

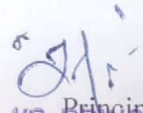
**Royal Education Society's
College of Computer Science and Information Technology (COCSIT), Latur**

List of Cross cutting in the curriculum

Program Name	Semester	Name of the Course	Course Code	cross-cutting issues
B. Sc. (CS) FY, B. Sc. (SE) FY, B. Sc. (NT) FY and BCA FY	I	Communication and Soft Skills – I	S1.2	Professional Ethics and Human Values
	II	Communication and Soft Skills – II	S2.4	Professional Ethics and Human Values
B.Sc. (BT) FY	I	Introduction to Biotechnology – I	CCBT-2A	Environment and its sustainability
		Microbiology - I	CCBT-4A	Environment and its sustainability
		English and Science Communication Skills - I	AECCBT-1A	Professional Ethics and Human Values
		Introduction to Biotechnology	CCBT-2A	Environment and its sustainability
	II	English and Science Communication Skills - II	AECCBT-1B	Professional Ethics and Human Values
		Microbiology - II	CCBT-4B	Environment and its sustainability
		Principles of Genetics	CCBT-3B	Gender
BBA FY	I	Business Environment	AECC-2	Environment and its sustainability
		Entrepreneurship - I	DSE-1B	Gender
	II	Business Ethics	AECC-4	Professional Ethics
		Organizational Behavior	CORE-5	Human Values
B.Sc. (BT) SY	III	English and Science Communication Skills - III	AECCBT1C	Professional Ethics and Human Values
	IV	Applied & Medical Microbiology	CCBT-3D	Environment and its sustainability
		English and Science Communication Skills - IV	AECCBT1D	Professional Ethics and Human Values



BBA SY	III	Human Resource Management – I	305	Human Values
	IV	Human Resource Management – II	405	Human Values
B.Sc(CS) TY, B.Sc(SE) TY, B.Sc(NT) TY and BCA TY	V	Skills Enhancement Course (SEC) – Enterprise Resource Planning (ERP), Accounting with Tally, Cyber Security, E-Commerce		Employability
B.Sc(CS) TY, B.Sc(SE) TY, B.Sc(BT) TY, B.Sc(NT) TY and BCA TY	V	Environmental Studies		Environment and sustainability
B.Sc(BT) TY	VI	Industrial Biotechnology	DSEBT-2F	Professional Ethics
		Environmental Biotechnology	DSEBT-3FA	Environment and sustainability


 Principal
 W.C. PRINCIPAL
 College of Computer Science
 and Information Technology, Latur

Name of Course	B.Sc. (Computer Science) First Year & B.Sc. (Soft. Engg.) First Year
Semester	I Semester
Name of Subject	Communication and Soft Skills - I
Subject Code	S1.2

Unit – I

1.	English Grammar & Usages		Lecturers Required	Ref. No.
	a)	Basic sentence structures	03	1, 2, 3, 4
	b)	Verbs and their forms with Tenses	03	1, 2, 3, 4
	c)	Clauses	03	1, 2, 3, 4
	d)	Synonyms & Antonyms	01	1, 2, 3, 4
	e)	Idioms & Phrases	02	1, 2, 3, 4

References:

Sr. No.	Name of the Book	Author	Publication
1)	A Practical English Grammar	A. J. Thomson, A.V. Martinet	Oxford University Press – 4 th Edition
2)	English grammar and composition	Rajendra Pal & Prem Lata Suri	Sultan Chand & Sons Publication – 19 th Edition
3)	English grammar and composition	Wren & Martin	S. Chand & Co. Ltd. -2008/9 th Edition
4)	Mac Millan Foundation English	R. K. Dwivedi, A. Kumar.	MacMillan India Ltd. – 2002 /2 nd Edition

Unit – II

2.	Communication Skills		Lecturers Required	Ref. No.
	a)	Concept	01	01
	b)	Methods (verbal & non-verbal)	02	01
	c)	Barriers to communication	03	01
	d)	Principles of effective communication	02	01

References:

Sr. No.	Name of the Book	Author	Publication
1)	Developing communication Skills	Krishna Mohan, Meera Banerji	MacMillan India Ltd. – 2005 /16 th Edition

Unit – III

3.	Soft Skills & Situational English		Lecturers Required	Ref. No.
	a)	Soft Skills : Concept & Skills	02	1, 2, 3
	b)	Leadership	03	1, 2, 3
	c)	Situational English : Thanking, inviting, Greetings, Introduction, Enquiring, Expressing gratitude, etc.	04	1, 2, 3

References:

Sr. No.	Name of the Book	Author	Publication
1)	Soft Skills	K Alex.	-
2)	Spoken English- Level one	G Radhakrishana Pillai, K Rajeevan	OlivannanGopalakrishanan Emerald Publication – 2008 Edition
3)	Personality Development & Communicative English	Dr. T. Bharti & Dr. M Hariprasad	Neelkamal Publications Pvt. Ltd. 2007 – 7 th Edition

Unit – IV

4.	Carrier skills		Lecturers Required	Ref. No.
	a)	Group Discussion	02	1, 2, 3, 4
	b)	Personal Interview	02	1, 2, 3, 4
	c)	Conflict Management	02	1, 2, 3, 4

References:

Sr. No.	Name of the Book	Author	Publication
1)	Developing communication Skills	Krishna Mohan, Meera Banerji	Macmillan India Ltd. 16 th Edition
2)	Group Discussion for Admissions & Jobs	AnandGanguly	Pustak Mahal, Delhi
3)	Soft Skills	K Alex.	-
4)	Personality Development & Communicative English	Dr. T. Bharti & Dr. M Hariprasad	Neelkamal Publications Pvt. Ltd. Hyderabad 2007 – 7 th Edition

Unit – V

5.	Passage comprehension & Reading strategies		Lecturers Required	Ref. No.
	a)	Reading skills	01	1, 2
	b)	Reading & understanding different text	03	1, 2

References:

Sr. No.	Name of the book	Author	Publication
1)	English grammar and composition	Rajendra Pal & PremLata Suri	Sultan Chand & Sons Publication – 19 th Edition
2)	Personality Development & Communicative English	Dr. T. Bharti & Dr. M Hariprasad	Neelkamal Publications Pvt. Ltd., Hyderabad 2007 – 7 th Edition

Unit – VI

6.	Writing Skills		Lecturers Required	Ref. No.
	a)	E-mail writing : To seek jobs, invitation, inviting, thanking emails, etc.	03	1, 2
	b)	Formal letters : Job application, Placing supply order, letter to editors, etc.	03	1, 2
	c)	Resume Building	01	1, 2

References:

Sr. No.	Name of the Book	Author	Publication
1)	Soft Skills	K Alex.	-
2)	Mac Millan Foundation English	R. K. Dwivedi, A. Kumar.	Macmillan India Ltd. 2002 – 2 nd Edition

Name of Course	B.Sc. (Computer Science) First Year & B.Sc. (Soft. Engg.) First Year
Semester	II Semester
Name of Subject	Communication and Soft Skills – II
Subject Code	S2.4

Unit – I

1.	Language Skills		Lecturers Required	Ref. No.
	a)	Definition	1	1, 2
	b)	Characteristics of language	2	1, 2
	c)	Listening: Process & types.	2	1, 2
	d)	Speaking: Process, speech style, etc.	3	1, 2

References:

Sr. No.	Name of the book	Author	Publication
1)	Developing Communication Skills	Krishna Mohan, Meera Banerji	MacMillan India Ltd. – 16 th Edition
2)	Personality Development & Communicative English	Dr. T. Bharti, Dr. M. Hariprasad	Neelkamal Publications Pvt. Ltd., Hyderabad – 7 th Edition

Unit – II

2.	Soft Skills and Telephonic Skills		Lecturers Required	Ref. No.
	a)	Mannerism and etiquettes	2	1, 2
	b)	Telephone etiquettes, Basic Telephone Mannerism, Handling tele-interviews, some useful expressions.	4	1, 2
	c)	Soft Skills : Negotiation Skills	2	3
	d)	Empathy skills	2	3

References:

Sr. No.	Name of the book	Author	Publication
1)	Written & Spoken English	V. H. Savant & S. R. Madan	University Press India Pvt. Ltd, Hyderabad
2)	Effective Telephone Skills	Thomas J. Farrell	Harcourt, 2 Sub-edition 1994
3)	Personality Development and Communicative English	Dr. T. Bharti, Dr. M. Hariprasad	Neelkamal Publication – 7 th Edition.

Unit – III

3.	Day-to-Day conversation		Lecturers Required	Ref. No.
	a)	Asking questions, Giving opinion, remarks, comments, etc.	3	1, 2

	b)	Role playing	2	1, 2
	c)	Telling short/moral stories	2	1, 2
	d)	Body language and speech	3	1, 2

References:

Sr. No.	Name of the book	Author	Publication
1)	Spoken English for you	G. Radhakrishna Pillai, K Rajeevan	Emerald Publication 2008 Edition
2)	Prism	-	Board of Editions, SRTMU, Nanded

Unit – IV

4.	Presentation Skills		Lecturers Required	Ref. No.
	a)	Art of public speaking : Delivering speech, Seminars, etc.	3	1, 2
	b)	Hosting the programs : Anchoring, Vote of thanks, etc.	3	1, 2
	c)	Presentation skills: Voice Modulation, Pitch and pace.	2	1, 2

References:

Sr. No.	Name of the book	Author	Publication
1)	Art of public speaking	Dr. B. R. Kishore	New light publishers, New Delhi
2)	Developing Communication Skills	Krishna Mohan, Meera Banerji	MacMillan India Pvt. Ltd. 2005 – 16 th Edition

Unit – V

5.	Report Writing		Lecturers Required	Ref. No.
	a)	Newspaper report writing	2	1
	b)	Formal report writing	2	1

References:

Sr. No.	Name of the book	Author	Publication
1)	Macmillan foundation English	R. K. Dwivedi, A. Kumar	Macmillan India Ltd – 2002 – 2 nd Edition

Unit – VI

6.	Phonetics		Lecturers Required	Ref. No.
	a)	Sounds in English : Consonants & vowels	2	1
	b)	Phonetic Transcription of words	2	1
	c)	Three term label	2	1

References:

Sr. No.	Name of the book	Author	Publication
1)	A course in Phonetics & spoken English	J. Sethi, P. V. Dhamija	Prentice – Hall of India Pvt. Ltd, New Delhi – 2 nd Edition

CBCS Syllabus-Bachelor of Business Administration (BBA)
With Effect from 2018-2019

VI. Business Environment

End of Semester Examination	40 Marks
Continuous Assessment	35 Marks
Total	75 Marks

Learning Objectives: - The objective of the course is to equip the students with the ability to analyse, interpret and apply the basic concepts of different environmental factors that affect business & decision making.

Utility: Student can acquire basic-level knowledge of business.

Prerequisite: Basic knowledge of business.

Unit. No.	Particulars	No. of Lectures
1	Nature and Purpose of Business <ul style="list-style-type: none"> Meaning and Characteristics of Business, concept of business cycle. Objectives of Business – economic and social objectives Maintenance of business and environment - Classification, Departmental factors on business, Business risks. 	11
2	Forms of Commercial Organizations <ul style="list-style-type: none"> Meaning, features, merits and limitations of the following forms: Sole Proprietorship, Partnership – Partnership Deed (Main Clauses), Types of Partners. Joint Stock Company, Private and Public-Sector Company, Co-operative Societies Multinational Corporations: Meaning and Features 	11
3	Social and Cultural environment: <ul style="list-style-type: none"> Nature of culture, Impact of culture in business; Ethics in business - Nature and meaning, Ethical business practices. 	11
4	Economic and Political environment: <ul style="list-style-type: none"> Meaning and Definition elements of environment - economics system - economic planning - objectives of economic planning (Evaluation measurement and problems size of national Income on capital income) 	11
5	Globalization: <ul style="list-style-type: none"> Meaning and nature of globalization, Reasons behind globalization. Strategies for internationalization, Globalization of Indian business. Objectives and principles of GATT, Functions of WTO, Structure of WTO, Arguments for joining WTO and arguments against joining WTO. 	10
	TOTAL	54

REFERENCE BOOKS:

- 1) Business Environment - Francis Cherunilam, Himalaya Publication.
- 2) Indian Economy – Datt & Sundharam - S. Chand Publication
- 3) Essentials Of Business Environment – K. Ashwathappa, Himalaya Publication.
- 4) Business Organisation - Ravindranath Badi, Himalaya Publication.

database by using a data form – how a data form works, elements of the data form, Entering, finding records, filters : finding record by criteria.

1.11. Case study can be given on every topic.

2. Introduction to Power Point:

Power point basics, Creating presentation, working with graphics in power point, Show effect and Animation effects. Case Study : Create a presentation for company you visited last year or create a presentation showing company profile for marketing etc.

3. Introduction to Internet:

Concepts and definition, Internet service providers, Internet Browser, URL, E-mail, Voice mail, FAX, Messengers, Cookies, Search engines, uploading and downloading.

Suggested Readings:

- 1) Fundamentals of Computer – By V. Rajaraman
- 2) Fundamentals of Computer – P. K. Sineha
- 3) MS-Dos 6.22 – Russell A Stultz (BPB)
- 4) Teach Yourself Windows 2000 – Brain Underdahl
- 5) Information Technology – By Nandkishor Dayma (Vidya PRakashan, Nagpur)
- 6) Microsoft Office- By Dienes Sheila
- 7) Leon, Alex & Mathews – Internet for Everyone – Leone TECH World Chennai

Note:

Distribution of marks for practicals is as follows.

1)	Journal/ Record Book (Certified)	05 Marks
2)	Oral/ Viva	05 Marks
3)	One theory question	10 Marks
Total		20 Marks

HUMAN RESOURCE MANAGEMENT

B.B.A. II Yr. (IV Sem.) Course Code : 405

Max. Marks : 50

(Theory : 40 + Internal : 10)

1. **Job Evaluation:** Definition, objectives of job evaluation, essential for the success of job evaluation programmes, job evaluation technique/methods.
2. **COMPENSATION:** Meaning and Concepts of wages, Factors influencing wages, Wage structure and administration, Wage theories, Minimum, fair and living wages. Elements of good wage plan, types of wages.
Rewards and Incentives: Meaning and types of rewards, Wage Incentives, Guidelines for effective incentive plans.
3. **EMPLOYEE SAFETY AND HEALTH:-** Industrial accident and injury- causes of accident. Accident measurement – Accident report and record, safety responsibility, safety education, and training. Accident prevention, statutory provisions for safety in India. Industrial health – importance, occupational hazards and diseases. Protection against hazards, Statuary provision under factory Act- Industrial health programme.
4. **INDUSTRIAL RELATIONS:** Definition and objectives of IR. Aspects of IR. IR programme. Trade Union, Principles of trade unionism Functions of TU.

BOOKS:

- 1) Human Resource Management- K. Aswathappa.
Himalaya Publishing House, Mumbai.
- 2) Personnel & Industrial Relations- P. Subbarao.

FINANCIAL MANAGEMENT

B.B.A. II Yr. (IV Sem.), Course Code : 406

Max. Marks : 50

(Theory : 40 + Internal : 10)

1. Long Term Investment Decision :- (Capital Budgeting)-

- (A) Basics of capital Budgeting-meaning, significance, process.
- (B) Appraisal Method- Accounting Rate of return technique, Payback period technique and Discounted cash flow Techniques- NPV, IRR, PI.
- (C) Estimation of Benefits (Cash flow) under each technique.

Note – 1) Examples should be based only on SLM and WDV methods of depreciation.

2) Replacement Decision be excluded.

- (D) Ranking conflicts and resolutions

2. Working capital management-I :

- (A) Overview: Concepts, Significance, Factors affecting working capital requirement, Computation of operating cycle.

Dimensions of working capital Management -Relative asset liquidity.

And Relative Financing Liquidity.

- (B) Working Capital Financing

Sources of working capital, finance including inter corporate loans.

Determining maximum permissible bank, finance based on Tandon and Chore

Committee recommendations (excluding illustration) Current scenario of bank finance.

3. Working Capital Management-II :

- A) **Measurement of Cash** : Cash Budgeting, Managing the flow, Cash control reports, Investment in marketable securities.
- B) **Management of receivables:** Credit policy variables credit evaluation, credit granting decision, control of receivables.
- C) **Management of Inventory:** Types, Motives for holding Inventory. Investment in inventory, Computation of EOQ, Maximum level, Minimum level, Reorder point and safety stock,(Excluding probability based calculation.)

Books:

- 1) Financial management-P.V.Kulkarni.
- 2) Financial management-I.M.Pandey.

CBCS Syllabus-Bachelor of Business Administration (BBA)
With Effect from 2018-2019

VII.2. Entrepreneurship - I

End of Semester Examination	40 Marks
Continuous Assessment	35 Marks
Total	75 Marks

Learning Objectives: - The objective of the course is to equip the students with the ability to analyse, interpret and apply the basic concepts and theories of entrepreneurship in starting a new venture.

Utility: Student can acquire basic-level knowledge of business entrepreneurship.

Prerequisite: Willingness to be an entrepreneur.

Sr. No.	Topic	No. of Lectures
1	Entrepreneur <ul style="list-style-type: none"> Definitions, characteristics, functions, types of Entrepreneurs. traits for Entrepreneur, Entrepreneur v/s manager. 	11
2	Entrepreneurship <ul style="list-style-type: none"> Entrepreneurship: Meaning & Importance, Four Key elements of Entrepreneurship; Why Entrepreneurship? factors stimulating Entrepreneurship, environment for Entrepreneurship, obstacles inhibiting Entrepreneurship. 	11
3	Theories of entrepreneurship development <ul style="list-style-type: none"> Risk bearing theory of knight Innovation theory of Schumpeter Regional climate theory Entrepreneurial motivation theory. 	11
4	Entrepreneurship-Creativity and Innovation <ul style="list-style-type: none"> Application of Creativity and Innovation in an Entrepreneurial organization. Tools for Environment Scanning- SWOT Analysis & PESTLE Analysis. 	11
5	Women Entrepreneurs <ul style="list-style-type: none"> Concept of women Entrepreneur, factors influencing women Entrepreneurs, types of women Entrepreneurs. Women Entrepreneurs in India, support and assistance, problems, remedial measures. 	10
	Total	54

Reference Books:

1. Entrepreneurship development, E Gordan and K Natarajan, Himalaya Publishing house, Mumbai
2. Fundamentals of entrepreneurship, G.S. Sudha, Ramesh Book depo. Jaipur
3. Entrepreneurship development programme and practices, Saini J.S. Deep and Deep publications, New Delhi
4. Entrepreneurial development concept and practices, Sarwate Dilip M, Everest publishing house, Pune 1996.

Bachelor of Business Administration (BBA)
With Effect from 2018-2019

XII. Business Ethics

End of Semester Examination	40 Marks
Continuous Assessment	35 Marks
Total	75 Marks

Learning Objectives: - The objective of the course is to equip the students with the ability to analyse, interpret and apply the basic concepts of ethical practices that affect business & future decision making.

Utility: Student can acquire basic-level knowledge of importance of ethical practices in business.

Prerequisite: Basic knowledge of ethics in business.

Unit. No.	Particulars	No. of Lectures
1	PRINCIPLES OF BUSINESS ETHICS <ul style="list-style-type: none">• Introduction, Ethics & Morals, Nature of Ethics.• Need for Business Ethics, Ethical Dilemmas, Benefits of Business Ethics, Fundamental principles of Ethics.	11
2	CORPORATE SOCIAL RESPONSIBILITY <ul style="list-style-type: none">• Corporate Social Responsibility, Need for CSR, Key Developments• CSR Mechanisms, Benefits of Corporate Social Responsibility	11
3	WORKPLACE ETHICS <ul style="list-style-type: none">• Factors Influencing Ethical Behavior at Work, Ethical Issues Discrimination, Harassment,• Importance of Ethical Behavior at the Workplace, Guidelines for Managing Ethics in the Workplace.	11
4	ENVIRONMENT & ETHICS <ul style="list-style-type: none">• Introduction, Sustainable Development, Pollution and Resource Depletion, Ecological Ethics, Conservation of Natural Resources, Developments in India, Eco-Friendly Business Practices	11
5	Ethics in Business <ul style="list-style-type: none">• Ethics In Marketing And Consumer Protection: Introduction, Ethical Guidelines, Behaving ethically in marketing, Healthy competition and protecting Consumer's interest, Consumer Protection Councils in India.• Ethics In Accounting And Finance: Introduction, Creating an Ethical Environment, Reasons for Unethical Behavior, Safeguards, Ethical conflict resolution	10
	Total	54

Reference Books:

1. Business Ethics and Corporate Governance – S.K. Bhatia.
2. Business Ethics and Corporate Governance – C.S.V. Murthy
3. Business Ethics – IPCC Booklet by ICAI.

Bachelor of Business Administration (BBA)
With Effect from 2018-2019

VII. Organisational Behaviour

End of Semester Examination	40 Marks
Continuous Assessment	35 Marks
Total	75 Marks

Learning Objectives: - The objective of the course is to equip the students with the ability to analyze, interpret and apply the basic concepts of Organisational Behavior in organization.

Utility: Student can acquire basic-level knowledge of psychology for beginners.

Prerequisite: Basic knowledge of management.

Unit. No.	Particulars	No. of Lectures
1	Introduction to Organizational Behavior <ul style="list-style-type: none">• Definition, Assumptions, Significance of organizational behavior, characteristics of OB.• Individual Behavior and Group Behavior, Factors affecting behavior, formal and informal group, stages of group formation.	11
2	Attitudes, Emotions, Personality, Perception <ul style="list-style-type: none">• Main Components of Attitudes, Major Job Attitudes.• Meaning of Emotions and Moods, Sources of Emotions and Moods.• Personality & its importance.• Definition of Perception & Factors That Influence Perception	11
3	Motivation: <ul style="list-style-type: none">• Meaning, Importance of Motivation.• Motivation Theories: Maslow Theory, Herzberg Theory, McGregor Theory and McClelland Theory	11
4	Leadership: <ul style="list-style-type: none">• Meaning, Importance, Qualities of Good Leader.• Theories of Leadership, Leadership Styles	11
5	Decision making: <ul style="list-style-type: none">• Decision Making: Concept, Importance, The Decision-Making Process.• Types of Decisions, Decision-Making Models - Classical Decision Model, Behavioral Decision Model, Systematic and Intuitive Thinking.	10
	Total	54

Reference Books:

1. Principles of Management - Dr. S.C. Saxena – Sahitya Bhavan Publication
2. Essentials of Organisation Behaviour by Robbins S.J., Text N.D.
3. Organisational Behaviour by John Schermerhorn & Richard Osborn, John Wiley & Sons Publishers.
4. Organizational Behaviour-Text, Cases and Games-by K. Aswathappa, Himalaya Publishing House.

Suggested Readings:

- 1) Fundamentals of Computer – By V. Rajaraman
- 2) Fundamentals of Computer – P. K. Sineha
- 3) MS-Dos 6.22 – Russell A Stultz (BPB)
- 4) Teach Yourself Windows 2000 – Brain Underdahl
- 5) Information Technology – By Nandkishor Dayma (Vidya PRakashan, Nagpur)
- 6) Microsoft Office- By Dienes Sheila
- 7) Leon, Alex & Mathews – Internet for Everyone – Leone TECH World Chennai

Note:

Distribution of marks for practicals is as follows.

1)	Journal/ Record Book (Certified)	05 Marks
2)	Oral/ Viva	05 Marks
3)	One theory question	10 Marks
Total		20 Marks

HUMAN RESOURCE MANAGEMENT

B.B.A. II Yr. (III Sem.), Course Code : 305

Max. Marks : 50

(Theory : 40 + Internal : 10)

1. **Human Resource Management** : Philosophy, evolution, concept and scope of HRM; functions of HRM. HR Dept., Human Resource policies - Importance, objectives and scope.
2. **Human Resource Planning**: Concept, need, responsibility for HR Planning. Assessing Human Requirements; Human resource forecasting, Work-load analysis; Job analysis; job description and job specification.
3. **Recruitment**: Meaning, pre-requisites of a good recruitment policy, various sources of recruitment, Steps in selection procedure. Psychological testing, purpose, characteristics and various types of tests, Interviews – types, induction, objectives and procedure.
4. **Employee Training And Development**: Need importance and objectives, steps in training programme. Training policy, Different training techniques, Executives/ Management development process.

BOOKS:

- 1) Human Resource Management- K. Aswathappa.
Himalaya Publishing House, Mumbai.
- 2) Personnel & Industrial Relations- P. Subbarao.

FINANCIAL MANAGEMENT

B.B.A. II Yr. (III Sem.) Course Code : 306

Max. Marks : 50

(Theory : 40 + Internal : 10)

1. Financial Management :- An Overview-

- (A) Finance Functions: Executive Functions (Financial Decisions)

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System (CBCS) Course Structure (New Scheme)
B.Sc First Year (Semester I)

Semester Pattern effective from June 2016

Biotechnology

CCBT-2A Introduction to Biotechnology

Maximum Marks: 75

Hours: 45

Credits:3

Objective: To understand the basic concept of Biotechnology and its applied areas

Unit-I: Introduction: Definition, Historical overview of Biotechnology, Recent discoveries from Cell biology to Biotechnology.

Biotechnology in Agriculture: Plant tissue culture, Seed Technology, Plant Breeding, Transgenic plants with examples. Biofertilizers, Biopesticide, etc.

Unit II: Biotechnology in Health & Biopharmaceuticals: Diagnostics- Ag-Ab Interactions and other types of diagnosis. Concept of Stem Cells, Hybridoma Technology, Genetic Counseling. Transgenic Animals and their applications.

Unit-II: Biotechnology in Industry: Beverage-Winery, Distillery, Dairy, Food Processing and packaging, Enzymes, Paper & Pulp etc

Unit-IV: Biotechnology in Environment & Biodiversity: Waste Water Treatment, Biodegradation, Bioremediation, composting, Solid waste Management. Biofuel- Biodiesel, Biogas, Ethanol. Biodiversity: *in situ*, *ex situ* conservation of endangered species. Ethical, Legal (IPR, Patent) and Social impact of Biotechnology.

Reference Books & Text:

1. Introduction to Biotechnology- Brown, C Publications ampbell, Priest-Panima Publications
2. Biotechnology-U Satyanarayana- New Age Publications
3. Biotechnology - B.D. Singh, Kalyani Publications
4. Biotechnology: Expanding Horizon- B.D. Singh- Kalyani Publications
5. Elements of Biotechnology - P.K. Gupta, Rastogi Publications
6. A Text book of Biotechnology - R.C. Dubey- S. Chand
7. Advances in Biotechnology- S.N. Jogdand- Himalaya Publication
8. Concepts in Biotechnology-Balasubranian- University Press
9. Biotechnology - Purohit- Agrobios Publication
10. Modern concepts of Biotechnology, H.D. Kumar, Vikas Publications

Practicals

1. Students are expected to go on field study to reveal the applied areas of biotechnology, Biotech
2. Companies, Products and their impact on society.
3. Survey and report on commercial dairy products and packaged food products available in market.
4. Survey and report on bio pesticides, and bio control agents available in market
5. Survey and report on genetically modified/hybrid crops seeds and vegetables
6. Survey and report on vaccination programme in India and vaccines in market
7. Survey and report diagnostic kits, antibiotics, anti sera available in market
8. Survey and report on use of Biofuel (Biodiesel, biogas, ethanol, biomass, coal etc)
9. Visit and report on local drinking and waste water treatment, bio composting, biogas unit
10. Report on government agencies- DBT, CSIR, ICMR, ICAR, TIFR, ISSER, IIT, DRDO etc
11. Report on Top 10 Biotech companies in India and World
12. Visit and report on Biotech Research Institute, Forensic Laboratory and Biotech Industry

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System (CBCS) Course Structure (New Scheme)
B.Sc First Year (Semester II)
Semester Pattern effective from June 2016

Biotechnology
CCBT-4A Microbiology- I

Maximum Marks: 75

Hours: 45

Credits:3

Objective: To understand basic concepts in Microbiology

Unit –I: Introduction to Microbiology

History of Microbiology: Discovery of microscope and Microbial world: Micrographia of Anton von Leeuwenhoek and Robert Hooke. Controversy over Abiogenesis: Aristotle's notion about spontaneous generation, Redi's experiment, Louis Pasteur's & Tyndall's experiment. Theory of fermentation, Discovery of anaerobic life & physiological significance of fermentation. Surgical antiseptics, Germ theory of disease – Koch's postulates & River's postulates.

Unit –II. Basic and applied areas: Medical Microbiology, Space microbiology, Soil and Agricultural Microbiology, Food and Dairy Microbiology, Geomicrobiology. Concept of Systematic and Classical taxonomy including Bergey's Manual of Bacteriology.

Unit-III: Morphology and Fine Structure of Bacteria

Morphology of Bacteria, Size and shape, Arrangements.

Ultra structure of Bacteria Structure, function and chemical composition of Capsule, Flagella, Pili and Fimbriae, Cell Wall (Gram positive & Gram negative), Cell membrane, Mesosome, Cytoplasm, Nucleoid and ribosome's.

Unit –IV. Cytoplasmic inclusion – PHB granules, glycogen, carbohydrates, Magnetosome, Gas vesicles, chlorosome, sulphur, granules.

Spore and Cyst- Endospore and Exospores, Germination and Sporulation of endospore.

Text & References:

1. General Microbiology-Powar and Dagainawala- Himalya Publication
2. Fundamental Principles of Bacteriology- A.J.Salle- TATA-McGraw Hill
3. General Microbiology-Pelczar- Tata McGraw Hill
4. Text-book of Microbiology- Anantnarayan, C.K. Jayram, Panikar, Orient Longman.
5. General Microbiology- Stanier R.-. Macmillan Press Ltd.
6. Text Book of Microbiology- R.C. Dubey- S.Chand

Practicals:

- 1.General Rules and Safety in Microbiology Laboratory.
- 2.Study of basic requirements in Microbiology Laboratory- Autoclave, Hot air oven & Incubator
- 3.Isolation of microorganisms from soil, water and air.
- 4.Detection of number of bacteria from milk by SPC
- 5.Microbiological examination of food
- 6.Simple staining
- 7.Gram staining
8. Measurement of size of microorganism by Micrometry method
- 9.Study of motility of Microorganisms by hanging drop method
- 10.Alcoholic fermentation

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System (CBCS) Course Structure (New Scheme)
B.Sc First Year (Semester I)
Biotechnology

AECCBT 1-A English & Science communication Skills –I
Maximum Marks: 50 Hours: 45 Credits:2

Objective: To improve the skills in correct English in writing and pronunciation

Unit I: Grammar

Word Classes (Open & Closed), Sentence – Kinds – Transformation, Phrase, Clause and its kinds,

Simple, Complex & Compound sentences, (Only definitions & Structure)

Tenses - Use of verbs in the Sentences

Unit II: Vocabulary

Morphology, Synonyms & Antonyms, One Word Substitution, Homophones & Homonyms

Unit III Communication Skills

Definition & its all Types, Communication Cycle & Barriers, Principles for Effective Communication,

Varieties in English (Indian, British & American).

Unit IV: Writing Skills

Letters (Formal & Informal), Report Writing (Scientific and Formal), Memorandum, Curriculum Vitae,

Personal Employment Interview, Group Discussion.

Phonetics: 44 sounds, consonants, vowels & Diphthongs, Transcription of words, Accent,

Syllable cluster and Intonation.

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & Meera Banerji
2. A Practical English Grammar A.J. Thomson -Oxford
3. Mastering English Grammar – S.H.Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English -J.Sethi & P.V.Dhamija
7. Radiance-Tengse

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System(CBCS) Course Structure (New Scheme)
B.Sc. First Year (Semester-II)

Semester pattern effective from June 2016

Biotechnology

AECCBT I-B English Science Communication Skills- II

Maximum Marks : 50

Hours : 45

Credits : 2

Objective : To be able to have effective communication, soft skills and career skills

Unit I : Grammar : grammar in day - today use

- a) Common errors in the use of English.
- a) Noun b) Pronoun c) Verb d) Preposition.
- b) Tense sequences in the clauses.
- a) Simple Present - Simple Present
- b) Simple Past - Simple Past,
- c) Simple Present - Simple Future
- c) Clauses : a) Adjective Clause & its function
- b) Adverb Clause & its usage.
- c) Noun Clause & its usage.

Unit II : Vocabulary :

- a) Vocabulary building : Active & Passive vocabulary
- b) Idioms & Phrases
- c) Synonyms & Antonyms (Advanced level)

Unit III : Communication & soft skills

- a) Para-jumbles
- b) Reading Comprehension (RC)
- c) Telephonic Interview
- d) Seminars
- e) Meetings - Notice, Agenda : Do's and Don'ts of the participant

Unit IV : Writing Skills

- a) Resume building : Do's and Don'ts
- b) Email writing Etiquettes - Business Emails
- c) Essay writing Techniques - Writing Essays

Reference Books :

- 1) Developing of Communication Skills - Krishna Mohan & Meera Banerji
- 2) A Practical English Grammar- A.J. Thomson - Oxford
- 3) Soft skills - by K. Alex
- 4) English Grammar & Composition - Rajendra Pal & Suri
- 5) Macmillan foundation English - R.K. Dwivedi A. Kumar

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System (CBCS) Course Structure (New Scheme)
B.Sc First Year (Semester II)

Semester Pattern effective from June 2016

Biotechnology
CCBT-4B Microbiology- II

Maximum Marks: 75

Hours: 45

Credits: 3

Objective: To understand basic concepts in Microbiology

UNIT-I: Microbial Nutrition, cultivation

Nutritional requirements – Major and Minor elements and growth factors. Nutritional types of microorganisms. Nutrient uptake mechanisms: Active and passive Diffusion, Osmosis. Types of Culture media with examples (Defined, Selective, natural, Differential, enrichment, Synthetic). Pure culture techniques (Streak, pour, Spread plate and roll tube method)

UNIT-II: Bacterial Growth: Growth Kinetics and growth curve; Generation time, Growth rate, specific growth rate. Methods of Enumeration -Microscopic methods, Plate counts, Biomass, Chemical methods, Optical density. Continuous culture – Chemo stat and Turbido stat models, Diauxic growth and Synchronous culture.

Unit-III: Control of Microorganisms by physical methods.

Concept of Pasteurization, Tyndallization, Sterilization. Physical methods of Microbial Control: Heat: Moist & Dry, Low temperature, Filtration, High pressure, Desiccation, Osmotic pressure Radiations.

Unit-IV: Control of Microorganisms by chemical methods.

Chemical methods of Microbial Control: Phenolics, Biguanides- Chlorohexidine, Alcohols, Halogens, Heavy Metals, Quaternary ammonium compounds, Surface active agents, Aldehydes, Sterilizing gases, Peroxygens, chemotherapeutic agents.

Text & References:

1. General Microbiology-Powar and Dagainawala- Himalya Publication
2. Fundamental Principles of Bacteriology- A.J.Salle- TATA-McGraw Hill
3. General Microbiology-Pelczar- Tata McGraw Hill
4. Text-book of Microbiology- Anantnarayan, C.K. Jayram, Panikar, Orient Longman.
5. General Microbiology- Stanier R.-. Macmillan Press Ltd.
6. Text Book of Microbiology- R.C. Dubey- S.Chand

Practicals:

- 1) Study of basic requirements in Microbiology Laboratory
 - i) pH meter ii) Spectrophotometer iii) Laminar air flow
- 2) Preparation of solid and liquid media
- 3) Isolation of microorganisms by using selective media.
- 4) Isolation of bacteria by spread plate, streak plate and pour plate method.
- 5) Study of bacterial growth curve.
- 6) Detection of number of bacteria from milk by breed method.

Swami Ramanand Teerth Marathwada University, Nanded
Choice Base Credit System (CBCS) Course Structure (New Scheme)
B.Sc First Year (Semester II)

Semester Pattern effective from June 2016

Biotechnology
CCBT-2B Principles of Genetics

Maximum Marks: 75

Hours: 45

Credits: 3

Objective: To focus on the principles of classical, modern & population genetics and principle of inheritance.

UNIT-I: Mendelian laws of Inheritance, & interaction of genes for monohybrid & dihybrid (incomplete dominance, co dominance, complementary & supplementary gene action, duplicate gene action, collaborator gene action, epistasis), Lethality & its types, Multiple alleles & isoalleles, scope & significance of genetics. Linkage & crossing over, its types, Mapping of genes, interference; coincidence.

UNIT-II: Sex determination in plants & animals. Sex Linkage, sex influenced & sex limited inheritance. Basic Microbial genetics: Conjugation, Transformation transduction Plasmid & its types. Transposable elements.

UNIT-III: Concept of Gene. Classical & modern gene concepts; Structure of Eukaryotic chromosome, Special types of chromosomes: Polytene & Lampbrush chromosome. Mutations-spontaneous & induced; chemical & Physical mutagens; induced mutation in plants, animals & microbes for economic benefit of man.

UNIT-IV: Structural & numerical aberrations involving chromosomes; evolution of wheat, cotton & rice; hereditary defects-Klinefelter Turner, Cri-du-Chat & Down syndromes. Extra chromosomal inheritance: Cytoplasm inheritance; mitochondrial & chloroplast genetic systems. Population genetics Hardy-Weinberg equilibrium, gene & genotypic frequencies.

Text & References:

1. Concepts of genetics (Sixth Edition), William S. Klug & Michael R, Cummings, Person
2. Genetics, M.W., Strickberger, Prentice Hall College Division.
3. Genetics, P.J. Russel, Benjamin/Cummings.
4. Principles of Genetics, E.J. Gardner, John W.H. Sons Inc.
5. Genetics - Verma Agarwal- S. Chand
6. Genetics –B.D. Singh –Himalaya Publication
7. Microbial Genetics- David Friefelder- Narosa Publications
8. Molecular Biology of Gene -J.D. Watson -Pearson.
9. Genetics, P.K. Gupta- Rastogi Publication.
10. General Microbiology- Powar & Dagainawala- Himalaya
11. Genetics-Arora-Himalaya Publications

Practicals:

1. Two examples each on Dihybrid & Monohybrid cross.
2. One example each on interaction of genes.
3. Two examples on Hardy Weinberg law.
4. Study of Karyotype.
5. Study of Human blood group.
6. Observe sex linked characters in tabulation from surroundings.
7. Study of Human Traits
8. Study of polytene chromosome.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure

B. Sc. Second year (Semester- III)

BIOTECHNOLOGY

AECBT-1C English and Science Communication Skills-III Marks: 50

Unit - I Applied Grammar

- a) Tense & its application.
- b) Transformation of sentences: Voice, Speech & Degree.
- c) Usages of Articles, propositions, conjunctions & adjectives.
- d) Basic sentence structures based on meanings: Interrogative, exclamatory, declarative, Imperative.
- e) Common mistakes in the use of adverb, conjunctions & in general usages, Redundancies in English language.

Unit-II Presentation Skills

- a) Preparing a short speech for public speaking.
- b) Presentation: pitch, pace, voice, modulation.
- c) Body Language and Voice Modulation
- d) Role playing on different situations.

Unit-III Soft Skills

- a) Interpersonal skills.
- b) Negotiation skills.
- c) Time management skills.
- d) Stress management skills.

Unit- IV Day-to-day Conversation

- a) Introducing one and others.
- b) Meeting friends, greetings and asking questions and answering them.
- c) Debate and extempore
- d) Story telling.

Reference Books:

- 1) English grammar & Composition – Rajendra pal & Suri
- 2) Objective general English – R. S. Agrawal
- 3) Macmillan Foundation English – R. K. Dwivedi A. Kumar
- 4) Developing of Communication Skills – Krishna Monhan & Meera Banerji
- 5) Soft Skills – by K. Alex
- 6) Personality Development & Communicative English – Dr. T. Bharti

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure

B. Sc. Second year (Semester- IV)

BIOTECHNOLOGY

CCBT-3D: Applied and Medical Microbiology

Marks 75

Objective: To understand applications of microorganisms in different areas.

UNIT I: Soil Microbiology: Importance of Biogeochemical cycles: Carbon Cycle: - Carbon assimilation, mineralization, Nitrogen Cycle: Ammonification, Nitrification, Denitrification, and Dinitrogen fixation in symbiotic and non- symbiotic microorganism. Sulphur Cycle: - Sulphur mineralization, oxidation and reduction of sulphur Phosphorus Cycle: - Solubilisation of inorganic phosphorus, Mineralization of organic phosphorus, immobilization, oxidation and reduction of phosphorus.

Air Microbiology: - Significance of microorganisms in air, enumeration of microorganisms and control of airborne microorganisms

UNIT II: Water Microbiology: Types of water, bacteriological examination of water (presumptive confirmative, complete test) MPN, SPC, membrane filter technique, indicator of fecal pollution, significance of index organism (*E. coli*), fecal/ non fecal coli forms (IMViC)

Food Microbiology: Scope of food microbiology, microbial spoilage of food, microbial examination of food, preservation of food by high temperature, chemicals, irradiation, physical techniques. Major food born infections and toxins.

UNIT III: Medical Microbiology: Etiological Agent, Virulence, Pathogenesis epidemiology (Sporadic, endemic, pandemic) Reservoirs of infection, Normal flora, commensals, opportunistic pathogens, carriers, septic shock, septicaemia, pathogenicity, virulence factors, toxins, bio safety levels. Concept of waterborne, airborne, nosocomial infections

UNIT IV: Morphology, pathogenesis, symptoms, laboratory diagnosis, preventive, Measures and chemotherapy for Typhoid, Tuberculosis, Malaria and AIDS.

Plant Pathology: Concept, Host- Pathogen Relationships in plants.

Text and Reference:

1. Alexander – Soil Microbiology-John Wiley
2. N.S. Subbarao – Soil Microbiology – Oxford
3. Atlas & Bartha – Microbial Ecology IV Ed., Tata McGraw Hills Pub.
4. A.J. Salle- Fundamental Principles of Bacteriology IIEd., Tata McGraw Hill Pub.
5. Adams & Moss- Food Microbiology Royal Society of Chemistry
6. Frazier- Food Microbiology- Tata Mc Graw Hill
7. Text book of Microbiology- Anantnarayan & Panikar-Orient Longman
8. General Microbiology- Powar and Daginawala- Himalaya

Practicals :

1. Enumeration of microorganisms from Soil.
2. Isolation of Symbiotic and Non Symbiotic N₂ fixing microorganisms/ PSB from soil.
3. Enumeration and Study of air Micro flora
4. Microbial examination of water, enteric pathogen from water sample. (IMViC test)
5. Isolation & Enumeration of microorganisms from food sample.
6. Isolation of micro flora from human skin and throat etc
7. Analysis of contaminated food material and analysis of toxins
8. Visit to food and Dairy Industry.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure

B. Sc. Second year (Semester- IV)

BIOTECHNOLOGY

AECCBT-1D: English and Science Communication Skills-IV

Marks: 50

Objective: To have effective communication & preparation of different competitive exam.

Unit - I Sentence Building – (Advanced Level)

- 1)Conditionals
- 2) Modals
- 3) Time expressions
- 4)Describing places, things, talking more about actions

Unit – II Personality Development (Grooming)

- 1) Developing Confidence and killing nervousness.
- 2) Attitude management and personality enhancement
- 3) Grooming for professional etiquettes and manners.

Unit – III Creative writing

- 1) Narrating the situations / Describing different situations
- 2) Elaborating pictures
- 3) Business E-mail : Invitation, Complaint, Appreciation , For Job.

Unit – IV Real life conversation

- 1) Talking about self and expressing feelings
- 2) Oratory Skills (Public speaking skills / techniques)
- 3)Body language & Dress code

Reference Books :

- 1)Developing of communication skills – Krishna Mohan & Meera Banerji
- 2)A Practical English Grammar – A.J.Thomson-Oxford
- 3)Soft Skills – by K. Alex
- 4)English Grammar and Composition – Rajendra Pal & Suri
- 5)Macmillan foundation English – R.K. Dwivedi A.Kumar

Swami RamanandTeerthMarathwada University, Nanded
Choice Based Credit system (CBCS Pattern)
B. Sc. Third Year (Semester VI)
Semester Pattern effective from June 2018
Biotechnology
DSEBT 3F: Environmental Biotechnology

Maximum Marks : 75

Hours : 50

Credits: 3

Salient Features : Syllabus focus on current needs of environmental sector. Details of important commercial agro products is nicely illustrated in syllabus. Provides information of important microbes for cleaning the environment.

Outcome : Will prepare students to understand the problems of environments and they can tackle environmental problems using recent Biotechnological advances.

Objectives : To understand aspects of environmental science and techniques implemented to solve environmental problems.

Prerequisites : Technical understanding of environment and its components is prerequisite to student to learn this syllabus.

UNIT- I : Waste Water Treatment.

Domestic (Municipal) and Industrial Waste Water Treatments: Primary, Secondary and Tertiary. Important microorganisms in waste water treatment, Principles of their growth and Plasmid Borne Metabolic Activities. Aerobic Biological Treatments: Activated sludge process Rotating Biological Contactors. Anaerobic Biological Treatments: Air Lift Membrane Bioreactors Packed Bed (Column Reactor.)

UNIT- II : Biodegradation techniques

Biodegradation: Definition and Concept, Ready Biodegradation, Ultimate Biodegradation and Inherent Biodegradation. Aerobic and Anaerobic degradation pathways in Microbes. Biodegradation of Hydrocarbon with Suitable Example. Concept of Municipal Solid Waste management

UNIT -III : Bioremediation

Introduction, Definition and Concept, Methods of Bioremediation (*in situ* and *ex situ* Methods) Bioremediation of Soil (Saline Soil and Alkaline Soil) Phytoremediation: Concept and Types. Applications of Bioremediation.

UNIT –IV: Xenobiotics

Xenobiotics and Recalcitrancy. Xenobiotics Degradation: Pesticide Degradation (Principle with suitable example) Herbicide Degradation (Principle with suitable example) Metabolism of Xenobiotics: Cytochrome P450 System, Phase I, Phase II, Metabolic reactions

Text &References :

1. Asthana D.K. and Asthana M., -Environment : Problems and Solutions- S. Chand
2. Chatterji A.K., Introduction to Environmental Biotechnology, Prentice Hall of India Pvt. Ltd
3. Jogdand S.N.- Environmental Biotechnology- Himalaya Publishing House
4. Kalaichelvan P.T., I Arul Pandi- Bioprocess Technology, MJP Publishers
5. Murugesan A. G. and Rajakumari C-Environmental Science and Biotechnology: Theory & Techniques, MJP
6. Rajendran, Gunashekar- Microbial Bioremediation-MJP
7. Hammer & Hammer-Water & Waste water Technology-PHI
8. Metcalf & Eddy-Waste water Engineering-TMH
9. Indushekar Thakur- Environmental Biotechnology-I K International
10. P. Mohapatra-Text book of Environmental Biotechnology-I K International

11. Rittmann B. E. And McCarty P. L.- Environmental Biotechnology Principles & Applications, McGraw Hill

Practicals

1. Determination of Dissolved Oxygen and Biological Oxygen Demand of polluted water.
2. Determination of Chemical Oxygen Demand of polluted water.
3. Bacterial Examination of Water by MPN Test: Presumptive and Confirmed Coliform test.
4. Determination of soil pH and Total organic carbon.
5. Determination of Total Carbohydrates and Phosphorus of soil.
6. NPK determination of soil samples
7. Determination of Alkalinity and Hardness of water.
8. Demonstration of Total Nitrogen estimation by Kjeldahl's Method.
9. Biodegradation of polymer compounds
10. Biodegradation of textile dyes
11. Visit to STP, MSW treatment/ Industrial effluent treatment plants.

Swami RamanandTeerthMarathwada University, Nanded
Choice Based Credit system (CBCS Pattern)
B. Sc. Third Year (Semester VI)
Semester Pattern effective from June 2018
Biotechnology
DSEBT 2F: Industrial Biotechnology

Maximum Marks : 75

Hours : 50

Credits: 3

Salient features : the course covers the knowledge of microbial processes and product formation

Utility of Course : To enhance production techniques and to get knowledge of downstream processing and optimization.

Learning objectives : To provide knowledge of many procedures in industries, role of microorganisms in industries and techniques used to improve product formation in industries.

Prerequisites : Should known basic design of fer knowledge about quality control and quality assurance.

UNIT- I : Strain Improvement

Selection of Mutants producing improved level of Primary Metabolites with suitable Example.
Isolation of mutants which do not produce feedback inhibitors or repressors. Mutants that do not recognize presence of inhibitors or repressors. Modification of Permeability.

UNIT - II : Down Stream Processing.

Removal and Recovery of cell mass (Precipitation, Filtration and Centrifugation)
Cell disruption - Physical and Chemical methods. Purification of Product Liquid-liquid extraction : Solvent Recovery. Chromatography : Adsorption, Ion-exchange, HPLC
Membrane processes: Ultrafiltration and Reverse Osmosis. Drying and Crystallization.

UNIT -III : Fermentation Processes.

Fermentation processes: Microorganisms involved, Inoculum preparation, Medium used and product Recovery. Enzyme: Protease, pectinase. Organic acid: Citric acid. Antibiotic: Penicillin, erythromycin. Vitamin: Vitamin B12, vitamin B2.

UNIT- IV : Quality Control, Process Economics and GLP.

Sterility testing. Pyrogen testing. Carcinogenicity testing. Toxicity testing.
Fermentation Economics: Cost Estimates ,Process Design ,Capital Cost Estimates, Operating Cost Estimates. Concept of QC, QA, Good Laboratory Practices, GMP.

Text &References :

1. Casida L.E - Industrial Microbiology- New Age
2. Crueger W and Crueger A - Biotechnology: A Textbook of Industrial Microbiology-Panama Publishing
3. Patel A.H. - Industrial Microbiology, Macmillan India
4. Peppler H.J and Perlman D - Microbial Technology, Vol I and II-Elsevier
5. Stanbury P.F., Whitaker A. and Hall S.J - Principles of Fermentation Technology-Elsevier
6. Prescott and Dunn's- Industrial Microbiology-CBS
7. Ed. G. Subramaniam- Bioseparation& Bioprocessing - Wiley –VCH
8. Product Recovery in Bioprocess Technology, 'BIOTOL series, Butter worth Heinemann 1992
9. Paul A. Belter, Cussler- Bioseparation :Downstraem Processing for Biotechnology - Academic Press
10. LarlSchuger-Solvent Extraction in Biotechnology - Springer
11. Roger Harrison-Bioseparation Science & Engineering-Oxford
12. N.K. Prasad-Downstream Process Technology-PHI

Practical:

1. Isolation and Screening of Industrially important Microbes-Acid, Antibiotics, Enzymes
2. Isolation & identification of bacteria from different milk & water samples.
3. Fermentative production purification and estimation of antibiotics/ vitamins
4. Fermentative production purification and estimation of Citric Acid
5. Fermentative production purification and Estimation of alcohol. using *Sacharomyces cerevisiae*
6. Estimation of fermentative product (Acetic acid from vinegar).
7. Qualitative estimations of fermentation products by analytical instruments
8. Wine production & estimation of alcohol
9. Production of cheese using different substrate fro microorganism.
10. Study of fermentation economics with any one example
11. Visit to Fermentation Industry

Name of Course	B.Sc. (Software Engineering) Third Year
Semester	VI Semester
Name of Subject	Cyber Security
Subject code	S6.CC.6 (Core Course Elective – III)

Prerequisite:

- Adequate knowledge of computer network.
- Adequate knowledge of possible risks on internet.

Course Objective

- Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
- Gain familiarity with protective network and distributed system attacks, defenses against them.
- Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.
- Acquaintance with cyber Law and IT Act 2000.
- Develop an understanding of Technical aspects of Digital signature.
- Develop a basic understanding of domain Name Disputes and Trademark Law.
- Acquaintance and awareness with cybercrime.
- Understand the broad set of technical, social & political aspects of Cyber Security.
- Recognized the role security management plays in cyber security defense

Course Outcome:

- Explain the concepts of confidentiality, availability and integrity (CIA) in context of Information Assurance.
- Understand the objectives of IT Act and Cyber Law.
- Understands Encryption and decryption methods.
- Understand Digital signature and it's technical aspects.
- Understand the concept of Domain Name Disputes, Cyber-squatting and Reverse Hijacking.
- Will understand cyber-crimes such as hacking and other offences.

Silent Features:

- Develops the knowledge of cyber Law and Cyber Act.
- Develops the skill of encryption and decryption.
- Understands the cyber-crimes and offences.

UNIT-I

Sr. No.	Object and Scope of the IT Act		Lectures Required	Ref. No
1	1.1	Genesis	2	1,2,3,4,5
	1.2	Object	2	1,2,3,4,5
	1.3	Scope of the Act	2	1,2,3,4,5

References:

Sr. No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		Professional Book Publishers – New Delhi.

UNIT-II

Sr. No.	Encryption		Lectures Required	Ref. No
2)	2.1	Symmetric Cryptography	2	1,2,3,4,5
	2.2	Asymmetric Cryptography	2	1,2,3,4,5
	2.3	RSA Algorithm	3	1,2,3,4,5
	2.4	Public Key Encryption	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		Professional Book Publishers – New Delhi.

UNIT-III

Sr. No.	Digital Signature		Lectures Required	Ref. No
3)	3.1	Technology behind Digital Signature	2	1,2,3,4,5
	3.2	Creating a Digital Signature	2	1,2,3,4,5
	3.3	Verifying a Digital Signature	2	1,2,3,4,5
	3.4	Digital Signature and the Law	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		Professional Book Publishers – New Delhi.

UNIT-IV

Sr. No.	Domain Name Disputes and Trademark Law		Lectures Required	Ref. No
4)	4.1	Concept of Domain Names	1	1,2,3,4,5
	4.2	New Concepts in Trademark Jurisprudence	2	1,2,3,4,5
	4.3	Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming,	4	1,2,3,4,5
	4.4	Jurisdiction in Trademark Dispute	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		Professional Book Publishers – New Delhi.

UNIT-V

Sr. No.	Cyber Regulations Appellate Tribunal		Lectures Required	Ref. No
5)	5.1	Establishment & Composition Of Appellate Tribunal	3	1,2,3,4,5
	5.2	Powers of Adjudicating officer to Award Compensation	2	1,2,3,4,5
	5.3	Powers of Adjudicating officer to Impose Penalty	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		Professional Book Publishers – New Delhi.

UNIT-VI

Sr. No.	The Cyber Crimes		Lectures Required	Ref. No
6)	6.1	Tampering with Computer Source Documents	2	1,2,3,4,5
	6.2	Hacking with Computer System	3	1,2,3,4,5
	6.3	Publishing of Information Which is Obscene in Electronic Form	2	1,2,3,4,5
	6.4	Offences : Breach of Confidentiality & Privacy	2	1,2,3,4,5
	6.5	Offences : Related to Digital Signature Certificate	2	1,2,3,4,5

References:

Sr.No	Name of Book	Writer	Publication
1	Cyber Law in India	Farooq Ahmad	Pioneer Books
2	The Indian Cyber Law	Suresh T Vishwanathan	Bharat Law house New Delhi
3	Hand book of Cyber & E-commerce Laws	P.M. Bakshi & R.K.Suri	Bharat Law house New Delhi
4	Guide to Cyber Laws	Rodney D. Ryder	
5	The Information Technology Act,2000		6) Professional Book Publishers – New Delhi.

NameofCourse		B.Sc. CS SY	
Semester		IVSemester	
NameofSubject		E- Commerce	
SubjectCode		S4.6(Skill Enhancement Course)	
Sr. No	Topic Name	Lecturers Required	Ref. No.
1.	Study of Business to Consumer E-commerce	1	
	1.1 Purchase one product from online shopping website. Example: Amazon, flipkart.		1
2.	Study of Consumer to Consumer E-commerce	1	1
	2.1 Purchase one product from another consumer.		1
3	Study of Consumer to Business E-commerce	1	1
	3.1 IN this practical give the ratings and comments regarding the products after purchasing the product.		1
4	Study of hoe to create our own online shopping website using HTML language.	1	1
	4.1 Create 4-5 html pages and link all the pages using “href” tag.		1
5	Study of Online Transaction.	1	1
	5.1 Make a payment of product using Online Transaction		1

Reference :1. E-commerce(The cutting edge of Business) by Kamlesh K. Bajaj and Debjani Nag .

NameofCourse		B.Sc. CS SY	
Semester		IVSemester	
NameofSubject		Computer Network Installation	
SubjectCode		S4.6(Skill Enhancement Course)	

Sr. No.	Title of Programmed	Required Hours
1)	Study of Transmission Medias – Twisted Pair Cable, Co-ax Cable, Fiber-optic Cable.	1 hours
2)	Study of Color code and Crimping CAT-5 Straight Cable	1 hours
3)	Study of Crimping CAT-5 Cross over Cable	1 hours
4)	Study of Networking Devices and Connected PC with – a) Hub b) Switch c) Router	2 hours
5)	Study of IP addresses- IPV4, IPV6.	2 hours
6)	Study of assigning IPV4 and IPV6 addresses to computer system	1 hour
	To Run All Types of Network Troubleshooting Command a) Ipconfig b) Ping c) Pathping d) Tracert e) Arp f) getmac	3 Hours

Six Monthly Core Module Course in
Environmental Studies
(For Undergraduate Courses of all Branches of Higher Education)

Unit I : Introduction & Natural Resources :

Environment : Definition, Scope, Importance, Need for public awareness.

Natural Resources : Renewable and Non Renewable resources, Natural resources and associated problems.

a) Forest Resources : Utility and natural renewal balance, Uses and over exploitation of forest resources, Deforestation case studies, Mining, Dams and their effects on forests.

b) Water Resources : Uses of water, Over utilization of surface and ground water, Floods, Draughts, Dams : Benefits and problems.

C) Mineral Resources : Environmental effects of extracting and using mineral resources.

D) Agricultural Resources : Changes caused by agriculture and overgrazing, Effects of modern agriculture, Fertilizer and pesticide problems, Water logging, Salinity.

E) Land Resources : Land as a resource, Effects on productivity, Man induced landslides, Soil erosion, Desertification

F) Energy Resources : Needs, Types of energy and quantities available, Growing energy needs, renewable and non renewable energy resources, Use of alternate energy sources.

Unit II : Ecosystems :

Concepts of an ecosystems, Structure and function of an ecosystem, Producers, Consumers, and Decomposers, Energy flow in an ecosystem, Ecological succession, Food chain, Food webs, Ecological pyramids,

Introduction, Types, Characteristic features & Structure of following ecosystems (01) Forest ecosystem, (02) Grassland ecosystem, (03) Desert ecosystem (04) Aquatic ecosystem (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries).

Unit III : Biodiversity and its conservation :

Introduction, Definition, Biogeographical classification of India, Value of Biodiversity : Productive use, Social, Ethical, Aesthetic, and option values, India as a mega diversity nation, Endangered and endemic species of India, Conservation of biodiversity.

Unit IV : Environmental pollution and its mitigation :

Definition of Pollution; Causes, effects and control measures of (A) Air pollution, (B) Water pollution, (C) Soil pollution, (D) Noise pollution

Solid waste management : causes, effects and control measures of urban and industrial wastes, nuclear hazards, Environmental hazards and their mitigation, Role of an individual in pollution and abatement.

Unit V : Field Work :

01. Visit to local area to document environmental assets – River, Forest, Grass land, Hill, Mountain etc.
02. Visit to local polluted site : Urban, Industrial, Agricultural
03. Study of common plants, Insects, birds etc,
04. Study of simple ecosystems : Pond, River, Hill, Slopes etc.

Name of Course	B.Sc. Software Engineering Third Year
Semester	VI Semester
Name of Subject	ERP (Enterprise Resource Planning)
Subject Code	S6.CC.5

Prerequisites:

Basic Programming, Mathematics-Statistics, Database Concepts

Course Objectives:

- To introduce the basic concepts of Enterprise Resource Planning.
- To introduce Business modeling and data modeling.
- To introduce ERP and related technologies such as OLAP, Data Mining, data ware housing etc.

Course Outcomes:

Students who complete this course should be able to

- Understand how to process row data to make it suitable for various decision Support Systems.
- Discover and measure ERP modules for manufacturing (CAD/ CAM).

Salient Features:

- ERP helps in analyzing and summarizing different elements of information. ERP process is a form where in which all the data and information can be extracted for the purpose of future benefit.
- Understand different ERP Modules, ERP – A Manufacturing Perspective and **ERP Market**

Unit – I

1.	1. Introduction to ERP	Lectures Required	Ref. No.
	1.1 Evolution of ERP	01	1
	1.2 What is ERP?	01	1
	1.3 Advantages of ERP	01	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit – II

2.	Enterprise – An Overview	Lectures Required	Ref. No.
	2.1 Integrated Management Information	01	1
	2.2 Business Modelling	03	1
	2.3 Integrated Data Model	03	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit- III

3.	ERP and Related Technologies		Lectures Require	Ref. No.
	3.1	BPR	01	1
	3.2	MIS	01	1
	3.3	DSS	01	1
	3.4	EIS		1
	3.5	Data Warehousing	03	1
	3.6	Data Mining	03	1
	3.7	OLAP	02	1
	3.8	Supply Chain Management	02	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit- IV

4.	ERP – A Manufacturing Perspective		Lectures Require d	Ref. No.
	4.1	ERP	02	1
	4.2	CAD / CAM	01	1
	4.3	MRP and BOM	01	1
	4.4	Close loop MRP	01	1
	4.5	Manufacturing Resource Planning and Distribution Requirements Planning	02	1
	4.6	JIT and Kanban	02	1
	4.7	Data Management	02	1
	4.8	Benefits of PDM	02	1
	4.9	MTO and MTS	02	1
	4.10	ATO, ETO, CTO	03	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit V

5.	ERP Modules		Lectures Require	Ref. No.
	5.1	Finance	02	1
	5.2	Plant Maintenance	01	1
	5.3	Quality Management	02	1
	5.4	Materials Management	01	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Unit VI

6.	ERP Market		Lectures Require d	Ref. No.
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	6.1	Benefits of ERP	01	1
	6.2	SAP AG	01	1
	6.3	Oracle Corporation	01	1
	6.4	QAD	02	1

References:

Sr. No.	Name of the Book	Author	Publication
1.	Enterprise Resource Planning	Alexis Leon	TATA McGraw Hill

Name of Course	B.Sc. NT TY
Semester	V Semester
Name of Subject	Accounting with Tally
Subject Code	S5.SEC1 (3)

1. Demonstrate company creation.
 - Accounting only
 - Accounting with inventory
2. Demonstrate create/ display / Alter group.
 - Single group
 - Multiple groups
3. Demonstrate create / display / Alter ledger.
 - Single ledger
 - Multiple ledger
4. Demonstrate voucher type.
 - Create voucher type
 - Alter voucher
5. Demonstrate accounting voucher creation / deletion / cancellation
 - Payment voucher
 - Receipt voucher
 - Sales voucher
 - Purchase voucher
 - Contra entry
 - Debit Note
 - Credit note
 - Journal entry
6. Demonstrate backup facility.
 - Single file
 - Multiple file
7. Demonstrate restore facility.
 - Single file
 - Multiple files
8. Demonstrate multiple accounting print.
 - Account book
 - i. Individual ledger
 - ii. Single ledger
 - iii. Cash book
 - iv. Bank book
9. Demonstrate export facility.
10. Display reports
 - Balance sheet
 - Profit and loss account
 - Trial balance
 - Ledger
11. Display trial balance by creating
 - New column
 - Alter column
 - Auto column
12. Demonstrate create inventory item
13. Demonstrate accounting features.