, generalized, specialized & abortive transduction, bacteriophages - lytic & lysogenic life cycle discovery, detection, molecular mechanisms of transformation, transformation methods. Bacterial conjugation. Two point and three point test crosses and gene mapping. Mapping of genes by tetrad analysis by mitotic crossing over.

### **TEXT BOOKS:**

1. Gardner EJ, Simmons MJ, Snustard. Ed, *Principles of Genetics*, 8<sup>th</sup> edition, John Wiley & Sons Inc., 2004.
2. Monroe W, Strickberger, *Genetics*, 3<sup>rd</sup> edition, Prentice Hall of India Private Ltd., New Delhi, 2008.
3. David Friefelder, *Molecular Biology*, 2<sup>nd</sup> edition, Narosa Publishing Home, 2006.
4. James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, *Molecular Biology of the gene*, 5<sup>th</sup> edition, Pearson Benjamin Cummings, 2009.

### **REFERENCES:**

1. De Robertis E.D.Pi and De Robertis, *Cell and Molecular Biology*, E.M.F. B I Waverly Pvt. Ltd., New Delhi, 1996.
2. Gerald Karp, *Cell and Molecular Biology, Concepts and Experiments*, 5<sup>th</sup> edition, John Wiley and Sons Pvt. Ltd., 2008
3. Lodish, H., Berk A., Zipursky, S.L. Matsudaria, P. Baltimore, D. and Darnell.J, *Molecular Cell Biology*, Media connected, W.H. Freeman and Company, 2004.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

(10BT42304) BIOCHEMICAL THERMODYNAMICS

L	T	P	C
4	1	-	4

## UNIT I

**Introduction and First Law of Thermodynamics:** The Scope of Thermodynamics, Joule's experiment, Internal energy, Formulation of the first law of thermodynamics, Thermodynamic state and state function, concept of Equilibrium, The phase rule. Application to bioprocess systems.

## UNIT II

**Second Law of Thermodynamics:** The statement of second law, the heat engine, Carnot cycle for an ideal gas, Entropy changes, Mathematical statement of second law. Application to bioprocess systems.

## UNIT III

**Volumetric Properties of Fluids:** PVT behavior, Phase rule and its applications, Equations of State, Theorem of corresponding states, Evaluation of equation of state parameters.

## UNIT IV

**Thermodynamic Properties of Fluids:** Estimation of thermodynamic properties using equations of state; Maxwell relations and their applications; Fundamental property relation for pure components. Calculation of flow processes based on actual property changes.

## UNIT V

**Solution Thermodynamics:** Partial molar properties; concept of chemical potential and fugacity Ideal and non ideal solutions; Gibbs Duhem equation; Excess properties of mixtures; Activity Coefficient and its evaluation.

## UNIT VI

**Phase Equilibria:** Criteria for phase equilibrium; Vapor – liquid equilibrium calculations for binary mixtures, Liquid – Liquid equilibrium and Solid-Liquid equilibrium.

## UNIT VII

**Chemical Reaction Equilibria:** Equilibrium criteria for homogeneous chemical reactions; Evaluation of equilibrium constant and effect of pressure and temperature on equilibrium constant; Calculation of equilibrium conversions and yields for single and multiple chemical reactions. Application to bioprocess systems.

## **UNIT VIII**

**Biochemical Thermodynamics:** Energetics of Metabolic Pathways, Energy coupling (ATP-NADH) , Stoichiometry and energetic analysis of cell growth and product formation ,elemental balances-degree of reduction concepts.

### **TEXT BOOKS:**

- 1.J.M.Smith, H.C.Van Ness and M.M. Abbott, *Introduction to Chemical Engineering Thermodynamics*, Mc Graw Hill publications, 2003.
- 2.Hougen and Watson, *Chemical Process Principles*, CBS publication 2004.

### **REFERENCES:**

- 1.Pradeep Ahuja, *Chemical Engineering Thermodynamics*, PHI Learning Private Limited, 2009.
2. M.D.Koretsky, *Engineering and Chemical Thermodynamics*, John Wiley and sons, 2004.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

(10BT42305) BIOPROCESS ENGINEERING

L	T	P	C
4	-	-	4

## UNIT I

**Introduction to bioprocesses:** An overview of traditional and modern applications of biotechnology industry, outline of an integrated bioprocess and the various (upstream and downstream) unit operations involved in bioprocesses, generalized process flow sheets.

## UNIT II

**Material balances:** Law of conservation of mass, generalized mass balance equation, simplified form, procedure for material balance calculations, material balance with recycle, bypass and purge streams, electron balances, biomass yield, product stoichiometry, maximum possible yield, material balance equations for unsteady state.

## UNIT III

**Energy balances:** Basic energy concepts, intensive and extensive properties, enthalpy and its calculation procedure, general energy balance equation, energy changes, non reactive process, procedure for energy balance without reactions, energy changes due to reaction, heat of reaction for system with biomass production, energy balance equations for unsteady state.

## UNIT IV

**Fermentation processes:** General requirements of fermentation processes, types of bioreactors, an overview of aerobic and anaerobic fermentation processes and their application in the biotechnology industry, solid-substrate, slurry fermentation and its applications, whole cell immobilization.

## UNIT V

**Media design:** Medium requirements for fermentation processes, carbon, nitrogen, minerals, vitamin and other complex nutrients, oxygen requirements, medium formulation for optimal growth and product formation, commercial media for industrial fermentations

## UNIT VI

**Metabolic stoichiometry:** Stoichiometry of cell growth and product formation, elemental balances, degrees of reduction of substrate and biomass, available electron balances, yield coefficients of biomass and product formation, maintenance coefficients.

## **UNIT VII**

**Energetics:** Energetic analysis of microbial growth and product formation, oxygen consumption and heat evolution in aerobic cultures, thermodynamic efficiency of growth.

## **UNIT VIII**

**Kinetics of microbial growth and product formation:** Phases of cell growth in batch cultures, simple unstructured kinetic models for microbial growth, monod model, growth of filamentous organisms, growth associated (primary) and non-growth associated (secondary) product formation kinetics, leudeking –piret models, substrate and product inhibition on cell growth and product formation, introduction to structured models for growth and product formation.

### **TEXT BOOKS:**

- 1 M. L. Shuler and F. Kargi, *Bioprocess engineering*, 2<sup>nd</sup> edition, Prentice Hall of India, 2009.
- 2 P. M. Doran, *Biochemical process principles*, 1<sup>st</sup> edition, Academic Press, 2008.
- 3 A.V.N. Swamy, *Fundamentals of Biochemical Engineering*, 1<sup>st</sup> edition, BS Publications, 2007.

### **REFERENCES:**

1. J. E. Bailey and D. F. Ollis, *Biochemical Engineering Fundamentals*, 2<sup>nd</sup> edition, McGraw Hill, 1986.
2. H.W. Blanch and D.S. Clark, *Biochemical Engineering*, 2<sup>nd</sup> edition, Marcel Dekker Publishers, 2007.

**SREE VIDYANIKETHAN ENGINEERING COLLEGE**  
**(AUTONOMOUS)**

II B.Tech, II Semester

**(10BT42311) BIOPROCESS ENGINEERING LAB**

L	T	P	C
-	-	3	2

**LIST OF EXPERIMENTS:**

**1. Microbial culture studies**

- a. Growth of microorganisms, estimation of Monod's parameters.
- b. Isolation of Useful microorganisms from natural samples- Soil and Water or Rhizobia and Cyanobacteria.

**2. Immobilized enzyme reactions**

- a. Techniques of enzyme immobilization – matrix entrapment, ionic and cross-linking.
- b. Bioconversion studies with immobilized enzymes.
- c. Immobilization of whole cells (Yeast) using Calcium Alginate method.

**3. Enzyme isolation and assay of enzymatic activity**

- a. Extraction of amylase & its assay.
- b. Extraction of papain & its assay.

**4. Enzyme kinetics**

- a. Estimation of Michaelis – Menten parameters, effect of pH and temperature on enzyme activity, kinetics of inhibition.
- b. Kinetic study of catalase.

**5. Media Formulation**

- a. Formulation of simple and complex culture media.
- b. Media preparation for fermentation, sterilization of media.

**6. Bioprocess examples**

- a. Citric acid production from *A. niger*.
- b. Ethanol production from *S. cereviceae*.

**TEXT BOOKS:**

1. Arnold, *Manual of industrial Microbiology and Biotechnology*, ASM, 2004.
2. J.Jayaraman, *Laboratory manual in biochemistry*, New age international publishers.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

## (10BT42311) ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY LAB

L	T	P	C
-	-	3	2

### LIST OF EXPERIMENTS:

1. Demonstration of viable cells using Confocal microscopy.
2. Verification of Beer – Lambert's law using UV Visible spectrophotometer.
3. Estimation of DNA by UV Visible spectrophotometer.
4. Estimation of RNA by UV Visible spectrophotometer.
5. Quantitative determination of proteins by UV Visible spectrophotometer.
6. Emission spectra of Anthracene using Spectrofluorimeter.
7. Separation of Amino acids by Paper chromatography.
8. Separation of Amino acids by Thin layer chromatography.
9. Separation of Proteins by Paper chromatography.
10. Separation of Proteins by Thin layer chromatography and SDS PAGE.
11. Separation of Nucleic acids by Agarose gel electrophoresis.
12. Demonstration of FTIR spectroscopy.
13. Estimation of turbidity using UV-Visible spectrophotometer.
14. Demonstration of HPLC.
15. Demonstration of blotting techniques.

### REFERENCES:

1. K. Wilson and J. Walker, *Principles and techniques of Practical Biochemistry*, 5<sup>th</sup> edition, Cambridge University Press, Cambridge, 2000.
2. S.K. Sawhney and Randhir Singh, *Introductory practical Biochemistry*, 2<sup>nd</sup> edition, Narosa Publishing House, New Delhi, 2000.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

II B.Tech, II Semester

## (10BT4HS02) ADVANCED ENGLISH COMMUNICATION SKILLS

L	T	P	C
-	3	-	-

### Unit I

**Vocabulary Building:** Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Study of word origin, Analogy, Idioms and Phrases.

**Functional English:** starting conversation, responding appropriately and relevantly, using the right body language, role play in different situations.

### Unit II

**Reading Comprehension:** Reading for facts, Guessing meanings from context, Scanning, Skimming, Inferring meaning and Critical reading.

### Unit III

**Academic Essay Writing:** Accuracy, Brevity, Clarity, Brainstorm, List your ideas, Sub-headings, Revising Content and Organisation.

### Unit IV

**Technical Report Writing:** Types of formats and styles, Subject-matter, Subject-organization, Clarity, Coherence and Style, Planning, Data-collection, Tools, Analysis.

### Unit V

**Career Skills:** Career direction, Exploring your talents, Personality inventories, Write a "Who I Am" statement, Thinking further, Perform career research, How do I get hired, Creating job satisfaction, Identify your satisfaction triggers, Positive attitude, Maintain a balanced lifestyle, Analyze your job in terms of your interests, Set goals to bring your interests and responsibilities in line, Personal SWOT analysis, Making the most of your talents and opportunities, Shaping your job to fit you better, Future proof your career, Managing your emotions at work, Get the recognition you deserve.

### Unit VI

**Resume Writing:** Structure and Presentation, Planning, Defining the career objective, Projecting ones strengths and skill-sets, Summary, Formats and Styles, Cover letter.

## **Unit VII**

**Group Discussion:** Dynamics of group discussion, Intervention, Summarizing, Modulation of voice, Fluency and Coherence, Participation, Relevance, Assertiveness, Eye contact and Body language.

## **Unit VIII**

**Interview Skills:** Concept and Process, Pre-interview planning, Opening strategies, Answering strategies, Interview through Tele and Video-conferencing.

### **REFERENCE BOOKS:**

1. M. Ashraf Rizvi, "Effective Technical Communication Skills" (2005) Tata McGraw Hill, New Delhi.
2. Meenakshi Raman and Sangetha Sharma, "Technical Communication, Principles and Practice." (2010) Oxford University Press, New Delhi.
3. Santha Kumar R, "Secrets of Success in Interviews". (2007), Crucial Books, Secunderabad.
4. M. Ashraf Rizvi, "Resumes and Interviews - The Art of Wining" (2008) Tata McGraw Hill, New Delhi.
5. Gopala Swamy Ramesh and Mahadevan Ramesh, "The Ace of Soft Skills: Attitude, Communication and Etiquette for Success", (2009) Pearson Education, New Delhi.

### **SUGGESTED SOFTWARE:**

1. TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
2. Softwares from 'train2success.com'
3. Resume Preparation, K-Van Solutions.
4. Facing Interviews, K-Van Solutions.
5. Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
6. Vocabulary Builder, Young India Films.
7. E-correspondence, Young India Films.
8. Group Discussions, (Ease - 2), Young India Films.
9. Report Writer, Young India Films.