SEMESTER – I			
Skill Enhancement Course - I Professional English for Botany – I			
Course Code: 21UBOPE1	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Objectives:

- To enhance the lexical, grammatical, sociolinguistic and communicative competence in an increasingly complex, interdependent world.
- To develop intellectual flexibility, creativity and critical thinking skills of students by offering adequate practice in professional context.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognise the words used in life science and improve their competence in using the language	1	An
CO-2	Comprehend unfamiliar texts and describe biological processes	7	Ev
CO-3	Apply critical and theoretical approaches to the reading and analysis of various texts in life science	3	An
CO-4	Analyse critically, negotiate and present without committing errors and develop entrepreneurshipskills	2	Un
CO-5	Recognize the technical words used life science laboratory settings	8	Re
CO-6	learn language use in formal/professional world	7	Ap
CO-7	Write simple sentences without spelling or grammatical error	7	Ap
CO-8	Improve English proficiency with good vocabulary	7	Ap

SEMESTER – I			
Skill Enhancement Course - I Professional English for Botany – I			
Course Code: 21UBOPE1	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

UNIT I: Communication

1. Listening :Listening to instructions and following – Instructions to use microscope
2. Speaking: Pair Walk – Dialogue between a teacher and student about the usage of microscope (formal conversation)
3. Reading: Comprehension passage – GregorJohann Mendel
4. Writing: Developing a story with pictures – Life cycle of *Aspergillus/ Sargassum*
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT II: Description

1. Listening: Listening to process description-drawing a flow chart- How to dissect *Datura* plant/ *Musa paradisiaca*
2. Speaking- Role play- - Conversation between a Botany teacher and a student regarding the colonization of lichen
3. Reading - Skimming/Scanning – Basic equipment used in Biology experiments
4. Process Description -Compare & Contrast – Nutrition in fungi
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT III: Negotiation Strategies

1. Listening: Listening to interviews of specialist – Dr. M.S. Swaminathan (Green Revolutionist) https://www.youtube.com/watch?v=-M7QqZcY_Z4
2. Speaking: Brainstorming (Mind mapping) – Symbiotic relationship of Fungi
3. Reading: Longer reading passages for comprehension – Cell organelles
4. Writing: – Essay writing – Economic importance of Algae
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT IV: Presentation Skill

1. Listening: Listening to Lecture – General characters of Bryophyte https://www.youtube.com/watch?v=VA2LNWkZNWo
2. Speaking: Short Talks – Bryophytes are Amphibians of plant kingdom
3. Reading: Comprehension – passage - I.O.P. Iyengar
4. Writing: Recommendations - (Using laptop or PC)
5. Vocabulary - Register specific (Incorporated into the LSRW tasks)

UNIT V: Critical Thinking Skills

1. Listening: Listening Comprehension – Introduction to Horticulture
2. Speaking - Making Presentation- Etiquettes in laboratory
3. Reading-Comprehension Passages, Note making - Photosynthesis
4. Writing - Problem & Solution Essays, Creative writing–Marine Ecosystem
5. Vocabulary - Register specific (Incorporated into the LSRW tasks)

Text Books:

1. Tamil Nadu State Council for Higher Education (TANSCHE).*Professional English forLife Sciences - I.*

Books for Reference:

1. Pandey S.N. and Trivedi P.S. *A Text Book of Botany,* Vol. I and II. New Delhi: VIKASPublishing House Pvt. Ltd., 2006.
2. Sharma O.P. *Text Book of Algae*. New Delhi: Tata Mc. Graw-Hall Publications, 2006.
3. Pandey, S.N. and P.S Trivedi. *A Text Book of Botany,* Vol. I. New Delhi: VikasPublishing House Pvt. Ltd., 2006.
4. Singh V. Pandey P.C. and Jain D.K. *A Text Book of Botany*.Meerut: Rastogi Publication,2002.

Semester – III			
Part III Core Skill Based Numerical Aptitude and Arithmetic Ability			
Code :18UMAS31	**Hrs/week :4**	**Hrs/ Semester :60**	**Credits :4**

Unit I

Percentage– Time and Work – Time and Distance

(Chapters 10,15,17, pages 179-218, 309-330, 343-360)

Unit II

True discount and Banker's discount – Ratio and Proportion

(**Chapters 26, 27, 12, Pages 485-489, 490-493, 248-276)**

Unit III

Average – Chain rule - Calendar – Trains – Boats and Streams

(Chapters 6,14,18,19, Pages 123-142, 291-308, 361-370)

Unit IV

Simplification – profit and loss

(Chapters 4,11, Pages 68-95, 219-247).

Unit V

Line Graphs-Pie charts - Bar Diagrams

(Chapters 33,34,35, Pages 525-536, 537-542, 543-549)

Text Book

1. Aggarwal R.S., Arithmetic Subjective and Objective for Competitive Examinations, S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55. Revised Edition 2014

Books for Reference

1. Aggarwal R.S., Quantitative Aptitude , S.Chand and Company Ltd. , Ram Nagar, New Delhi.
2. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

Semester – III			
Part III Non Major Elective- Mathematics for Competitive Examinations I			
Code :18UMAN31	**Hrs/week :2**	**Hrs/Semester :30**	**Credits :2**

Unit I

H.C.F and L.C.M of Numbers **(Chapter 2, Pages 22-36)**

Unit II

Simplification **(Chapters 4, Pages 58-75)**

Unit III

Square Root and Cube Root **(Chapter 5, Pages 76-95)**

Unit IV

Time & Work **(Chapters 11, Pages 206-222)**

Unit V

Time & Distance **(Chapter 13, Pages 231-243)**

Text Book

Aggarwal R.S., **Objective Arithmetic** (Edition 2004), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55

Book for Reference

Aggarwal R.S., **Arithmetic Subjective and Objective for Competitive Examinations** (Revised Edition 2011), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55

SEMESTER – II			
Skill Enhancement Course - II Professional English for Botany – II			
Course Code: 21UBOPE2	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Objectives:

- To enhance the lexical, grammatical, sociolinguistic and communicative competence in an increasingly complex, interdependent world.
- To develop intellectual flexibility, creativity and critical thinking skills of students by offering adequate practice in professional context.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognise the words used in life science and improve their competence in using the language	1	An
CO-2	Comprehend unfamiliar texts and describe biological processes	7	Ev
CO-3	Apply critical and theoretical approaches to the reading and analysis of various texts in life science	3	An
CO-4	Analyse critically, negotiate and present without committing errors and develop entrepreneurship skills	2	Un
CO-5	Recognize the technical words used life science laboratory settings	8	Re
CO-6	learn language use in formal/professional world	7	Ap
CO-7	Write simple sentences without spelling or grammatical error	7	Ap
CO-8	Improve English proficiency with good vocabulary	7	Ap

SEMESTER – II			
Skill Enhancement Course - II Professional English for Botany – II			
Course Code:21UBOPE2	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

UNIT I: Communication

Listening: Listening to audio text and answering questions: Primary Tissues in plants
Pair Work: Pairwise reading of a conversation script (e.g. difference between plant cell and animal cell) prepared by each pair of their choice. (The script can be based on any topic in plant science)
Reading: Comprehension passage- JanakiAmmal, the Indian Botanist
Writing: Developing a story with pictures: Story of seed
Vocabulary: Unit oriented

UNIT II: Description

Listening: Listening to Process Description - Mitosis
Role play: Deforestation
Reading Passages on Environment conservation
Process Description - Compare & Contrast Algae and Fungi
Vocabulary: Unit oriented

UNIT III: Negotiation Strategies

Listening to the interviews of James Watson, Stephen Hawking, SasiTharoor Small group discussion - Green Revolution, impacts, limits, and the path ahead
Reading: Passage reading - Pseudoscience, the paranormal, and science education
Writing: Developing essay from the passage -Healthy diet.
Vocabulary: Unit oriented

UNIT IV: Presentation Skills

Listening : Listening to lectures and notes taking-
(https://www.youtube.com/watch?v=Dh9ptiJj7TE)
Speaking: Organized speech – Frustrations of people in Pandemic situation. (informative)
Reading: Comprehensive passage - Embryogenesis and answering questions.
Writing: Descriptive writing- Interpretation-Animals for ever (Gerald Durrell's)
Vocabulary: Unit oriented

UNIT V: Critical Thinking Skills

Listening: Listening for information - Introduction to enzymes
Speaking: Preparation of Power Point presentation –Small group discussion on errors in Power Point presentation: History of Botany
Reading: Note making –Professional Competence and Professional Ethics
Writing: Summary writing – Drug designing.

Text Book:

1. Tamil Nadu State Council for Higher Education (TANSCHE).*Professional English forLife Sciences - I.*

Books for Reference:

1. Verma P.S. and Agarwal. V.K. *Cell biology, Genetics, Molecular Biology, Evolution andEcology*. New Delhi, S. Chand and Co., 2007.
2. Bhojwani S.S and Bhatnagar S.P. *The embryology of Angiosperms*. New Delhi: VikasPublishing house PVT. Ltd., 2007.
3. Dubey, R.C. 2006. *Text Book of Biotechnlogy*, fourth edition. New Delhi. S. Chand and CoLtd., 2006.

Semester – IV			
Part III Allied V		**Statistics II**	
Code :18UMMA41	**Hrs/week : 3**	**Hrs/ Semester :45**	**Credits : 3**

Unit I

Random variables - Discrete random variables - contiuous random variables –Mathematical expectations.

(**Text Book 1: Chapter12, Sec 12.1 - 12.4, pages: 304 -328)**

Unit II

Moment generating function - Characteristic function.

(Text Book 1: Chapter12, Sec 12.5 - 12.6, pages: 331-342)

Unit III

Binomial distribution - Poisson distribution.

(Text Book 1: Chapter13, Sec 13.1 - 13.2, pages: 343 -369)

Unit IV

Normal distribution.

(Text Book 1: Chapter13, Sec 13.3, pages: 371 -389)

Unit V

Continuous probability distributions - Beta1, Beta2 & Gamma distributions,

(Text Book 2: Chapter 9, Sec 9.5 - 9.7, pages: 9.38 - 9.50)

Text Books

1. S. Arumugam and A. Thangapandi Issac; Statistics, New Gamma Publishing House, Palayamkottai, 2011.
2. S.C. Gupta and V.K. Kapoor; Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.

Books for Reference

1. S.C. Gupta and V.K. Kapoor; Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.
2. Sancheti D.C and Kapoor V.K; Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.

Semester – IV			
Part III Non Major Elective-Mathematics for Competitive Examinations II			
Code :18UMAN41	**Hrs/week :2**	**Hrs/Semester: 30**	**Credits :2**

Unit I

Average **(Chapter 7, Pages 124-138)**

Unit II

Problems on Numbers **(Chapter 16, Pages 267-278)**

Unit III

Problems on Ages **(Chapters 17, Pages 279-285)**

Unit IV

Simple Interest **(Chapter 18, Pages 286-298)**

Unit V

Compound Interest **(Chapter 19, Pages 299-312)**

Text Book

Aggarwal R.S., **Objective Arithmetic** (Edition 2004), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55.

Book for Reference

Aggarwal R.S., **Arithmetic Subjective and Objective for Competitive Examinations** (Revised Edition 2011), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55.

Semester - III			
Allied III - HEALTH PSYCHOLOGY			
Code : 17UPSCA3	Hrs/week : 6	Hrs/Sem:90	Credits : 4

Objectives

- To understand the various health issues in our daily life.
- To over the pain and the problems related.

UNIT I: INTRODUCTION

Definition – Mind-body relationship – Field of Health Psychology – Focus of Health Psychology

UNIT II: HEALTH BEHAVIOUR & PRIMARY PREVENTION

Health beliefs, behaviours and behaviour change – Health promotion – Changing Health Habits – Cognitive Behavioural approaches – Transtheoretical model of behaviour change – Health enhancing behaviours – Health compromising behaviours

UNIT III: STRESS, PAIN & COPING

Defining, measuring and managing stress – theoretical contributions to stress – sources of chronic stress – stress and illness – coping with stress – Pain- Nature of Pain, Types of Pain, Pain and Personality, Pain Control Techniques, Pain Management Programmes.
coping and external resources – social support – coping outcomes – stress management

UNIT IV: BEHAVIOUR & CHRONIC DISEASE

Behavioural factors in Chronic diseases – Behavioural factors in Cancer – Living with chronic illness

UNIT V: BEHAVIOURAL HEALTH

Tobacco – Using Alcohol and other drugs – Eating disorders – Exercising

TEXT BOOKS

1. Taylor, S. E. (2014). Health Psychology. 9th ed. McGraw-Hill Education
2. Brannon, L. &Feist, J. (2010). Health Psychology: An introduction to behaviour and health. 7th ed. Wadsworth Cengage Learning.
3. Ogden, J. (2012). Health Psychology. 5th ed. McGraw-Hill Education

Semester - I			
Core II - History of Psychology			
Code : 17UPSC12	Hrs/week : 4	Hrs/Sem:60	Credits : 4

OBJECTIVES

- To give an overview of the field of Psychology
- To expose the students to many sub disciplines that makes up the science of Psychology.
- To understand various perspectives on interpreting psychological phenomenon

UNIT I: SYSTEM & SCHOOLS OF PSYCHOLOGY
Approaches to Psychology - Paradigms and revolutions - Specializations in Psychology.

UNIT II: STRUCTURALISM & FUNCTIONALISM
Structuralism: Psycho Physical Laws and Consciouness, Wilhelm Wundt, Oswald and Titchener; Functionalism: Darwin, Galton, William James, Stanley Hall, John Dewey.

UNIT III: THE PSYCHOANALYTIC PERSPECTIVE
Psycho analysis: Sigmund Freud, Carl Jung, Alfred Adler; Neo- Psycho Analysis: Erickson,Horney.

UNIT IV: HUMANISTIC-EXISTENTIALISTIC VIEW
Humanistic Psychology: Maslow, Rogers, Rollo May.
Gestalt Psychology: Max Wertheimer, Kurt Koffka, Wolfgang Kohler, Kurt Lewin

UNIT V: BEHAVIOURISM
Models of Learning: John Watson, Pavlov, Hull, Tolman, Skinner, Seligman, Bandura

REFERENCES

1. A History of Psychology: Globalisation, Ideas and Application, Robert B. Lawson, Jean E. Graham, Kristin M. Baker, Prentice Hall of India, 2008, New Delhi

2. A History of Psychology: Original Sources and Contemporary Research. Benjamin, Jr. L.T. McGraw Hill. (1988).

3. History of Psychology (2nd Ed) Hothersall.D, McGraw Hill. London (1990)

Semester - II			
Core IV - General Psychology			
Code : 17UPSC22	Hrs/week : 4	Hrs/Sem:60	Credits : 4

Objectives :

- Understand the process of memory and causes of forgetting.
- Know the meaning and types of Thinking, learning, Motivation and emotions.

UNIT 1 : THEORIES OF LEARNING

Classical conditioning – significance of classical conditioning; instrumental conditioning- significance of instrumental conditioning; reinforcement- nature, schedules, parameters; cognitive learning- latent learning, insight, imitation; individualized learning- computer assisted learning, learning programmes.

UNIT 2 :MEMORY & THINKING

Memory processes: Theories about memory – a general memory function; information – processing theories- sensory register, short term memory, rehearsal; long term memory; levels of processing theory; long term memory – organization, TOT, semantic and episodic memory, encoding and storing long term memories; role of organization, role of imagery, role of constructive processes; retrieval from long term memory.

Forgetting: interference, retrieval problems motivated forgetting, amnesia- psychological Amnesia, biological Amnesia; improving your memory – improving study methods.

Thinking and language: The thinking process- concepts, problem solving, decision-making, creative thinking; language communication.

UNIT 3 : INTELLIGENCE

Nature of Intelligence: The Psychometric Approach: The Structure of Intellect – Factor Analysis – The g factor: Intelligenc as General Mental Capacity – Intelligence As Specific Mental Abilities – Crystallised and Fluid Intelligence – Carroll's Three-Stratum Model: A Modern Synthesis – Cognitive Process Approaches: The Nature of Intelligent Thinking – Broader Conceptions of Intelligences: Beyond Mental Competencies: Gardner's Multiple Intelligences – Emotional Intelligence

UNIT 4 : MOTIVATION & EMOTION

Motives as interferences, explanation and predictor, some theories of motivation, biological motivation, social motives- motives to know and to be effective. frustration and conflicts of motives; defense mechanism.

Expression & perception of emotion; the physiology of emotion and stress, some theories of emotion.

UNIT 5 : PERSONALITY

What is Personality? Type and Trait approach ; Psychodynamic, Behaviouristic and Humanistic (Maslow andRogers) approaches.

REFERENCES :

1. Robert A Baron (2002), Psychology, 5th Edition, Prentice Hall, India.
2. Morgan, C.T. and King, R.A. (1994) introduction to Psychology, Tata McGraw hill co, Ltd, New Delhi.
3. Robert S. Feldman (2004) understanding Psychology 6th Edition Tata MrGram – Hill.
4. Ciccarelli, S. & Meyer, G.E. (2006). Psychology. New Delhi: Pearson Education.
5. Zimbardo, P.G. and Weber, A.L. (1997). Psychology. N.Y. Pearson. Edition.

SEMESTER V			
Core VIII	**Microbiology**		
Code: 18UBOC52	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Vision:

- To provide information on various techniques to culture different microbial strains and recent advances in the field of microbiology

Mission:

- To know the characteristic features of microbes including their mode of nutrition
- To make the students aware of symptoms and preventive measures of common human diseases.
- To exploit the potentialities of microorganisms in food and industries.

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	realise the history and scope of microbiology	3	Un
CO-2	understand the structure and growth characteristics of microorganism that enabling the learner to identify and classify microorganisms by themselves	4	Cr
CO-3	use various microbiological techniques to isolate, characterize and identify bacterial and viral pathogens of plants.	6	An
CO-4	provide a thorough knowledge about the microbes causing human diseases , their symptoms and preventive measures	4	Ap
CO-5	understand the role of microorganisms in biotechnology, fermentation, medicine and other industries for human well being	4	Ap
CO-6	discuss the role of microorganism in food, milk and water	4	An
CO-7	identify and control food borne disease and food spoilage	4	An
CO-8	test the quality of milk and enumerate microorganisms found in milk and soil	6	Ev

SEMESTER V			
Core VIII	**Microbiology**		
Code: 18UBOC52	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Unit I:

Brief history and scope of microbiology. Morphology and ultra structure of Bacteria. Reproduction – binary fission, conjugation, transduction and transformation. Nutrition types - chemosynthetic, photosynthetic, saprophytic, parasitic and symbiotic.

Unit II

Culture of microorganisms – sterilization (dry, heat, moist heat and filtration), media for micro organisms (NA, Czapek-Dox and PDA), Methods of culturing bacteria – broth culture, agar plate and agar slant culture, pure culture, batch culture and continuous culture. Growth – phases of growth.

Unit III

Virus – general characteristics, structure and multiplication of TMV and T_4 phage. Microbes and human diseases –typhoid, cholera, tuberculosis and influenza

Unit IV

Fermentation technology- fermentors- stirred tank, tower and air lift. Commercial production of vinegar, citric acid, penicillin and vitamin B_{12}.

Unit V

Food microbiology – types of food spoilage and methods of food preservation. Microorganisms as food -single cell protein –bacteria, fungi and yeast.
Milk microbiology - bacterial flora in milk, types of contamination and pasteurization of milk.
Water microbiology – testing potability of water and methods of purification of potable water.

Text Book

1. Dubey, R.C. and D.K. Maheswari, 2003. A textbook of Microbiology. S. Chand company Ltd. New Delhi.

Books for Reference:

1. Adams, M.R. and M.O. Moss, 2005. Food Microbiology. New Age International publishers.
2. Kalaichelvan, P.T. 2005. Microbiology. Biotechnology - Lab Manual – MJP Publishers, Chennai.
3. Patel, A.H. 2004. Industrial Microbiology. Mac Milan India Ltd., New Delhi.
4. Pelzar, M.H., E.C.S Chan and N.R. Krieg. 2005. Microbiology. Tata MC. Graw Hill Pub. Co. Ltd., New Delhi.
5. Purohit, S.S. 1988. Microbiology. Agro Botanical publishers India.

Practical

Hrs/ week: 2

- Sterilization (dry, heat, moist heat and filtration)
- Preparation of media- NA, PDA
- Demonstration of plating and serial dilution technique
- Pure culture technique – streak plate method
- Staining of Bacteria (Gram's staining)
- Analysis of milk – dye reduction test

Spotters

- Ultra structure of bacterial cell, T_4 phage, TMV and HIV-EM
- Colony counter
- Fermentors- stirred tank, tower and air lift,
- Agar slant/ stab/plate
- Milk samples
- Spoiled food

Submission: Record note book

Book for Reference: Lakshmanan M, Kunthala Jeyaraman, Jeyaraman and Gnanam, 1971.Laboratory experiments in microbiology and molecular biology, Higginbothams Pvt. Ltd.

Semester-I			
Allied-II IT for Managers			
Code:18UBAA12	**Hrs/Week:3**	**Hrs/Sem.: 45**	**Credit:3**

Vision

To make the students understand about computers and make them efficient in operating computers.

Mission

Provide an understanding of computers, computer operating systems and train students in computer application software.

Course Outcome :

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the history and basic concepts of computers	1	Un
CO-2	know about the input devices of a computer	1,5	Un
CO-3	know about the output devices of a computer	1,5	Un
CO-4	create word documents with formatting features	3,5	Cr
CO-5	apply spell and grammar check in MS Office	4	Ev
CO-6	know about MS Excel in detail for calculations	5	Cr
CO-7	know about MS Power point for presenting company data	5	An
CO-8	create multimedia presentation	1,5	Cr

Semester-I			
Allied-II IT for Managers			
Code:18UBAA12	**Hrs/Week:3**	**Hrs/Semester: 45**	**Credit:3**

Unit - I Introduction to Computers:

Computer: History of Computer – Evolution - First Generation Computer-Next Generations.

Unit - II Components of Computer:

Components: Types of Input Devices (Keyboard, Mouse, Light, Pen Optical / Magnetic Scanner, Touch Screen, Microphone for voice as input, track ball) – Types of Output Devices (Monitor, Printers, Plotter, Speaker)

Unit – III MS Word:

MS Word: Introduction to Word-creating word document – formatting- spell check- grammar Check-Working with Tables- Saving, Opening and Closing document.

Unit - IV MS Excel:

MS Excel: Introduction- Spread sheet-Entering data in working sheets-Editing and formatting worksheets–Charts-Functions like saving, opening and closing work book.

Unit - V MS PowerPoint:

MS PowerPoint: Creating a basic power point presentation-Insert picture – Animation-Creating Multimedia Presentation-Insert tables and Graphs.

Text Book:

1. Stephen L Nelson-*Office 2000,The Complete Reference*, Tata McGraw Hill Publishing Company Limited.
2. Krishnan, N., *Windows and MS-office 2000 with Database concepts,* Scitech Publications.

Books for Reference:

1. Alexis Leon, *Introduction to Computers* – Chennai: Vikas Publishing House.
2. Vikas Gupta – *Comdex Computer Course Kit, Windows XP with Office 2007,* New Delhi. Dreamtech Press.

Semester-II			
Allied III- Business Correspondence			
Code:18UBAA21	**Hrs/Week:3**	**Hrs/Sem.: 45**	**Credits: 3**

Vision:

Enable the student to recognize the relationship of effective communications skills to success in academic, work and social environments.

Mission:

Understand the importance of communication correspondence in day to day life of a business.

Course Outcome :

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the meaning and definition of business correspondence.	1	Un
CO-2	understand the need and uses of business letters in business fields.	2	Un
CO-3	create the students to write business letters.	6	Ap
CO-4	know to fill bank, insurance and agency forms.	6	Cr
CO-5	understand the importance of short and long reports.	6	Un
CO-6	understand about interdepartmental communication.	8	An
CO-7	know the need of business correspondence.	4	Ap
CO-8	know the techniques of business correspondence.	4,6	Ap

Semester-II			
Allied III- Business Correspondence			
Code:18UBAA21	**Hrs/Week:3**	**Hrs/Sem.: 45**	**Credits: 3**

Unit - I Business Correspondence:

Business: Meaning – Need of a Business Letter – Functions of Business Letter – Kinds of Letter – Kinds of Business Letter - Layout.

Unit - II Kinds of Business Letter:

Types: Interview - Appointment – Promotion – Enquires – Replies – Orders – Sales – Circular – Complaints.

Unit - III Forms of Correspondence: Bank, Insurance and Agency Correspondence:

Bank, Insurance and Agency Correspondence: Correspondence with customers - correspondence with the head office - correspondence with other banks- Fire Insurance – Marine Insurance – Life Insurance– Specimen Letters of agency correspondence.

Unit - IV Reports:

Reports: Importance – Oral & Written Reports – Functional Areas of Reports – Types – Features – Preparing reports – Shot report – Long reports.

Unit - V Interdepartmental Communication:

Interdepartmental Communication: Memos – Office Orders – Circulars – Notices – Notification – Agenda – Minutes.

Text Book:

1. Rajendra Pal & J.S. Korlahalli- *Essentials of Business Communication*, Sultan Chand & Sons, New Delhi.

Books for Reference:

1. Shirley Taylor - *Communication for Business,* New Delhi: Pearson Publications.
2. R.S.N. Pillai & Mrs.Bagavathi - *Modern Commercial Correspondence*, New Delhi: Sultan Chand & Sons,

Semester II			
Core – III Principles of Management			
Code:18UBAC21	**Hrs/Week:5**	**Hrs/Semester:75**	**Credits:4**

Vision:

Provide thorough knowledge about historical developments, theoretical aspects and emerging trends and developments in management.

Mission:

To enable student to understand fundamental concepts and principles of management, including the basic roles, skills and functions of management.

Course Outcome :

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the basic principles, nature and levels of management.	1,4	Un
CO-2	understand the scientific approaches of management	4	Un
CO-3	know the importance of planning its procedures and limitations.	1	Cr
CO-4	analyze organizational structure and span of control.	2,3,5	An
CO-5	understand the steps in staffing.	1,8	Un
CO-6	identify the difference between power and authority.	7	Re
CO-7	evaluate the effectiveness of directing and coordinating.	5	Ev
CO-8	understand the techniques and importance of controlling.	1,2	Un

Semester II			
Core – III Principles of Management			
Code:18UBAC21	**Hrs/Week:5**	**Hrs/Semester: 75**	**Credits:4**

UNIT – I Concepts of Management:
Management: Meaning - Definition – Nature – Scope – Importance of Management.

UNIT- II Contributions of Management:
Management Thoughts: Henry Fayol's Principles – F. W. Taylor's Scientific Management – Contribution of Peter. F. Drucker.

UNIT – III Planning and Organizing:
Planning: Meaning – Definition – Nature – Objective - Types – Steps – Limitations of Planning.
Organizing: Meaning – Definition of Organizing – Nature – Functions – Classification of Organization.

UNIT-IV Staffing and Directing:
Staffing: Meaning – Definition – Functions of Staffing – Process of Staffing. Directing: Meaning – Definition – Principles – Importance of Directing.

UNIT-V Co-ordination and Controlling:
Co-ordination: Meaning – Definition –Features – Principles – Techniques (Control Techniques, Statistical Report, Critical Path Method, Management Audit, Managerial Audit, Managerial Statistics, Standing Orders).
Controlling: Meaning – Definition – Advantages – Characteristics – Process - Techniques in control process.

Text Book:

1. L.M.Prasad, *Principles & Practice of Management* – Sultan Chand & Sons – New Delhi.

Books for Reference:

1. C.B.Gupta - *Management Theory & practice,* Sultan Chand & Sons, New Delhi.
2. P.C. Tripathi& P.N Reddy - *Principles of Management,* Tata McGraw Hill, New Delhi.
3. Weihrich and Koontz – *Management,*A *Global Perspective.*
4. N.Premavathy - *Principles of Management,* Sir Vishnu Publication, Chennai.

Semester V			
Core XII – Advertising and Sales Promotion			
Code :18UBAC52	Hrs/Week :6	Hrs/Sem :90	Credits :4

Vision:

To enable the students to learn the basic concepts of advertising .

Mission:

To acquaint the students with thorough knowledge of various advertising media and advertising agency.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the basic idea of advertising and its nature and benefits.	1	Un
CO -2	understand the types of advertising on the basis of demand, geographical, time.	7	Un,Ap
CO-3	understand media and factors influencing media plan.	2	Un,Re
CO-4	know advertising copy and its types.	8	Ev,Re
CO-5	gain the information on services rendered by advertising agency.	2	Un,Re
CO-6	understand the creativity in advertising copy	7	Un
CO-7	understand the importance of advertising agency.	2	Re
CO-8	know the various classification of print media.	7	Cr

Semester V			
Core XII – Advertising and Sales Promotion			
Code :18UBAC52	Hrs/Week :6	Hrs/Sem :90	Credits :4

Unit –I Introduction:

Advertising: Meaning – Definition – Evolution – Objectives-Nature and Scope of Advertising – Benefits of Advertising – Limitations-Advertising - Evolution of Advertising.

Unit – II Classifications:

Types of Advertising – Product and Institutional Advertising – On the basis of Audience, GeographicCoverage & Medium – Push and Pull Strategy – Professional Advertising.

Unit – III Types of Media:

Media:Meaning-Definition – Print Media – Indoor &Outdoor Advertising – Direct Mail Advertising – Radio and TV, Film Advertising – Factors influencing Media Planning.

Unit –IV Advertising Copy:

Advertising copy - Meaning-Definition-Creativity – Activities comprising Creative Design Process – Qualities of good Advertising Copy - Classification of Copy – Components of Advertising Copy.

Unit – V Advertising Agency:

Meaning of Advertising Agency – Functional departments of Advertising – Service rendered by Advertising Agency – Functions of an Advertising Agency – Types of

Agency.

Text Book

1.Bhargav P.K.Advertisement Management, New Delhi: Damins Garg for Murarilal & Sons, Darya Ganj.

2. Rustom & Davar, Sahrab R.Davar. Salesmanship and publicity, New Delhi: – Vikas Publisihing House,

Books for Reference:

1.Mahendra Mohan, Advertising Management, New Delhi: Tata McGraw Hill.

2.Mr. RajeevBatra JohnG. Myers David Aaker.A,. Advertising Management, New Delhi: 5th Edition, Pearson education Pvt.Ltd.

Semester VI			
Core XV - Production Management			
Code:18UBAC62	Hrs/Week:6	Hrs/Sem:90	Credits:4

Vision:

To improve the overall productivity of the manufacturing concern.

Mission:

To enable the students to apply the strategies for maximising the output of goods with minimum cost.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand production system.	1	Un
CO-2	analyse the factors relating to plant layout and plant locations.	8	Ev
CO-3	understand the concepts of work study and motion study.	8	Un
CO-4	analyse the production planning and control.	4	An
CO-5	understand the process of routing and scheduling.	1,3	Un
CO-6	understand the objectives of quality control.	3,6	Un
CO-7	gain knowledge on the basic concepts of quality certification.	5,7	Un
CO-8	understand the objectives and importance of material management.	1,3	Un

Semester VI

Core XV - Production Management			
Code:18UBAC62	Hrs/Week:6	Hrs/Sem:90	Credits:4

Unit – I

Production Management– Scope and Significance –Production System – Functions and Types – Factors influencing Plant Location – Plant Layout and its kinds.

Unit - II

Work Study - Time Study - Motion Study – Work Measurement– Principles and factors - Maintenance of Plant – Types.

Unit - III

Production Planning and Control – Definition – Objectives and Importance –Elements of Production Planning – Routing and Scheduling.

Unit - IV

Quality Control and Inspection – Objectives and Significance – SQC – AGMARK,ISI and ISO – Certification Marks.

Unit - V

Material Management – Objectives and importance – Purchasing – Procedure – Store Keeping – Objectives – Functions - JIT.

Text Books:

1. Moorthy Y.L.R. Brand Management, New Delhi: 2012 – First Edition,Vikas Publishing House.
2. Kevin Lane Keller, Strategic Brand Management: Building, Measuring and Managing, New Delhi: 3rd Edition 2007, Prentice Hall of India.

Books for Reference:

1. Ramesh Kumar, Managing Indian Brands, New Delhi: 2002. Vikas Publications.
2. MahimSagar, Deepali Singh, D.P.Agarwal. Achintya Gupta.Brand Management Chennai (2009): Ane Books Pvt., Ltd.

Semester V			
Core Integral II – Case Study			
Code:18UBAI52	Hrs/Week:5	Hrs/Sem:75	Credits:4

Vision:

To develop interpersonal skills through both a team work and completing individual tasks.

Mission:

Enable a researcher to gain a more detailed, un-biased understanding of a complex situation, through the use of a range of research tools.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the overall situations as well as to analyse the company's strategy.	8	Ev
CO-2	know the process key information needed for decision making.	5,7	An
CO-3	identify the company's strength and weakness.	6	An,Ev
CO-4	know the strategically and applied critical thinking.	1	Re
CO-5	understand the decision making techniques.	5.7	An,Ap
CO-6	identity the alternatives in research.	1	Ev
CO-7	understand and evaluate the opinion of others.	1	Un,Ev
CO-8	analyse the criticism in organisation.	4	Ap

Semester V			
Core Integral II – Case Study			
Code:18UBAI52	Hrs/Week:5	Hrs/Sem:75	Credits:4

CASE ANALYSIS

One case per week is to be discussed by the students. The cases could be from different functional areas of management.

The students would be provided with the case lets. They would discuss the ‘case’ in groups. The teacher would guide and facilitate group discussions so as to impart, develop and hone the GD

Skills.

Semester VI			
Core Integral III - Banking Practices			
Code : 18UBA161	Hrs/Week : 5	Hrs/Sem : 75	Credit : 4

Vision:

To make students understand about the banking practices.

Mission:

Develop students with the theoretical and legal concepts of banking.

Course Outcome:

CO. NO	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand about the banker and customer	1,3	Un
CO-2	know about the types of deposits	4,6	Un
CO-3	identify loans and advances	1,2,7	Re
CO-4	understand the different approaches to technological change.	2	Un
CO-5	understand the different modes of charging security.	5	Un
CO-6	understand the basic concepts of electronic banking.	1,5	Un
CO-7	understand and analyse the types of ebanking services.	1,5	Un
CO-8	gain knowledge on benefits and constraints of banking	2,5	Ap

Semester VI			
Core Integral III – Banking Practices			
Code:18UBAI61	Hrs./Week:5	Hrs./Sem: 75	Credits:4

Unit –I Introduction to Bank:

Banker and Customer: Meaning – Definition – General and Special relationship between Banker and Customer – Functions of Bank

Unit –II Deposits:

Types of Deposits –Pass Book – Negotiable Instruments – Cheque - Definition – Difference

Between Cheque And Bill Of Exchange, Endorsement, Crossing, Marking, Material Alteration.

Unit –III Loans and Advances:

Loans and Advances – Principles of Sound Lending – Secured and Unsecured Advance – Forms of Advances.

Unit –IV Modes of Security:

Modes of Charging Security – Lien – Pledge – Mortgage – Assignment – Hypothecation.

Unit –V e-Banking:

Electronic Banking – Traditional Vs e-Banking – Types of e-Banking – Advantages-Constraints.

Text Book

1.Kandasami K.P,S.Natarajan, Parameswaran. R,Banking law and Practice. New Delhi: S.Chand Publications.

Book for Reference:

1. Gordon.E and Natarajan.K Banking theory Law and Practice, Mumbai: 21’st Revision Edition.Himalaya Publishing House Ltd.

SEMESTER I			
Part III	**ALLIED**	**BIOCHEMISTRY -I**	
Code: 18UBCA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

VISION:

Acquire knowledge about the chemical composition of life.

MISSION:

- Understand fundamental biochemical processes.
- Knowledge about vitamins and their deficiency
- Study the functions of hormones.

Course Outcomes

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	Explain about the chemical composition and the elements of life. Differentiate direct and indirect method for the determination of energy requirement of man	1,2	Un
CO 2	Express the importance of bioenergetics	7	Un
CO 3	Compare the biological reaction such as exergonic reaction and endergonic reaction	3	An
CO 4	Demonstrate about the various energy rich compounds such as adenosine triphosphate, guanosine triphosphate, uridinetriphosphate, Cytidinetriphosphate and acyl phosphate.	5	Ap
CO 5	Distinguish water soluble and fat soluble vitamins and analyze their composition, functions and deficiency symptoms.	3	An
CO 6	Interpret the hormones producing organs and their functions, Know about the plant as well as animal hormones.	3,5	Cr,Re
CO 7	Identify the antibiotics which are all responsible for affecting cell wall synthesis, cytoplasmic membrane and enzyme systems.	7	Re
CO 8	Develop knowledge about the antibiotics interfering with nucleic acid function and inhibiting protein synthesis.	5	Ev

SEMESTER I			
Part III ALLIED BIOCHEMISTRY -I			
Code: 18UBCA11	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

UNIT–I Introduction To Biochemistry

Introduction to biochemistry - scope – chemical composition of life – elements of life – water – biological importance – Energy requirements of the body – Measurement of energy value of foods – Determination of energy requirement of man – Direct method, Indirect method, Respiratory quotients (RQ) of food stuffs – Total heat production – Significance of RQ - Basal metabolism – Definition – Conditions for measurement – Factors influencing, Measurement, Significance, Specific dynamic action.

UNIT – II Bioenergetics

Introduction – Importance of bioenergetics - Energy and work – thermodynamic principles - Biological reactions – Exergonic reaction – Endergonic reaction – Energy and its forms - Energy rich compounds – Adenosine triphosphate – Guanosine triphosphate – Uridine triphosphate – Cytidine triphosphate – Acyl phosphate - Energy coupling.

UNIT – II Vitamins

Introduction – definition - Sources of vitamin – Deficiency diseases – provitamins – biological functions - Properties of Vitamins – Classification of vitamins - water soluble (Vitamin B_1, B_2, B_3, B_5, B_6, B_7, B_9 and B_{12}) and fat soluble vitamins (Vitamin – A, D, E and K) and their composition, functions and deficiency symptoms.

UNIT – IV Hormones

Introduction –Definition – Properties – Biological Functions – Chemical Nature – Hormones secreting glands – Hormones producing organs and their functions - Classification of hormones: based on chemical nature – Functions of Hormones – Plant hormones – Animal hormones.

UNIT – V Antibiotics

Introduction – Definition – Antibiotics affecting cell wall synthesis (pencillin, cephalosporin) – Antibiotics affecting the cytoplasmic membrane – Antibiotics interfering with Nucleic acid function – Antibiotics inhibiting protein synthesis (streptomycin, erythromycin, neomycin)– Antibiotics affecting enzyme systems – Drug resistance.

Text Books:

1. Dulsy Fatima, L.M. Narayanan, R.P. Meyyan Pillai, K. Nallasingam, S. Prasanna Kumar and N. Arumugam, *Biochemistry,* Saras Publication, 1996
2. Patricia trueman, *Nutritional Biochemistry* , MJP publisher 2011
3. L.Veerakumari, *Biochemistry* MJP publisher 2010

Book for Reference :

1. Dr. A.C. Deb, *Concepts of Biochemistry*, Books & Allied (P) Ltd., 1999
2. C.B. Powar, G.R.Chatwal, *Biochemistry,* Himalaya Publishing House 2002

SEMESTER V			
Core VII Biotechnology (Common Core)			
Code: 18UBCC51	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credit: 3**

Vision

To gain knowledge about the importance of Biotechnology in different fields
To create graduates who endeavor for the welfare of mankind.
Create opportunities for multi-disciplinary education, training and research in Biotechnology

Mission

Impart quality education for lifelong professional growth and opportunity in a wide range of careers. To create awareness towards socio-ethical implications of potentials of biotechnology. Provide a platform for Biotechnology education, training and research at the interface of multiple disciplines

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	describe different cloning vehicles and learn the different type of vectors	1	Kn, Un
CO-2	gain knowledge about techniques of biotechnology.	2	Un
CO-3	summarise the different techniques in animal biotechnology	2	Un, An
CO-4	compare the various techniques in plant and animal biotechnology	4	Cr
CO-5	enumerate cell culture, organ culture and stem cell culture and point out implications in health care	6	Kn, An
CO-6	distinguishes methods of alleviating environmental pollution and understand the synthesis of industrial products	5	An
CO-7	relate biotechnology and its benefits to mankind	6	Ap, Ev
CO-8	design, conduct experiments, analyse and interpret data for investigating problems in Biotechnology and allied fields	7,8	Ap

SEMESTER V			
Core VII Biotechnology (Common Core)			
Code: 18UBCC51	Hrs/Week:4	Hrs/Sem: 60	Credits: 3

Unit I Cloning Vectors

Introduction – Scope and importance of biotechnology – cloning vehicles – bacterial plasmid vectors – pBR322 and Ti plasmid – bacteriophage vectors – lambda – M13 – Plant viral vector – CaMV- Gemini virus and tobamovirus – animal viral vector – SV40- Role of restriction and modification enzymes

Unit II Gene Cloning and Screening

Gene cloning – methods of introduction of cloned genes into host cells – transformation – liposome mediated transfer – electroporation – particle bombardment gun – viral vector method – DNA library – PCR – hybridization technique – blotting techniques – Southern, Northern and Western.

Unit –III Cell, Tissue and Organ culture

Culture media – cell culture techniques – monolayer culture and immobilized culture of cell lines –callus culture – suspension culture and anther culture – techniques and applications of human embryonic stem cell culture – plant embryo culture- invitro pollination – organ culture – techniques – tissue engineering of artificial skin and cartilage.

Unit – IV Environmental and Bioprocess technology

Biotechnological methods for sewage and waste water treatment – bioremediation – degradation of xenobiotic (hydrocarbons and pesticides) – role of genetically engineered microbes – biomining – bioleaching – industrial production of penicillin and ethanol – Biodiesel – Biofertilizer – mass cultivation and application of Azolla

Unit –V Health Care Biotechnology

DNA probes and diagnosis of genetic disorders – DNA fingerprinting technique – gene therapy and treatment of genetic diseases – vaccines – recombinant DNA vaccines and viral vaccines – edible vaccines- Bt cotton – Golden rice- Human Genome Project – types – methods of sequencing – potential benefits of mankind

Text Books

1. Dubey R.C.S. 2004. *Atext book of Biotechnology*. Chand and Comp.Ltd, New Delhi,
2. Kumaresan, V. 2010 *Biotechnology*. - Saras Publication, Nagercoil - 2010.

Books for Reference

1. Singh, B.D. 2005. *Biotechnology*. Revised edition, Kalyani Publishers, Chennai.
2. Dubey, R.C. 2006. *Text Book of Biotechnlogy*. 4th edition, S. Chand and Co Ltd, New Delhi.

3. Rema, L.P. 2009. *Applied Biotechnology*, MJP Publishers, Chennai.
4. Shailendra Singh. 2007. *Applied Biotechnology*. 1st edition, Campus Books International New Delhi.
5. Clark, and J. Pazdernik. 2009. *Biotechnology*. Elsevier Academic Press, California, USA.
6. Ramadass, P. 2009. *Animal Biotechnology* – Recent Concepts and Development. MJP Publishers, Chennai.

Practicals Sub. Code: 18UBCCR1

Hours:2 **Credit : 1**

1. Isolation of Blue Green Algae
2. Preparation of synthetic seed
3. Estimation of dissolved oxygen and BOD
4. DNA estimation by Spectrophotometric method
5. Preparation of plant and animal tissue culture media
6. Preparation of SDS – PAGE (Gel mould only)
7. Isolation of protoplast
8. Estimation of protein by column chromatography
9. Demonstration :
   Electrophoresis – full technique
   Blotting
   PCR – DNA Amplification
   Mushroom cultivation / Vermiculture
10. Models and Charts pertaining to theory

Books for Reference:

1. Harisha, S. 2007. *Biotechnology Procedures and Experiments Hand Book*. Infenity Science Press, LIC, Hinghum, Massachusett, New Delhi, India.
2. Asish Verma, Surajit Das, Anchal Singh. 2008. *Laboratory Manual for Biotechnology*. S.Chand and Company, New Delhi.

Semester - V			
Common Core - Computer Oriented Numerical Methods			
Code: 18UCCC51	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Vision:

To inspire the students with modern computational methods to carry out the problems.

Mission:

To equip students with the knowledge of algorithms of numerical analysis and execute it efficiently with MATLAB.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	Find numerical solution of a problem in all aspects and apply these methods to practical implementation as reliable and efficient.	3	Re
CO-2	Recognize and apply appropriate principles and concept relevant to Numerical Analysis.	3	Ap
CO-3	Discover the most appropriate estimate for the missing data.	3	Cr
CO-4	Analyze the errors obtained in the numerical solutions of problems.	3	An
CO-5	Use appropriate numerical methods, determine the solutions to given problems.	3	Ap
CO-6	Demonstrate the method of interpolation and find the solution for the data.	**3**	Un
CO-7	Develop their calculation skills.	**3**	Cr
CO-8	Differentiate Gauss Jacobi iteration and Gauss Seidal Iteration method.	**3**	An

Unit I:

Difference operators-Other difference operators-Newton's interpolation formula-Lagrange's interpolation formulae-Divided difference-Divided difference formula-Inverse interpolation.

(Textbook: 1, Chapter 3, Sec 3.1, 3.2, Chapter 4, Sec 4.1,4.3,4.4,4.5,4.6, pages 3.1 – 3.45, 4.1- 4.16, 4.31- 4.54) (Problems only)

Unit II:

Derivatives using Newton's forward difference formula-Derivatives using Newton's backward difference formula-Derivatives using Newton's central difference formula-Maxima and minima of the interpolating Polynomial-Numerical Integration-Newton – Cote's quadrature formula-Trapezoidal Rule-Simpson's one third rule-Simpson's three eighth rule-Wedley's rule.

(Textbook: 1, Chapter 5, Sec 5.1 – 5.4, Chapter 6, Sec 6.1 – 6.4, pages 5.1 – 5. 24, 6.1 – 6.26) (Problems only)

Unit III: Taylor series method-Picard's method- Runge-Kutta method.

(Textbook: 1, Chapter 7, Sec 7.1,7.2,7.4, pages 7.1-7.15, 7.25-7.40) (Problems only)

Unit IV :

Introduction to MATLAB: MATLAB environment – Types of files _ platform – search path – Constants, variables and expressions – Vectors and Matrices – Polynomials – Input Output statements – MATLAB Graphics.

(Textbook:2, Chapters:1,2,3,4,5,6)

Unit V:

Control Structures- writing programs and functions – ordinary differential equation and symbolic mathematics – MATLAB Applications. **(Textbook: 2, Chapters: 7,8,9,10)**

Text Books:

1.Arumugam S and Thangapandi Isaac A, Numerical Analysis With Programming in C, New Gamma Publishing House, Palayamkottai.

2.Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, MATLAB and its Applications in engineering, Pearsons Publications.

Books for Reference:

1.Stormy Attaway, MATLAB- A Practical Introduction to Programming and Problem Solving.

2.Stephen J. Chapman, Essentials of MATLAB Programming, Published November 1st 2007 by Thomson Learning

SEMESTER –VI			
Part III Core Integral III Securities Law and Financial Markets			
Code:18UCCI61	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Vision: Seeks to adhere to sound, conservative business principles to provide an attractive investment environment.

Mission: To enable the students to learn about an organized, fair, transparent, and efficient market for trading securities and to deepen the knowledge about the securities law and financial instruments.

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the various theories of security law and types of financial market.	1,2	Un
CO-2	enhance their analytical skills through extensive and in-depth discussion of the financial markets.	2,5,8	An
CO-3	demonstrate in-depth knowledge of the legal rules on mutual fund and shares.	2,5,8	Ap
CO-4	display a thorough understanding of the various Financial Markets Act.	4,5,8	Un
CO-5	analyse to what extent a financial market satisfies the conditions of an efficient market.	5,8	An
CO-6	possess the ability to discuss and write about the theory of financial markets.	5,8	Un
CO-7	know the various risks involved in trading derivative instruments.	2,5	Un
CO-8	understand the roles and power of SEBI.	2,5	Un

SEMESTER – VI			
Part III	**Core Integral III**	**Securities Law And Financial Markets**	
Code: 18UCCI61	**Hrs/Weeks: 5**	**Hrs/Sem:90**	**Credits:4**

Unit – I Financial Market

Financial Market- Capital Market – Money market –Participants and Instruments in Capital market & money market

Unit – II Securities Exchange Board of India

Securities Contract (Regulation) Act, 1956-Object of the Act- Regulatory framework governingIndian Capital market- Role and Powers of SEBI- Recognition of stock exchange- Bye laws-Membership in Stock exchange- Eligibility- Powers of Central Government

Unit – III New issue market and Investors Protections

New issue market –Parties involved in the new issue market –Govt and Statutory agencies-Collection centers- Placement of issue –Allotment of shares –Investors Protection in the Primary market – secondary market – role of intermediaries

Unit – IV Mutual Fund

Mutual Fund – Meaning –Definitions –Types –Performance, Evaluation –SEBI Regulations on mutual fund-Mutual Fund current scenario

Unit – V Depositories Act and Credit Rating

Depositories Act, 1996- Importance-definition –Depository Participants-Dematerialization – Opening of Demat - SEBI Regulations - Credit Rating – Concepts – Importance- Benefits in India – Rating process –Rating symbols

Text Book:

1.Gordon. E. & Natarajan .*Financial Market & Services.* New Delhi: Himalaya Publishing House.

Books for Reference:

1. Gurusamy. S. *Indian Financial System.* Chennai: Vijay Nicole Imprints Private Limited.
2. Natarajan L. *Financial Market & Services.* Chennai: Margham Publications.
3. Anil Agashe, *Financial Services, Markets& Regulations*, New Delhi: Himalaya Publishing house.
4. Gupta N.K., Monika Chopra, *Financial Markets Institutions & Service*, Chennai: ANE Books.
5. Shashi K.Gupta, Nisha Agarwal, Neeti Gupta, *Financial Market & Services*, Ludhiana: Kalyani Publishers.

SEMESTER II			
Part III Core III Inorganic Chemistry- I			
Code :18UCHC21	**Hrs./Week:4**	**Hrs/ Sem:60**	**Credits:4**

Vision

Transforming knowledge into skill through novel metallurgical techniques and periodic properties

Mission

- Recall the basic methods of purification of ores.
- Explain the general characteristics about s and p block elements.
- Have an insight into the theory of practicals.

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO 1	Recall the methods of purification of ores	1	R
CO 2	Identify the electronic configurations of the zero, s, p d-and f-block elements	1, 5	An
CO 3	Explain the general characteristics and diagonal relationship of alkali and alkali earth metalsand discuss the preparation and uses of their compounds	1	Un
CO 4	Describe the extraction and uses of various lanthanide and actinide compounds.	1, 5, 7	Un
CO 5	Derive equations for reactions of compounds of the zero group elements	1, 3	Ap
CO 6	Compare the different shapes of compounds of noble gases	3, 4	Ap
CO 7	Apply the knowledge about interfering radicals, common ion effect and solubility product	1, 4, 7, 8	Ap
CO 8	Communicate the concepts and results of their laboratory experiments clearly and concisely to both chemists and non-chemists through effective writing and oral communication skills	1, 2 7, 8	Ev

SEMESTER II			
Part III Core III Inorganic Chemistry- I			
Code :18UCHC21	**Hrs./Week:4**	**Hrs/ Sem:60**	**Credits:4**

Unit I General Principles of Extraction of Metals

Minerals, ores and gangue -different steps of metallurgy – crushing and grinding of the ore – concentration of the ore – hand picking - gravity separation (Hydraulic Washing) - electromagnetic separation – electrostatic separation – froth flotation process - leaching process – calcination – roasting –difference between calcination and roasting – reduction to free metals – reduction by displacement, thermal decomposition, carbon (smelting), heating in air, an electro positive metal (Gold Schmidt's aluminothermic process) – Kroll's process – flux and slag. Refining of impure metals – thermal refining - distillation, liquation – vapour phase refining- Van Arkel process, carbonyl process- electrolytic process- zone refining process- Elingham diagram- Types of furnaces – Fuel fired – blast, reverberatory and blast furnace – Electric furnace – Arc furnaces and resistance furnace.

Unit II s-block elements

General characteristics of IA and IIA group elements – diagonal relationship of lithium with magnesium – anomalous behaviour of lithium and beryllium – extraction of lithium beryllium. Sodium carbonate and sodium bicarbonate – manufacture – properties and uses – principle of fire extinguisher. Preparation and uses of basic beryllium acetate, epsum salt, gypsum, plaster of Paris and lithopone.

Unit III p-block elements (boron and carbon)

Boron – classification and nomenclature of boron hydrides – preparation, structures and uses of diborane – boron trihalides as Lewis acid – relative strength of boron trihalides.
Lewis acids – oxo compounds of boron – ortho boric acid – preparation, properties and uses
Borax bead test.

Carbides – Classification with examples – Preparation, Properties, uses and Structure of Calcium Carbide, Boron Carbide, Aluminium Carbide and Silicon Carbide – Per carbonates – Preparation, Properties and Structure of Permonocarbonate , perdicarbonates - Preparation, Properties and uses of Carbonyl Chloride and Carbon disulphide -Fullerenes

Unit IV p-block elements (nitrogen and halogens)

Liquid ammonia as a non-aqueous solvent – Preparation, Properties, Uses and Structures of

hydrazine, hydrazoic acid and hydroxylamine – Structure of oxides of Nitrogen(NO, N_2O, NO_2, N_2O_4, N_2O_5)

Pecularities of fluorine, the first element of the group – manufacture of fluorine – etching on glass. hydrides of halogens (hydrogen halides) - formation – physical state - stability – reducing character - nature of bonds – relative strengths of oxide – Born – Haber cycle. Interhalogen compounds – preparation and structure of interhalogen compounds. Pseudohalogen-polyhalides and basic nature of iodine.

Unit V Theory of practicals II

Inorganic quantitative analysis – Primary and secondary standard. Preparation of a primary standard solution. Methods of expressing the strength of the solution – percentage, normality, molarity, molality and formality, volumetric principle – calculation of strength of solution.

Types of titrations –definition - principle andexamples.Acid-base titrations - Redox titrations involving self, internal and external indicators. Complexometric titrations.

Inorganic qualitative analysis - basic idea Types of radicals - simple and interfering radicals Common ion effect and solubility product -definition -applications in inorganic qualitative analysis.

Analysis of anions: Test for sulphide, sulphate, nitrate (brown ring test), bromide and iodide (silver nitrate test),chloride and chromate (chromyl chloride test), oxalate and fluoride (calcium chloride test), borate (ethyl borate test), phosphate (ammoniummolybdate test).

Need for eliminating interfering radicals –methods of elimination of various radicals.

Analysis of Cations : Test for – lead, copper, cadmium, antimony, bismuth, cobalt, nickel, manganese, zinc, barium, strontium, calcium, magnesium and ammonium.

Principles of gravimetric analysis – precipitation methods – conditions of precipitation – co-precipitation and post precipitation

Text books

1. B.R.Puri, L.R.Sharma, K.C.Kalia, *Principles of InorganicChemistry*, Milestone publishers and distributers, Delhi.
2. R.D.Madan, *Modern Inorganic Chemistry,*S.Chand& Co.,Ltd.New Delhi,2005

Books for Reference

1. Gurdeep Raj, *Advanced inorganic Chemistry*, Goel Publishing house1986.
2. Sathyaprakash and R.D.Madan, *Advanced Inorganic Chemistry* Volume I, S.Chand and Company, New Delhi.2005,
3. S. Giri, D.N. Bajpai and O.P. Pandey, *Practical chemistry*, S. Chand and Company Ltd., New Delhi.6th Edition.

SEMESTER- II			
Part III	**Core IV**	**Organic Chemistry-I**	
Code :18UCHC22	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

Vision

Acquire excellence in Organic Chemistry for educating and graduating students

Mission

- Gain knowledge about the importance of ethers, epoxides, hydroxy, nitro and amino compounds
- Appreciate the applications of organometallic compounds in synthesis
- Understand the concepts of tautomerism & molecular rearrangements

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	Prepare alcohols and summarize their properties, Distinguish between 1^o, 2^o& 3^o alcohols, Recognise the differences between the acidities of alcohols and phenols	1,3,6	Ev,An,Re
CO 2	Reframe the alcohol series,Justify the effect of substituent on the acidity of phenols, Know the preparation and uses of thioalcohols	1,2,3,6	Cr,Re
CO 3	Estimate alkoxy group by ziesel's method	1,2	Cr
CO 4	Compare ethers and alcohols, nitroalkanes and alkyl nitrites, Differentiate 1^o, 2^o&3^o amines by reactions	1,3	An
CO 5	Justify the effect of substituent on the basicity of aromatic amines	1,3	Cr
CO 6	Recall the synthetic importance of organometallic compounds, RecogniseFrankland reagent and its significance	1,6,7	Re
CO 7	Illustrate the theory of resonance and tautomerism	1,3	Un
CO 8	Identify the product of rearrangement reactions such as pinacol-pinacolone, Benzil-Benzilic acid, Curtius, Lossen, Favorskiiand Friesrearrrangement.	1,3	An

SEMESTER- II			
Core IV	**Organic Chemistry-I**		
Code :18UCHC22	**Hrs/Week:4**	**Hrs/ Sem: 60**	**Credits:4**

UNIT – I Hydroxy Compounds

Alcohols – General methods of preparation and properties of mono hydric alcohols – distinction between primary, secondary and tertiary alcohols – (Lucas test, catalytic dehydrogenation, oxidation, Victor - Meyer's test)-Interconversion of primary, secondary and tertiary alcohols. Ascent and descent in the series of alcohols-trihydric alcohol-Glycerol-Preparation, properties – derivatives of glycerol- nitroglycerine-blasting gelatin- Cordite and dynamite-Phenols – classification with example – effect of substitutent on the acidity of phenols – Mechanism of Kolbe's reaction, Riemer- Tiemann- test for phenol – Preparation & uses of Nitrophenol (picric acid only)- Dihydric phenol – Catechol, Resorcinol &Quinol –Thioalcohols-ethyl mercapton.

UNIT-II Ethers and Epoxides

Classification- Preparation by Williamson's synthesis and alkoxymercuration-demercuration methods.- Ziesel's method for the estimation of alkoxy groups-comparison of ethers and alcohols- Phenolic ethers- preparation and properties of anisole, guaicol-

Ethers- ethers of industrial importance – Preparation properties and uses of oxirane, and dioxane

UNIT – III Nitro Compounds and Amino Compounds

Preparation and reaction of nitrile and isonitrile – distinction between nitroalkane and alkyl nitrites – reduction reaction of nitroalkane – NEF reaction.

Preparation of o, p,m-dinitrobenzene- trinitrobenzene.

Aliphatic amine – separation of mixture of amine –(Hoffmann, Heisenberg method)-Comparison of 1^o, 2^o&3^o amines- Mustard oil reaction- Mannich reaction – ascending and descending of amines.

Aromatic amines – effect of substitutents on the basicity of aromatic amines-preparation and properties of phenylenediamine

Diazonium compounds- Preparation of diazonium chloride and its synthetic applications.

UNIT -IV Organometallic Compounds

Definition – examples- Organomagnesium compound (Alkyl magnesium halides) – preparation, general characteristics and synthetic applications (Nucleophilic substitution reactions , addition reaction and miscellaneous reactions.) Organo zinc compounds(Diethyl

Zinc-Frankland reagent)- preparation, properties and synthetic applications (Nucleophilic substitution and addition reactions). Organo Lithium compounds (alkyl lithium) –preparation and synthetic applications- Organo Silicon compounds- Preparations and reactions- Preparation and uses of TEL.

UNIT – V Tautomerismand Molecular Rearrangements

Resonance – definition – resonance energy – resonance theory.

Tautomerism – Definition – Types of tautomerism – Keto-enol, Nitro -acinitro, Lactam - lactim, p-Nitrosophenol- Quinone monoxime and amido-imidotautomerism.

Molecular Rearrangement

a) Rearrangement involving migration to electron deficient carbon- Pinacol-pinacolone rearrangement, Benzil-benzilic acid rearrangement
b) Rearrangement involving migration to electro deficient nitrogen-Curtius rearrangement, Lossen rearrangement
c) Rearrangement involving carbanion intermediate – Favorskiirearrrangement
d) Rearrangement involving migration from oxygen to aromatic ring-Fries rearrangement

Text Books

1. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, *A Text Book of Organic Chemistry,* 2nd Revised Edition, 1998.
2. ArunBahl and B.S.Bahl, *Advanced Organic Chemistry,* S.Chand and Company Ltd., Reprint 2005.
3. M.K.Jain and S.C.Sharma , *Modern Organic chemistry,* Vishal Publishing Co., 2017-2018

Books for Reference:

1. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013
2. I.L Finar, *Organic Chemistry,* Volume 1, The Fundamental Principles, 6th Edition, 1973.

SEMESTER- III			
Core V	**Physical Chemistry-I**		
Code : 18UCHC31	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credits : 4**

Vision:

Explore and enhance new chemical frontiers in physical chemistry.

Mission:

Mould the students to acquire knowledge in the field of nuclear chemistry, Surface Chemistry , phase rule and gaseous states of matter

Course Outcome :

CO No.	Upon completion of this course, students should be able to	PSO addressed	CL
CO- 1	have an overall knowledge about liquid and gaseous states of matter	1,2 , 3	Re
CO- 2	explain the relationship between kinetic energy and temperature of a gas; between temperature and the velocity of a gas; and between molar mass and the velocity of a gas.	1,3	Un
CO- 3	understand the basis of nuclear forces , nuclear stability , radioactivity and nuclear reactions	1,2,4	Un
CO- 4	interpret phase rule	1,3,4	Ev
CO- 5	prioritise the phenomenon of catalysis in industry and biological systems and learn the basic concepts of adsorption and its applications in various walks of life	1 , 2,5,7,8	Ap
CO- 6	enumerate the general characteristics of catalytic reactions and thorough knowledge of the theory behind homogeneous and heterogeneous catalysis	1 ,2,7	Re
CO- 7	distinguish adsorption/desorption and the kinetics of catalytic reactions on a surface.	3,4,5,7,8	An
CO- 8	justify the significance of Freundlich, Langmuir isotherms and BET isotherm	1,2	Ev

SEMESTER- III			
Core V	Physical Chemistry-I		
Code : 18UCHC31	Hrs/Week : 4	Hrs/ Sem : 60	Credits : 4

Unit I Gaseous State

Kinetic theory of gases – justification of postulates-derivation of kinetic gas equation-deduction of gas laws from the kinetic gas equation-Charle's law, Boyle's law, Avogadro's law, ideal gas equation – Dalton's law of partial pressure – Graham's law of diffusion- kinetic theory and temperature – Maxwell's law of distribution of velocities (no derivation) –types of molecular velocities – graphical representation and its significance- collision diameter – collision number – collision frequency – mean free path – viscosity of gases-calculation mean free path and collision diameter from Chapman equation- deviations from ideal behavior-compressibility factor- effect of pressure and temperature on deviation-explanation of deviation-volume correction-pressure correction – Van der Waal's equation—limitations-liquefaction of gases-critical phenomenon—Andrew's isotherms of CO_2- Van der Waal's equation and critical constants-experimental determination- law of corresponding states.

Unit II Nuclear Chemistry – I

Nuclear size- Nuclear Forces – Packing Fraction – mass defect and binding energy – mass energy relation – stability of nucleus – n/p ratio – odd even rule – magic numbers – nuclear models (Shell model and liquid drop model) – Types of radioactive decay – Radioactive series – k electron capture and internal conversion- group displacement law – detection and measurement of radioactivity by G.M Counter – rate of decay – half life and average life – Geiger Nuttal rule – radioactive equilibrium – nuclear isomerism

Unit III Nuclear Chemistry – II

Artificial radioactivity – different types of artificial radioactivity – Nuclear reactions (elastic, inelastic, scattering and spallation) – Nuclear Fission and atom bomb – Nuclear Fusion and hydrogen bomb –Stellar energy – fertile and fissile isotopes – Neutron activation analysis – Application of radioactive isotopes in medicine, reaction mechanism and carbon dating – Nuclear reactor –and its components – fast breeder reactors – Nuclear power reactors in India – Particle accelerators (Cyclotron, Synchrotron)- Chemistry of Hot atom – Radiation Dosimetry – Hazards and precautions in Nuclear Technology

Unit IV Phase Rule

Statement – definitions of terms used – thermodynamic derivation of phase rule –phase diagrams- areas- curves- triple point- meta stable equilibrium- polymorphism-enantiotropy-monotropy- -experimental determination of transition point –colour change,density change,-solubility change, and cooling curve methods.

One component system-water system, Sulphur system -two component system – condensed system and reduced phase rule – simple eutectic system – Ag-Pb system –Pattinson's process for the desilverisation of argentoferrous Lead –Zn-Cd system -principles of freezing mixture –

KI-H_2O -system forming compounds with congruent and incongruent melting points – (Zn – Mg system, $FeCl_3$ – H_2O system)

Unit V Surface Chemistry

Adsorption – types- physisorption and chemisorption – adsorption of gases by solids- adsorption isotherm – derivation and significance of Freundlich and Langmuir isotherms – BET isotherm (no derivation) – applications of adsorption – adsorption indicator- heterogenous catalysis-froath floatation process-

Catalysis - General characteristics of catalytic reactions – acid-base catalysis and enzyme catalysis– Fischer Lock and key theory – characteristics of enzyme catalysis. Mechanism and kinetics of enzyme catalysed reaction (Michaelis-Menton equation). Activation energy and catalysis – theories of homogeneous and heterogeneous catalysis – mechanism of the hydrogenation of ethene on nickel surface. Acid base catalysis – mechanism – promoters – promotion action – examples of catalytic poisoning – negative catalysis – mechanisms of negative catalysis, autocatalysis and photocatalysis.

Text Books

1. B.R.Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.
2. Arun Bahl, B.S. Bahl, G.D. Tuli, Essentials of Physical Chemistry, S. Chand & Company Ltd., New Delhi, 2008.

Books for Reference

1.Sadhan Kr.Dutta, Principles of Physical Pharmacy and Biophysical Chemistry, Books and Allied (P) Ltd. Kolkata, 2007

2. P.L.Soni, O.P.Dharmaha,Text Book of Physical Chemistry(A Modern Approach), Sultan Chand and Sons Publishers, Revised Edition, 2010.

3.Iran.Levine,Physical Chemistry,Mc Graw Hill, Kogakusha Ltd. 1978.

SEMESTER- V			
Core VIII	**Organic Chemistry III**		
Code :18UCHC52	**Hrs./Week:5**	**Hrs/ Sem: 75**	**Credits:4**

Vision: Develop novel molecules and methods to synthesize Organic molecules

Mission:

- Understand Retrosynthesis and its relay approach to synthesis
- Study Specific name reactions
- Have an idea on Green Chemistry

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	compare the general reactions of aldehydes and ketones	5	Ap
CO - 2	explain the mechanism of Claisen, Benzoin, Perkin, Knovenegal reaction- Wittig reaction-iodoform reaction explain the factors influencing strength of acid - effect of substituent in benzene ring	2	Un
CO - 3	generalize the properties of carbonyl and carboxyl compunds	1,6	Cr
CO - 4	classify the polynuclear hydrocarbons Structure Elucidation of alizarin	1.5	Ap Cr
CO - 5	state synthons and synthetic equivalent- Protection and deprotection of different groups	3	Re
CO - 6	explain Retrosynthesis of 5-hexanoic acid	1,3,6	Un
CO - 7	apply green chemistry in day-to-day life, dry cleaning, versatile bleaching agent	4,7	Ap
CO - 8	implement an awareness about green chemistry and the methods of microwave assisted synthesis	3,8	Ap

SEMESTER- V			
Core VIII	**Organic Chemistry III**		
Code :18UCHC52	**Hrs./Week:5**	**Hrs/ Sem: 75**	**Credits:4**

Unit I- Carbonyl Compounds

Aliphatic aldehyde& ketones-Reactivity of carbonyl groups-general reactions of aldehydes and ketones-mechanism of addition and condensation reaction- Cannizzaro reaction-Aldol condensation-Distinction between aldehydes and ketones-Reduction reaction-MPV reduction-Wolf-kishner- Clemmenson reaction

Aromatic aldehydes and ketones- general methods of preparation, reaction and test-Mechanism of Claisen, Benzoin, Perkin, Knovenegal reaction- Wittig reaction-iodoform reaction

Unit-II Carboxylic Acid And Their Derivative

Aliphatic monocarboxylic acid- general methods of preparation and reactions- acidic nature-factors influencing strength- dicarboxylic acid- Blanc's rule-Aromatic monocarboxylic acid-effect of substituent in benzene ring- Aromatic dicarboxylic acid-Reactions of phthalic acid –Test for Carboxylic acid – Aliphatic hydroxy acids – Preparation reactions of maleic acid and citric acid – Action of heat on hydroxy acid – aliphatic acid derivative- reaction of ester, acid halide and acid amide.

Unit - III Polynuclear Hydrocarbons

Isolated Systems – Preparation of diphenyl, triphenylmethane and 1,2-diphenyl ethane.**Condensed systems –** Synthesis, reactions and structure of naphthalene and anthracene. Phenanthrene – synthesis and structure of phenanthrene. Derivatives of naphthalene and anthracene – Naphthols - Naphthyl amines, Naphtha quinones, Anthraquinone. Alizarin -structural elucidation of alizarin.

Unit-IV Organic Synthesis – An Introduction

Synthons and synthetic equivalent (electrophilic and nucleophilic). Carbon-carbon bond forming reactions involving Michael and Dieckmann reaction-Protection of functional groups and removal of protecting groups-Application of Protection and deprotection to alcohols, aldehydes, ketones, acids, phenols and amines. Retrosynthetic analysis of 5-hexanoic acid

Unit – V Green Chemistry

Introduction – need for green chemistry – twelve principles of green chemistry – green chemistry in day-to-day life – dry cleaning, versatile bleaching agent – atom economy – green solvents – supercritical fluid CO_2, ionic liquids and water

Microwave assisted organic synthesis – introduction – microwave assisted reactions in water – Hofmann elimination and hydrolysis of benzyl chloride – microwave assisted reactions in organic solvents – esterification and Fries rearrangement – microwave assisted reactions in solid state – deacylation, oxidation of alcohols using clayfen.

Text Books

1. K.S. Tewari, N.K. Vishnoi, S.N. Mehrotra. A Text Book of Organic Chemistry, 2nd Revised Editions, 1998
2. Arun Bahl and B. S. Bahl Advanced Organic chemistry, S. Chand and Company Ltd., Reprint 2005.

Books for Reference

1. Bhupinder Mehta, Manju Mehta, Organic chemistry, PHI Learning pvt. Ltd., 2005.
2. Rashmi Sanghi, Green Chemistry Environmental Friendly Alternatives Editors M.M.Srivatsava Narosa Publishing House, Reprint 2008.
3. V. Kumar, An introduction to green chemistry, Vishal Publishing Company, Jabudhar Delhi Edition, May 2007.
4. V. K. Ahluwalia, Green Chemistry , Ane Books Pvt. Ltd; Second edition.2012
5. I.L.Finar Organic chemistry, The Fundamental Principles, Volume I, 6th edition, 1973.
6. N.Tewari Advance Organic Reaction mechanism Books and allied (P) Ltd. Kolkata 700010 India Second revised edition 2005.
7. M.K.Jain and S.C.Sharma Modern organic chemistry, Vishal publishing co., 4th edition 2012.

SEMESTER- VI			
Core XI	**Organic Chemistry-IV**		
Code :18UCHC62	**Hrs./Week: 4**	**Hrs/ Sem: 60**	**Credits: 4**

Vision: Empathize the structure, reactions, properties Organic compounds and contribute to the future of humanity

Mission:

- Understand the different applications of Photochemistry in Organic compounds
- Know the importance of Heterocyclic compounds, Alkaloids and Terpenes
- Analyze structure of different types of nucleotides

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO -1	identify the type of the photochemical and thermal reactions	1,7	Re
CO - 2	understand the important applications of photochemistry in organic compounds	1	Un
CO - 3	illustrate the mechanisms of specific reactions	1	Ap
CO - 4	know about the importance of heterocyclic compounds, alkaloids and terpenes Identify the nature of compounds in heterocyclic compounds	1, 5	Re
CO - 5	apply the methods of extraction of Alkaloids	1, 2,6	Ap
CO - 6	compare quinoline and isoquinoline	1,4	Ap
CO - 7	analyse amino acid spectrophotometrically	1, 2, 8,	An
CO - 8	recall the colour reactions of proteins Classify the structure of DNA and RNA	1, 3 5	Re Un

SEMESTER- VI			
Core XI	**Organic Chemistry-IV**		
Code :18UCHC62	**Hrs./Week: 4**	**Hrs/ Sem: 60**	**Credits: 4**

Unit – I Organic Photochemistry

Introduction – Photochemical vs thermal reactions – singlet and triplet states – allowed and forbidden transitions – Jablonski diagram – photosensitization – photochemical reaction – elimination reaction – Norrish type I and Type II – photolysis of cyclic ketone – photolysis of aldehyde – photolysis of compounds containing Nitrogen – Barton reaction – photocycloaddition– Paterno-Buchi reaction – photo induced reaction of α,β-unsaturated ketone

Unit-II Name Reactions and their Mechanism

Reformatsky reaction-Birch reduction- Cope elimination- Bayer-villiger oxidation-Ritter reaction-Jones oxidation-Hell-Volhard –Zelinsky reaction-Dakin reaction- Darzens reaction.

Unit- III Heterocyclic Compounds

Introduction – preparation and reactions of furan, pyrrole and thiophene. Aromatic character and basic nature – comparative reactivity. Preparation and reactions of pyridine – preparation and reactions of quinoline, isoquinoline and indole. Structural elucidation of pyridine, quinoline and isoquinoline.

Unit-IV Alkaloids and Terpenoids

Alkaloids – definition – classification – occurrence – extraction using soxhelet apparatus pigment analysis using flame photometer-extraction of oil from plants using Clevenger-general characteristics. General methods of identification –functional nature of oxygen, nitrogen. Oxidation, Hofmann's exhaustive methylation – structure and synthesis of coniine, piperine and nicotine

Methods of extraction –Qualitative analysis of phytochemicals –Quantitative estimation of tannin, phenolic compounds.

Terpenoids – introduction – classification – isolation of terpenoids – isoprene rule – general properties of terpenoids. General procedure for determining structure of terpenoids – synthesis and structure of geraniol, Citral, dipentene and menthol.

Unit-V Amino acids and Proteins

Amino acids - classification, general methods of preparation and reactions of amino acids, zwitter ion - isoelectric points, action of heat on □□□□and □□□amino acids. Peptides and proteins - Peptide linkage - polypeptide - classification of proteins - synthesis of peptides - Merrifield synthesis - primary structure - end group analysis - Dangyl chloride, Edman method - secondary structure - tertiary structure - denaturation - colour reactions of proteins – nucleotides- Structure of DNA-Watson and Crick model- structure and types of RNA.

Estimation of folic acid , amino acid and protein by colorimetry/spectrophotometrically

Text Books

1.K.S. Tewari, N.K. Vishnoi, S.N. Mehrotra. A Text Book of Organic Chemistry, Vikas publishing house (P) Ltd.2002.

2.Arun Bahl and B. S. Bahl Advanced Organic chemistry, S. Chand and Company Ltd., Reprint 2005.

3. Organic Reaction Mechanisms, V. K. Ahluwalia and Rakesh Kumar Parashar, 2011,Narosa Publishing House, New Delhi

Books for Reference

1. I.L Finar Organic Chemistry Volume II, Stereochemistry and the Chemistry of Natural Products Edition V Reprint 1986.
2. Jerry March, Advanced Organic Chemistry, Reactions Mechanisms and Structure, 4th Edition. 2013

SEMESTER VI			
Core XII	**Physical Chemistry III**		
Code :18UCHC62	**Hrs/Week : 5**	**Hrs/ Sem : 75**	**Credits : 4**

Vision:

Inspiring and educating the students the core concepts in Physical Chemistry

Mission:

Enable the young Chemistry buds to sustain a deep knowledge in thermodynamics, solutions and thermochemistry

Course Outcome

CO No.	Upon completion of this course, students should be able to	PSO addressed	CL
CO - 1	study various thermodynamic parameters and its applications in different physical states of the systems	1 ,2 , 3	Re
CO - 2	understand the kinetics of the reaction and to determine the reaction mechanism	1,2,4	Re
CO - 3	apply reaction kinetics to determine the rate of chemical reactions; understand the factors that influence rates of reaction.	1,2 , 3,5	Ap
CO - 4	catagorise fundamental uniqueness of the chemical and physical properties of nanomaterials and their potential impact in science, engineering, medicine, and the environment	1,2 , 3,5	An
CO - 5	outline the concepts of top down and bottom up methods of nanomaterials preparation	2, 3,5,6	An
CO - 6	have a thorough Learning of miscible and immiscible liquids	2,3,4	Re
CO - 7	comparison of vapour pressure of partially miscible liquids and mixture of immiscible liquids and understand the theory of fractional distillation and steam distillation and its applications.	2,3	An
CO - 8	outline the statement of Nernst distribution law , its deviations and applications	1, 2,3,4	An

SEMESTER VI			
Core XII	**Physical Chemistry III**		
Code :18UCHC62	**Hrs/Week : 5**	**Hrs/ Sem : 75**	**Credits : 4**

Unit I Thermodynamics I

Terminology – thermodynamic equilibrium – types of thermodynamic system – thermodynamic processes – (Isothermal, adiabatic, isobaric, isochoric) – definition and example – sign conventions – first law of thermodynamics – enthalpy of a system – relation between ΔH and ΔE – molar heat capacities – definition – molar heat capacity at constant volume – molar heat capacity at constant pressure – relation between C_p and C_v. Joule Thomson effect – Joule Thomson coefficient – inversion temperature.

Unit II Thermodynamics II

Limitations of first law of thermodynamics .Second law of thermodynamics – Different statements – Concept of entropy – Entropy changes in isothermal expansion of an ideal gas – Entropy changes in reversible and irreversible processes – Work function and free energy function – Variation of free energy with temperature and pressure – Gibbs Helmholtz equation – Derivation and significance – Partial molar properties – Chemical potential – Gibb's Duhem equation – Derivation and significance ..

Unit III Thermodynamics III

Claussius-Claypeyron equation – application in ice skating – derivation (integral and differential forms) and significances – derivation of Van't Hoff isotherm and isochore. Concept of fugacity– fugacity of a gas in a gaseous mixture –physical significance of fugacity. Nernst heat theorem – third law of thermodynamics – statement – determination of absolute entropy of solids, liquids and gases – experimental verification of the third law of thermodynamics – entropy change in chemical reactions – derivation of the Boltzmann entropy equation – residual entropy – zeroth law – energy relations in living systems.

Unit IV Solution

Liquids in liquids –completely miscible liquids- ideal and non-ideal mixtures-Raoult's law - distillation of homogenous binary liquid mixtures -Theory of fractional distillation – Azeotropic distillation.

Partially miscible liquids – Phenol-water, Triethylamine-water and Nicotine-water systems –Variation of solubility with temperature – vapour pressure of partially miscible liquids-critical solution(consolute) temperature-upper, lower,upper and lower - influence of impurity on CST and applications.

Immiscible liquid systems- vapour pressure of mixtures of immiscible liquids- theory of steam distillation and its applications.

Nernst distribution law – statement–conditions - thermodynamic derivation –-deviations from the law(molecular association and dissociation) -— applications-distribution indicators-study of complex ions-solvent extraction

Unit V Chemical Equilibrium

Reversible reactions- nature of chemical equilibrium- characteristics-law of mass action-explanation of the law of mass action based on the molecular collision theory-equilibrium constant; equilibrium law-relationship between K_c and K_p-Application of law of mass action to the equilibria involving the formation of NH_3 , dissociation of $CaCO_3$ and the dehydration of $CuSO_4.5H_2O$. Lechatelier's principle – statement-application to the formation of NH_3

Text Books

1. B.R.Puri. L.R. Sharma, Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2008.
2. Arun Bahl, B.S. Bahl, G.D. Tuli, Essentials of Physical Chemistry, S. Chand & Company Ltd., New Delhi, 2008.

Books for Reference

1. Samuel Glasstone, Thermodynamics for chemists, Afflliated East-West Press (Pvt.) Ltd, New Delhi, III printing, 2010.
2. Sadhan Kr.Dutta, Principles of Physical Pharmacy and Biophysical Chemistry, Books and Allied (P) Ltd. Kolkata, 2007
3. P.L.Soni, O.P.Dharmaha,Text Book of Physical Chemistry(A Modern Approach), Sultan Chand and Sons Publishers, Revised Edition, 2010.
4. Iran.Levine, Physical Chemistry, Mc Graw Hill, Kogakusha Ltd. 1978.

SEMESTER -IV			
Part III	**Allied VII**	**Auditing**	
Code:18UCOA41	**Hrs/Week: 3**	**Hrs/Sem: 45**	**Credits : 3**

Vision:

To provide an understanding of the principles and practice of auditing.

Mission:

To enable students to have a thorough knowledge on auditing principles and practice.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	understand the meaning and objectives of audit and vouchers.	1,2	Un
CO – 2	know the features of E- auditing	1,2	Un
CO – 3	understand the constraints of audit and vouchers.	1,2	Un
CO – 4	know the features and differences between internal control and internal audit.	1,2	Ev
CO – 5	understand the differences between verification of assets and liabilities.	2,4	Un
CO – 6	know the rules for appointment of company auditor and contents of auditor's report.	5,8	Un,An
CO – 7	know the types of auditor's report	5,8	Un,Re
CO – 8	analyse the classification and differences between investigation and auditing.	2	An

SEMESTER –IV			
Part III Allied VII	**Auditing**		
Code:18UCOA41	**Hrs/Week: 3**	**Hrs/Sem: 45**	**Credits : 3**

Unit I – Introduction

Introduction – Meaning – Objectives – Difference between Investigation and Auditing – Advantages – Limitations –Auditing working papers.

Unit II – Vouching

Test Checking and Routine Checking – Vouching - Meaning – Objects – Importance of voucher.

Unit III – Internal Check

Internal check – Meaning – Objectives – Advantages and disadvantages of internal check – Internal check regarding cash, wages, purchase and purchases returns, sales and sales returns.

Unit IV - Verification of Assets and Liabilities

Verification of assets and liabilities – Meaning – Classification of assets – Verification of different types of assets – Verification of liabilities.

Unit V - Company Audit

Company auditor – Appointment – Qualification and disqualification – Removal of an auditor – Status – Rights, duties and liabilities – Auditors report – Contents – e - audit.

Text Book:

Tandon B.N. *Auditing*. Delhi: M/S S. Chand & Co.

Books for Reference:

1. Sharma T.R. *Auditing*. Agra: Sathiya Publications.
2.Saxana, Reddy &Appannaiah. *Text book of Auditing*.Mumbai: M/S Himalaya Publishing House.

SEMESTER –V			
Part III Core XIII	**Business Law**		
Code:18UCOC53	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Vision:

To expose students to various business laws.

Mission:

To enable students to have adequate knowledge on rules and regulations of commercial laws.

Course Outcome:

Co.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the essentials and steps to enter into a contract.	1,2	Un
CO-2	familiarize with the terminology used in contract Act	1,4	Un
CO-3	know about the remedies of breach of contract.	1,2,3	An
CO-4	understand the contract of indemnity and its kinds.	1, 2,5	Un
CO-5	know the performance of Contract	1,4,5	Ap
CO-6	understand the contract of Contract of Guarantee	1,2,8	Un
CO- 7	understand the types of bailment, rights and its duties.	1,4	Un
CO-8	know the rights of buyers and sellers, its conditions and warranties regarding Sale of Goods Act.	6,7	Ap

SEMESTER –V			
Part III Core XIII	**Business Law**		
Code:18UCOC53	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I Introduction to Contract Act:

The Indian Contract Act - Definition - Essential Elements of Contract-Classification of Contracts – Offer – Acceptance – Communication of Offer, Acceptance and Revocation – Consideration – Contract Without Consideration – Capacity to Make Contract.

Unit II Performance of Contract:

Performance of Contract – Contract not to be Performed – Discharge of Contract – Remedies for Breach of Contract – Specific Performance – Quasi Contracts.

Unit III Contract of Indemnity:

Contract of Indemnity – Contract of Guarantee – Extent of Surety's Liability – Kinds ofGuarantee – Rights of Surety – Discharge of Surety

Unit IV Bailment:

Bailment – Classification of Bailment – Duties and Rights of Bailor and Bailee – Pledge – Rights and Duties of Pawor and Pawnee – Pledge by Non Owners – Contract of Agency

Unit V Sale of Goods Act:

Sale of Goods Act – Difference Between Sale and Agreement To Sell – Right of Buyers and Sellers - Duties - Conditions And Warranties – Delivery of Goods – Unpaid Seller

Text Book:

KapoorN.D..*Business Law*.New Delhi:Sultan Chand & Sons.

Books for Reference:

1. Tulsian P.C..*Business Law*.New Delhi:Tata McGraw Hill Edition.
2. Tulsian P.C..*Business and Corporate Law*.New Delhi:Tata McGraw Hill Edition.

SEMESTER –VI			
Part III Core XIV Management Accounting			
Code:18UCOC61	**Hrs/Week: 6**	**Hrs/Sem : 90**	**Credits : 4**

Vision:

Develop professional and accounting skills for decision making in business to excel in their career.

Mission:

To acquaint the students with accounting concepts, tools and techniques for managerial decision making.

Course Outcome :

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	understand the basic concepts of management accounting and differentiate management accounting from financial accounting and cost accounting.	1,2	Un
CO – 2	understand the contexts where types of ratios can be applied for evaluating the performance and financial position of a firm.	2,5	Un,Ap
CO – 3	evaluate the performance of a firm using fund flow statement.	5,8	Ev,Ap
CO – 4	evaluate the performance of a firm using cash flow statement.	5,8	Ev,Ap
CO - 5	use marginal costing techniques for optimising cost and profit.	2,3,5	Un,Ap
CO - 6	understand the features and importance of budgets and budgetary control	1,5	Un,Ap
CO - 7	prepare various budgets	5,8	An,Ap
CO - 8	identify the significance of standard costing, budgeting and budgetary control in managerial decision making.	2,5	An,Ap

SEMESTER –VI			
Part III Core XIV Management Accounting			
Code:18UCOC61	**Hrs/Week: 6**	**Hrs/Sem : 90**	**Credits : 4**

Unit I Introduction to Management Accounting& Ratio Analysis:
Meaning - Objectives and Scope of Management Accounting - Functions - Management Accounting Vs Financial Accounting - Management Accounting Vs Cost Accounting - Advantages - Limitations. Tools of Financial Statement Analysis (Theory only).
Ratio analysis: Meaning **-** Importance - Limitations - Ratio Analysis for
Liquidity, Activity, Solvency and Profitability.

Unit II Funds Flow and Cash Flow Analysis:
Funds Flow Analysis**:** Concept of Fund- Schedule of changes in working capital - Preparation of Funds flow statement.
Cash Flow Analysis: Cash from operations - Preparation of Cash Flow Statement as per AS-3.

Unit III Marginal Costing:
Meaning of Marginal cost and Marginal costing - Advantages and Limitations of Marginal costing - Contribution - P/V ratio - BEP - Margin of safety - Applications of marginal costing in managerial decision making: Fixation of selling price - Key factor - Make or Buy - Selection of suitable product mix.

Unit IV Budgetary Control:
Meaning of budget - Budgetary Control - Objectives - Features - Advantages - Limitations - Preparation of Budgets: Production budget - Purchases Budget - Sales Budget - Cash budget - Flexible budget.

Unit V Standard Costing:
Meaning of Standard cost and Standard costing - Advantages and Limitations of Standard costing - Comparison between standard costing and Budgetory control - Analysis of Variances: Material Variances - Labour variances - Overhead Variances.

Note: Theory – 30% Problems – 70%

Text Book:
Pillai, R.S.N.and Bhagavathi V. *Management Accounting*. New Delhi:S,Chand & Sons. 2010.

Books for Reference:

1. Jain, S.P.and Narang, K.L. *Cost Accounting*. Chennai: Kalyani publishers. 2011.
2. Maheswari, S.N. *Principles of Management Accounting*. New Delhi: Sultan Chand & Sons. 2012.
3. Gupta,S.P. *Management Accounting* . Agra: Sahitya Bhawan Publications.

SEMESTER –VI			
Part III Core XV Income Tax Law and Practice-II			
Code:18UCOC62	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Vision:

To enable the students to acquire practical skills on Income Tax Assessment.

Mission:

To impart practical skills in clubbing, set off of losses and in computation of income of individuals and firms.

To provide knowledge about the computation of tax liabilities of Individuals, HUF and Firms.

Course outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	understand and apply the concept of clubbing of income	1,2,3	Un
CO – 2	set off and carry forward losses	2,5	Ap
CO – 3	understand and apply deductions U/S 80 C to 80 U	2,5	Ap
CO -4	understand the various assessment procedures	5,8	Ap
CO -5	understand and compute advance tax and TDS	5,8	Ap
CO – 6	understand and apply the tax rate and deductions.	4,5	Ap
CO – 7	compute income of individuals and firms.	2,5	Ap
CO – 8	prepare Income Tax returns of individuals and firms	5,8	Ap

SEMESTER –VI			
Part III Core XV Income Tax Law and Practice-II			
Code:18UCOC62	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I: Clubbing of Income and Set off

Clubbing of income – Set off and carry forwards of losses – Problems.

Unit II: Deduction

Deductions from gross total income – Tax rate (Simple Problems).

Unit III: Procedure for filing of return

Returns – Types – Belated return – Defective return – Assessment – Tax deducted at Source – e-Filing – PAN.

Unit IV: Assessment of Individual

Assessment of individuals and H.U.F - Computation (Simple Problems).

Unit V: Assessment of Partnership firms

Assessment of firms – Book profit – Computation(Simple Problems).

Note : Theory : 30% Problem 70%

Text Book :

Mehrotra H.C and Goyal S.P. *Income tax law & accounts, Agra:* SahityaBhawanPublication. (Relevant assessment year).

Books for Reference:

1. Gaur.V.P, Narang, Puja Gaur &Rajeevpuri. New Delhi:*Income tax law & Practice.*Kalyani Publishers.
2. Lal B.B and Vashist .N. *Income tax law & Practice*.New Delhi:I.K.International Publishing House Pvt Ltd.

SEMESTER –VI			
Part III Core XVI	**Industrial Law**		
Code:18UCOC63	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Vision:

To understand Industrial law concepts.

Mission:

To be capable of interpreting and adhering to Industrial laws.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the disputes of strike, lock out, retrenchment, lay off and compensation	1,2	Un
CO-2	know about the welfare, safety and health of workers.	2,5,8	Ap
CO-3	analyse Women and Factories Act	4,5,8	Ap
CO-4	understand the various act relating to payments.	5,8	Ap
CO-5	understand the rules regarding workmen's compensation.	2,5	Un
CO-6	know the Minimum Wages Act	1,3	An
CO-7	understand the Trade Union Act	1,4	Un
C0-8	know the rights and duties of Employee State Insurance Act.	7,8	Ev

SEMESTER –VI			
Part III Core XVI	**Industrial Law**		
Code:18UCOC63	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I The Industrial Disputes Act:

The Industrial Disputes Act 1947 – Definition – Authorities – Strike – Lock Out – Illegality - Retrenchment – Lay Off – Compensation

Unit II The Factories Act:

The Factories Act 1948 – Definition – Welfare – Safety & Health – Working Hours – Employment of Young Persons – Women Annual Leave With Wages – Penalty

Unit III The Workmen Compensation Act:

The Workmen Compensation Act 1923 – Definition – Liability of Employer – Rules Regarding Workmen's Compensation

Unit IVThe Minimum Wages Act:

Minimum Wages Act 1948 – Payment of Gratuity Act - Payment Of Bonus Act 1965

Unit V The Trade Union Act:

Trade Union Act 1926 – Definitions – Registration of Trade Unions – Rights and Liabilities of a Registered Trade Union – Employees' State Insurance Act 1948 – Definitions – Contribution – Benefits – E.S.I Fund – Authorities – Penalties

Text Book:

KapoorN.D..*Industrial Law*.New Delhi:Sultan Chand & Sons.

Book for References:

1. Tulsian. P.C. *Business and Corporate Law*.New Delhi:Tata McGraw Hill Edition.

SEMESTER –V			
Part III Core Integral II - Cost Accounting			
Code:18UCOI52	Hrs/Week: 5	Hrs/Sem: 75	Credits : 4

Vision:

Develop professional skills relating to cost accounting

Mission:

To enable the students to understand the basic principles of Cost Accounting and to develop skills in the preparation of cost accounts.

Course Outcomes :

CO No.	Upon completion of this course, students will be able to:	PSO's Addressed	Cognitive Level
CO – 1	Understand the objectives and functions of cost accounting	1,5	Un
CO – 2	Understand the preparation of cost sheet.	1,5,8	Ap
CO – 3	Determine the elements of material and the techniques of material control	4,5	Un &Ap
CO - 4	Know the concepts of labour cost computation and control.	1,5,8	Un &Ap
CO – 5	Understand the overhead allocation and apportionment.	1,5	Un &Ap
CO - 6	Gain knowledge on absorption of overheads	1,7,8	Un &Ap
CO – 7	Understand the techniques of Contract costing	5,8	Un &Ap
CO – 8	Gain knowledge on the techniques of Process costing and prepare process accounts.	5,8	Un &Ap

SEMESTER –V			
Part III Core Integral II - Cost Accounting			
Code:18UCOI52	Hrs/Week: 5	Hrs/Sem: 75	Credits : 4

Unit I Introduction to Cost Accounting and Material control:

Definition of Cost Accounting - Objectives - Difference between Financial Accounting and Cost Accounting - Elements of cost - Cost unit - Cost Centre - Classification of cost and costing.

Material control: Purchasing - Centralised and Decentralised purchasing. Store Keeping - Setting of levels of stock - Economic Ordering Quantity - ABC analysis - VED Analysis. Purchase price computation - Methods of valuing material issues: FIFO - LIFO - Simple Average - Weighted Average.

Unit II Labour Cost – Computation and Control:

Labour costs - Control over labour costs: Labour Turnover: Meaning - Methods of LTO - Causes, Effects and Prevention of LTO. Idle time: Meaning - Causes - Treatment. Overtime: Meaning - Causes - Treatment. Systems of wage payment: Methods of Time wage system - Methods of Piece wage system: Straight - Differential Piece rate: Taylor's Differential Piece rate - Merrick's Multiple Piece rate. Premium and Bonus plans: Halsey - Rowan.

Unit III Accounting for Overheads:

Meaning of Allocation and Apportionment of Overheads - Bases of Apportionment - Meaning of Reapportionment of overheads - Methods of Reapportionment - Meaning of Absorption of Overheads - Methods of Absorption of overheads.

Unit IV Cost sheet:

Format of Cost sheet - Preparation of Cost sheet, Tender or Quotation in Unit costing. Reconciliation of profits as per cost and financial accounts.

Unit V Methods of costing:

Contract costing: Features - Treatment of Profit in incomplete contracts.

Process costing: Features - Treatment of Normal loss, Abnormal loss and Abnormal gain in process accounts.

Note: Theory – 30% Problem – 70%

Text Book:

Pillai, R.S.N. and Bhagavathi,V, Cost Accounting, S.Chand&Co,Ltd.,New Delhi, 2013.

References:

1. Reddy,T.S.andHari Prasad Reddy.Y.,*Cost Accounting*, Margham Publications, Chennai, 2014.
2. Jain,S.P.andNarang, K.L.,*Cost Accounting- Principles and Practice*,Kalyani publishers, Chennai, 2013.
3. Murthy and GuruSamy.S.,*Cost Accounting*, Tata McGraw Hill, New Delhi, 2012.
4. Maheswari, S.N., *Cost and Management accounting*, Sultan Chand & Sons, New Delhi, 2013.

Semester - V			
Common Skill Based Core : Computer for Digital Era and Soft Skills			
Code : 18UCSB51	**Hrs / Week : 2**	**Hrs / Sem : 30**	**Credits : 2**

Course Outcome

- Identify different types of computer systems.
- Classify various types of softwares being used.
- Compare various digital payments and use them in day to day life.
- Recognise the innovative technologies IoT and integrate it in various fields.
- Analyze various social networking platforms and use them efficiently.
- Distinguish various cyber attacks and apply preventive measures.
- Understand the various soft skills needed to become successful.
- Analyze self and adapt oneself to work in a team.

Unit I: Fundamentals of Computers:

Introduction to computers- Components of computers-Working principle-Types of computers-Tablet-Notebook-Smart phone-PDA-Impact of computers on society-Types of software.

Unit II: Recent Trends in Computer Science and e-Governance:

E-Commerce - digital payments-E-Learning- IOT based applications-Mobile applications

Unit III: Social Media:

Face book-Twitter-Linked In-Instagram-Advantages of Social Networking-Issues/Risks of Social Networking-Protecting ourselves from social Networking problems-Cyber crimes-Hacking-Phising- Cyber Security

Unit IV: Introduction to Soft Skills:

Learning objectives – What are soft skills?-Categories of Soft Skills-Integral Parts of Soft Skills.

Unit V: Understanding Self and Team Building:

Introduction- Transactional Analysis (TA) - Structural analysis of Ego states- The functional model of Ego states - Egogram-Storkes - Life Position - Egogram And Life Positions Questionnaire-Team And Team Building- Features of effective creative teams

Books for Reference:

1. Peter Norton, Introduction to Computers 6th Edition
2. Charles P Pfleeger, Shari Lawrence Pfleeger, Security in Computing, I Edition, Pearson Education, 2003.

3. http://www.digitalindia.gov.in/content/social-media-analytics
4. https://www.researchgate.net/publication/307878962_Introduction_to_E-Governance
5. http://www.ijqr.net/journal/v10-n1/5.pdf

SEMESTER- IV			
Core V– Python Programming			
Code: 18UCSC41	**Hrs / week :5**	**Hrs / Semester: 75**	**Credits :4**

Unit I:

Introduction and overview :

Introduction, What is Python, Origin, Comparison, Comments, Operators, Variables and Assignment, Numbers, Strings, Lists and Tuples, Dictionaries, if Statement, while Loop, for Loop and the range() Built-in Function, Files and the open() Built-in Function, Errors and Exceptions, Functions, Classes, Modules.

Syntax and Style:

Statements and Syntax, Variable Assignment, Identifiers, Basic Style Guidelines, Memory Management, Python Application Examples.

Unit II:

Python Objects

Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types.

Numbers and Strings :

Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions. Sequences: Strings, Lists, and Tuples, Sequences, Strings, Strings and Operators, String-only Operators, Built-in Functions, String Built-in Methods, Special Features of Strings.

Unit III:

Lists :

Operators, Built-in Functions, List Type Built-in Methods, Special Features of Lists, Tuples, Tuple Operators and Built-in Functions, Special Features of Tuples.

Conditionals and Loops:

if statement, else Statement, else if Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement, else Statement.

Unit IV:

Files and Input/output: File Objects, File Built-in Function, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules

Unit V:

Regular Expressions :

Introduction/Motivation, Special Symbols and Characters for REs, REs and Python.

Programming Exercise: Check for data error in CSV files: Numeric Check, Alphanumeric Check, Email Check, Date Check.

Text Book:

1. Chun, J Wesley, Core Python Programming, 2nd Edition, Pearson, 2007 Reprint 2010.

Books for Reference:

1. Barry, Paul, Head First Python, 2nd Edition, O Rielly, 2010.
2. Lutz, Mark, Learning Python, 4th Edition, O Rielly, 2009.

SEMESTER- IV			
Core – VI – RDBMS			
Code: 18UCSC42	**Hrs / week :6**	**Hrs / Semester: 90**	**Credits :4**

Unit I:

Introduction:

Database System Applications-Purpose of Database Systems-View of Data-Database Languages-Relational Databases-Database Design-Data Storage and Querying-Transaction Management-Database Architecture-Data Mining and Information Retrieval-Specialty Databases-Database Users and Administrations-History of database Systems

Introduction to Relational Model:

Structure of Relational Databases-Database Schema-Keys-Schema Diagrams-Relational Query Language

Formal Relational Query Language-Relational Operations

Unit II:

Formal Relational Query Languages:

The Relational Algebra-The Tuple Relational Calculus-The Domain Relational Calculus

Database Design And The E-R Model:

Overview of the Design process-The entity Relationship Model-Constraits-Removing Redundant Attributes-Entity Sets-Entity Relationship Diagrams-Reduction to Relational Schemas-Entity Relationship Issues-Extended E-R Features-Alternative Notations for Modeling data-Other Aspects of Database Design

Unit III:

Relational Database Design:

Features of Good Relational-Designs-Atomic Domains and First Normal Form-Decomposition using Functional dependencies-Functional-Dependency Theory-Algorithms for Decomposition-Decomposition Using Multivalued Dependencies-More Normal Forms-Database Design Process-Modelling Temporal Data

Storage and File Structure:

Overview of Physical Storage Media-Magnetic Disk and Flash Storage-RAID-Tertiary Storage-File Organization-Organization of Records in Files-Data Dictionary Storage-Database Buffer

Unit IV:

Transactions:

Transaction Concept-A Simple Transaction Model-Storage Structure-Transaction Atomicity and Durability-Transaction Isolation-Serialzability

Concurrency Control:

Lock base Protocols-Deadlocks Handling-Multiple Granularity-Timestamp Based protocols-Validation Based Protocols-Multiversion Schemas-Shapshot Isolation

Unit-V:

Database System Architectures:

Centralized and Client-Server Architectures-Server System Architecture-Parallel Systems-Disturbuted Systems

Parallel Databases:

Introduction0I/O Parallelism-Interquery Parallelism- Intraquery Parallelism

Distributed Databases:

Homogeneous and Heterogeneous databases-Distributed Data Storage-Distributed Tranasctions

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, ―Database System Concepts‖, Sixth Edition, Tata McGraw Hill, 2011.
2. RamezElmasri, Shamkant B. Navathe, ―Fundamentals of Database Systems‖, Sixth Edition, Pearson Education, 2011.

Books for References:

1. C.J.Date, A.Kannan, S.Swamynathan, ―An Introduction to Database Systems‖, Eighth Edition, Pearson Education, 2006.
2. Raghu Ramakrishnan, ―Database Management Systems‖, Fourth Edition, McGraw-Hill College Publications, 2015.
3. G.K.Gupta,"Database Management Systems‖, Tata McGraw Hill, 2011.

SEMESTER- V			
Core – VII– Operating Systems			
Code: 18UCSC51	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Vision:

To study about the resource manager and how to use the resources efficiently

Mission:

Use various scheduling algorithms for process scheduling. How to avoid deadlock situation.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Define Operating System Structure and the various operations , process of operating system	1	Re
CO-2	Analyze the Various Scheduling Algorithms of Process Management	6	An
CO-3	Explain the concept of Deadlock.	6	Re
CO-4	Implement the various allocation methods of Memory Management	6	Ap
CO-5	Access Methods and File allocation Methods	6	Re
CO-6	Compare the scheduling algorithms of disk	6	An
CO-7	Discuss about open source software	9	Un
CO-8	Compare Linux with other operating system	6	An

Unit I:

Introduction and System Structures: Operating system definition, computer system organization, and architecture, structure and operations, process, memory and storage management.

Unit II:

Process Management: Process concepts, scheduling and operations on processes. Process Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, Synchronization: Background, critical section problems, Peterson's Solution, Synchronization Hardware, Classic problem of synchronization.

Unit III:

Deadlock: Deadlock: System model, deadlock characterization, methods for handling deadlock, deadlock prevention, avoidance and detection, Recovery from deadlock.

Memory Management: Memory Management Strategies: Background, swapping, Memory allocation, Paging, Structure of the page table.

Unit IV:

File system: File system: File concept, Access methods, File system structure, allocation methods and free-space management. Disk structure, disk scheduling algorithms and management RAID structure.

Unit V:

Open Source

Introduction to Linux: What is Linux? – A Brief History of Linux – System features – Differences between Linux and other Operating Systems .

Some Basic Linux Commands:Directory oriented commands, file oriented commands, Process oriented commands, General Purpose Commands.

Text Books:

1. A. Silberschatz, P.B. Galvin and G. Gagne, Operating System Concepts, 8th Edition, Wiley India, 2011.

2. Linux complete - Grant Taylor , BPB Publications. 1998 (Chapter 1).

Books for Reference:

1. Stalling William, Operating Systems: Internals and Design Principles, 7th Edition, Prentice Hall, 2011.

2. Dietel, Operating Systems, 3rd Edition, Pearson Education,2004.

3. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Prentice Hall, 2007.

SEMESTER- V			
Core – VIII – Programming With PHP and MySQL			
Code: 18UCSC52	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Vision:

Create dynamic webpages

Mission:

Use open source software PHP and MYSQL to create dynamic web pages.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Explain the variable usage in PHP	1	Un
CO-2	Creating forms with conditional statements	1	Cr
CO-3	Describe about arrays, files, cookies and functions.	2	Un
CO-4	Create an application using file operation	4	Cr
CO-5	Implement the concept of oracle in Mysql query	7	Ap
CO-6	Explain the concept Grouping data, filtering, Aggregate function	7	Un
CO-7	Explain the concept of the sub queries, joining tables,set operator and full text searching	7	Ap
CO-8	Develop PHP program with database connectivity .	7	Cr

Unit I :

Introduction:

Introduction- Open source PHP – PHPhistory- features-variables-statementsoperators-conditional statements-if-switch-nesting conditions-merging forms withconditional statements-loops-while-do-for – loop iteration with break andcontinue.

Unit II:

Arrays and Functions:

Arrays- Creating an array- modifying array-processing array-groupingform with arrays- using array functions- creating user defined functions- usingfiles- sessions- cookies- executing external programs- Creating sampleapplications using PHP.

Unit III:

File Handling:

Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get_contents- reading a fle into into an array with file-checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy-deleting files-writing to a file-reading and writing binary files –locking files

Unit IV:

MySQL:

Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting andfiltering retrieved data -Advanced data filtering-Data manipulation functions-Aggregate functions -Grouping data- Sub queries-Joining Tables- Set operators-Full text searching.

Unit V:

PHP with MySQL:

Working MySQL with PHP-database connectivity- usage of MYSQLcommands in PHP-processing result sets of queries- handling errors-debuggingand diagnostic functions-validating user input through Database layer andApplication layer- formatting query output with Character- Numeric- Date andtime –sample database applications.

Text Books:

1. VIKRAM VASWANI- “PHP and MySQL”- Tata McGraw-Hill- 2005

2. BEN FORTA - ”MySQL Crash course “ SAMS- 2006.

3. Steven Holzner,The Complete reference PHP, Tata McGraw Hill,2008

Books for Reference:

1. Tim Converse- Joyce Park and Clark Morgan- ”PHP 5 and MySQL”-Wiley India reprint- 2008.

2. Robert Sheldon- Geoff Moes- ”Beginning MySQL”-Wrox- 2005.

3. Alexis Leon and Mathews Leon- “Database Management Systems”-Vikas- 2008.

SEMESTER VI			
Core – IX– Android Programming			
Code: 18UCSC61	**Hrs / week :5**	**Hrs / Semester: 75**	**Credits :4**

Vision:

To create android apps

Mission:

To create apps using various layouts and views

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Distinguish different mobile techniques	2	Re
CO-2	Install Android SDK	5	Ap
CO-3	Design User Interface	5	Cr
CO-4	Modify app to include multimedia content	10	An
CO-5	Create app to access SD card	10	Cr
CO-6	Create app with Google Maps	10	Cr
CO-7	Design app with SQLite database	10	Cr
CO-8	Deploy Mobile app	10	Ap

Unit I:

Getting started with Android Programming: What is Android?- Android versions- Features and architecture of Android- Android Devices in the market- Obtaining the required tools- Android Studio- Android SDK- Creating Android Virtual Devices (Avds)- Android Developer Community- Launching Android Application.

Using Android Studio for Android development : Exploring IDE- Using Code Completion- Debugging Application -Setting Break points- Publishing Application- Generating a Signed APK

Unit II:

Activities, Fragments and Intents: Understanding activities - applying styles and themes to an activity- Hiding the activity title- Displaying a dialog Window and a Progress dialog- Linking activities using intents- returning results from an Intent- Passing data using an Intent Object- Fragments - adding Fragments dynamically - life Cycle of a Fragment- interactions between Fragments- Understanding the Intent Object - Using Intent Filters- Displaying notifications

Getting to know the Android User Interface: Understanding The Components of a Screen- Views and View groups - Frame layout - Linear layout (Horizontal) and linear layout(Vertical)- Table layout- Relative layout - Frame layout- Scroll view- Adapting to Display Orientation- Anchoring Views - Managing Changes to Screen Orientation - Persisting State information during changes in configuration- detecting orientation changes-

Controlling the orientation of activity- Utilizing the Action Bar- adding action Items to Action Bar- Creating the User Interface programmatically- listening for UI Notifications

Unit III:

Designing user Interface with views: Using basic views - Text view - Button, Image button, Edit text, Checkbox, Toggle button, Radio button, and Radio group Views- Progress bar View- Auto complete text view View- Using Picker Views- Time picker View- Date picker View- using List Views To Display Long Lists- List view View- Using The Spinner View- understanding Specialized Fragments- using List fragment- Dialog fragment- Preference fragment

Displaying Pictures and Menus With Views: Using Image Views to Display Pictures- Image view - Image switcher- Grid view- Using Menus With Views- Creating the helper Methods- Options Menu- Context, Web view

Unit IV:

Data persistence: Saving And Loading User Preferences- Accessing Preferences Using An Activity- Programmatically Retrieving And Modifying the Preferences Values- Persisting Data to Files- Saving To Internal Storage- Saving To External Storage (SD Card)-Choosing the Best Storage option- Creating and using Databases- Creating Dbadapter Helper Class- Using the Database Programmatically

Content Providers: Sharing Data In Android- Using a Content Provider- Predefined Query String Constants- Projections- Filtering- Sorting- Creating Your Own Content Providers- Using The Content Provider

Unit V:

Messaging: SMS Messaging- Sending SMS Messages Programmatically- Sending SMS Messages using Intent- Receiving SMS messages- Caveats and warnings- Sending Email

Location-Based Services: Displaying Maps- Creating the Project- obtaining the Maps API Key- Displaying Map- Zoom Control- Changing Views- navigating to a specific location- Getting the location that was touched- Geo coding and reverse Geo coding- Getting location data- Monitoring location

Text Books:

J. F.DiMarzio ,Beginning Android Programming with Android Studio, John Wiley &sons, Inc, Fourth Edition

Books for Reference:

1. Ed Burnette, Hello, Android: Introducing Google's Mobile Development Platform, Pragmatic.2009.
2. Jerome (J.F) DiMarzio , Android - A programmer's Guide, TataMcgraw Hill,2010.
3. JhonHarton, Android Programming for Beginners ,Packt Publishing, 2015

SEMESTER VI			
Core – X– Software Engineering			
Code: 18UCSC62	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Vision:

Be successful professionals in the field with solid fundamental knowledge of Software Engineering on creating more complex software systems.

Mission:

Prepare students with a thorough understanding of software engineering Techniques and important concepts such as software processes from software specification through system evolution with ethical values to solve real world problems.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Describe the concepts of Software Engineering.	1	Un
CO-2	Describe Software Life Cycle Model	1	Un
CO-3	Discuss Project Management	2	Ap
CO-4	Discuss software Requirement and specification	2	Ap
CO-5	Explain Software Design Process	3	Un
CO-6	Describe User Interface Designing	3	Un
CO-7	Explain software Testing and Software Reliability and	3	Un
CO-8	Discuss Software Quality Management System	3	Un

Unit I:

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design.

Software Life Cycle Models:- A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model. (12L)

Unit II :

Software Project Management:- Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. Requirements Analysis and Specification:- Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document. (12L)

Unit III:

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design?

Function-Oriented Software Design:- Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design. (12L)

Unit IV:

User Interface Design:- Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System.

Coding and Testing:- Coding – Software Documentation – Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis. – White-box Testing. (12L)

Unit V:

Software Reliability and Quality Management:- Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification. – SEI Capability Maturity Model: Level 1 to Level 5. Software Maintenance:- Characteristics of Software Maintenance: Characteristics of Software Evolution – Software Reverse Engineering. (12L)

Text Book:

1. RajibMall,Fundamentals of Software Engineering Fourth Edition ,PHI Learning Private Limited 2015.

Books for Reference:

1. Ian Sommerville , Software Engineering 9th Edition , Pearson Education Asia.

2.R.S.Pressman, Software Engineering: A Practitioner‘s Approach (7th Edition), McGraw-Hill, 2009.

3. K L James , Software Engineering 2nd Edition , PHI.

SEMESTER VI			
Core – XI– Computer Networks			
Code: 18UCSC63	**Hrs / week :5**	**Hrs / Semester:75**	**Credits :4**

Vision:

Gain fundamental knowledge about computers and devices communicate.

Mission:

Analyse different network models, various topologies and various protocols.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Define Network and the various types of Network	1	Re
CO-2	Demonstrate the model of Network	1	An
CO-3	Analyze the structure of Switch and the Protocols.	2	An
CO-4	Discuss Connection devices by using Wired LANs	2	Ap
CO-5	Discuss the Network layer and Transport Layer in routing and TELNET	6	Re
CO-6	Describe the various routing algorithms in network layer	8	Un
CO-7	Define Network Security and other aspects of Security	5	Re
CO-8	Acquire the basic knowledge of layers of OSI model	5	Re

Unit I :

Introduction: Data communications-Networks- Network Types- Internet History- Standards and Administration.

Network Models : Protocol Layering- TCP/IP Protocol suite- The OSI Model.

Transmission Media: Guided Media- Unguided Media: Wireless

Unit II:

Switching: Introduction- Packet switching – Structure of a switch.

Data Link control :DLC Services- Data Link Layer Protocols –HDLC.

Media Access Control : Random Access- Controlled Access.

Unit III:

Wired LANs: Ethernet -: Ethernet Protocol – Standard Ethernet - Fast Ethernet- Gigabit Ethernet - 10Gigabit Ethernet.

Wireless LANS: Bluetooth.

Connecting Devices and Virtual LANs: Connecting Devices – Virtual LANs.

Unit IV:

Network layer: Unicast Routing : Introduction – Routing Algorithms- Unicast Routing Protocols.

Next Generation IP : Ipv6 Addressing

Introduction to Transport Layer: - Introduction – Transport-Layer Protocols.

Application Layer : Standard Client – Server Protocols: FTP- Electronic mail-TELNET Secure Shell –Domain Name System.

Unit V:

Quality of Services : Data- flow characteristics Flow control to improve QOS-Integrated Services.

Cryptography and Network Security: Introduction – Confidentiality-Other aspects of Security .

Text Book:

1. BehrouzA.Foruzan,"Data Communications and Networking ", McGraw Hill Education Private Ltd., Fifth Edition 2013.

Unit I: Chapter 1.1-1.5, 2.1-2.3,7.1,7.3

Unit II: Chapter 8.1-8.4, 11.1-11.3, 12.1-12.2

Unit III: Chapter 13.1-13.5, 15.3, 17.1-17.2

Unit IV : Chapter 20.1-20.3, 22.1,23.1-23.2, 26.2-26.6

Unit V : Chapter 30.1-30.3, 31.1-31.3

Books forReference:

1. Andrew S.Tenanbaum,"Computer Networks", Fourth Edition, PHI,2002.
2. R.S.Rajesh, K.S.Easwarakumar&R.Balasubramanian, Computer Networks, Vikas Publishing House ,2012
3. James F. Kurose, Keith W.Ross, Computer Networking , Fifth Edition,Pearson,2010.

SEMESTER V			
Core – Practical V – PHP& MySQL Lab			
Code: 18UCSCR5	**Hrs / week :5**	**Hrs / Semester: 75**	**Credits :3**

List of Practicals :

1. Creating simple webpage using PHP.
2. Write programs using conditional-looping statements in PHP.
3. Use of looping statements in PHP
4. Creating programs using arrays.
5. Creating user defined functions.
6. File manipulation using PHP.
7. Creating simple table with constraints.
8. Insertion-Updation and Deletion of rows in MYSQL tables.
9. Searching of data by different criteria.
10. Sorting of data.
11. Demonstration of joining tables.
12. Usage of subqueries.
13. Validating Input.

SEMESTER VI			
Core – Practical VI – Android Programming Lab			
Code: 18UCSCR6	**Hrs / week :5**	**Hrs / Semester: 75**	**Credits :3**

List of Practicals :

1. Creating “Hello world” Application.
2. Creating an Application that displays message based on the screen orientation.
3. Create an application that displays custom designed Opening Screen.
4. Create menu in Application.
5. Play an audio, based on the user event.
6. Read/ write the Local data.
7. Display Map based on the Current location.
8. Create / Read / Write data with database (SQLite).
9. Hello world – windows app.
10. Create a Tiles based app.
11. Design a Lock Screen in the existing app.
12. Learn to deploy both android and windows Applications.

SEMESTER- V			
Core – Integral I – Data Mining			
Code: 18UCSI51	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Vision:

To analyse the data for KDD

Mission:

Use market basket analysis, clustering techniques to identify the hidden pattern in the data.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Define data mining process and the various data mining techniques	1	Re
CO-2	Apply market basket analysis	7	Ap
CO-3	Compare different classification methods	7	An
CO-4	Implement cluster analysis	7	Ap
CO-5	Create an ODS	7	Cr
C0-6	Discuss about data warehousing	6	Re
CO-7	Compare and contrast OLAP AND OLTP	7	An
CO-8	Describe various search engines .	10	Un

Unit I:

Introduction: What is Data Mining?-Why Data Mining now!-The Data Mining Process-Data Mining Applications-Data Mining Techniques.

Association Rules: Introduction-basics-The Task and a Naïve Algorithm-The Apriori Algorithm-Improve the efficiency of the Apriori Algorithm.

Unit II:

Classification: Introduction-Decision tree-Building a Decision Tree-Overfittingand pruning-Decision Tree Rules- Naïve Bayes Method-Estimating Predictive Accuracy of Classification Methods-Improve Accuracy of classification methods-other evaluation criteria for classification methods.

Unit III:

Cluster Analysis: What is Cluster Analysis?- Desired features of Cluster Analysis-Types of Data –Computing Distance- Types of Cluster Analysis Methods-Partition

Methods-Hierarchical Methods-Density based methods- Quality and validity of cluster analysis methods.

Unit IV:

Web Data Mining: Introduction-Web Terminology and characteristics- Locality and Hierarchy in the web-Web Content mining- Web usage mining.

Search Engine: Introduction-Search Engine Functionality- Search Engine Architecture.

Unit V:

Data Warehousing: Introduction-Operational Data Stores-Data Warehouses-Data Warehouse Design-Guidelines for Data Warehouse Implementation-Data Warehouse Metadata.

Online Analytical Processing (OLAP): Introduction- OLAP- Characteristics of OLAP Systems-Multi Dimensional View and Data Cube-Data Cube Implementation- Data Cube Operations.

Text Book:

1. G.K.Gupta, Introduction to Data Mining with Case Studies, Prentice Hall of India, 2008. Chapters: 1.1-1.5, 2.1-2.5, 3.1-3.4, 3.6-3.12, 4.1- 4.8, 4.10,5.1-5.5, 6.1, 6.3-6.4, 7.1-7.2, 7.4-7.7, 8.1-8.3, 8.5-8.8.

Booksfor Reference:

1. Margaret H.Dunham; S.Sridhar, Data Mining Introductory and Advanced Topics, Pearson Education, 2007.
2. Alex Berson and Stephen J. Smith, Data Warehousing, Data Mining, OLAP, TMH Publication ,1997 .

SEMESTER VI			
Core – Integral II– Cloud Computing			
Code: 18UCSI61	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Vision:

Attain knowledge about how to design and build cloud environments to enhance performance and cost reduction

Mission:

Learn about various service models PaaS, SaaS, IaaS and data centres. To analyse cloud storage systems.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Define cloud computing	1	Re
CO-2	Describe the characteristics of cloud	2	Un
CO-3	Identify the technical foundations of cloud system architecture	2	An
CO-4	Characterize the distinction between infrastructure , platform, software and service	7	An
CO-5	Illustrate the use of load balancing techniques	7	Ap
CO-6	Attempt to generate new ideas and innovations in cloud computing	7	Cr
CO-7	Compare and contrast the various web services	10	An
CO-8	Demonstrate the usage of mail services	10	An

Unit I:

Understanding cloud computing:

Cloud computing - cloud types- the cloud cube model- deployment models-service models-characteristics of cloud computing-assessing the role of open standards.

Assessing the value proposition:

Measuring the cloud's value – the laws of cloudonomics –cloud computing obstacles – measuring cloud cost – avoiding capital expenditures

Unit II:

Cloud Architecture:

The cloud computing stack – composability – infrastructure – platforms – virtual appliances – communication protocols – Connecting to the cloud: The Jolicloud net book OS – Chromium OS the browser as an operating system.

Developing Cloud Services:

Infrastructure as a service (IaaS) – IaaS workloads- Platform as a service (PaaS) – Software as a service (SaaS)– Identity as a service (IDaaS) – Compliance as a service(CaaS).

Unit III:

Virtualization and CloudApplications:

Virtualization technologies – load balancing and virtualization – advanced load balancing – the Google cloud

Cloud Security:

Securing the cloud –security service boundary –security mapping- securing data –brokered cloud storage access-encryption-auditing and compliance

Unit IV:

Google Web Services:

Google Analytics – Google translate- Google Toolkit –Google APIs

Amazon Web Services:

working with Amazon Elastic compute cloud(EC2)- Amazon simple storage system(S3) – Amazon Elastic block store(EBS)- cloud front.

Microsoft Web Services:

Windows azure platform – windows Azure App fabric.

Unit V:

Cloud Storage:

Cloud storage definition – unmanaged cloud storage – managed cloud storage – creating cloud storage systems – backup types - cloud backup features

Webmail Services:

Cloud mail services- Google Gmail- Mail2Web – Windows Live Hotmail- Yahoo Mail

Textbook:

1.Barrie Sosinsky, **Cloud Computing Bible**, Wiley India Pvt. Ltd, 2012. New Delhi.

Books for Reference:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the WayYou Work and Collaborate Online, Que Publishing, Second Edition, August 2008.

2.Aley Beard, Cloud Computing Best Practices for Managing and MeasuringProcesses for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, EmereoPvt. Limited, July 2008.

SEMESTER –IV	
Self Study Course II - Mathematical Reasoning	
Code: 18UCSSS2	**Credits: 2**

Unit I :

Simplification, Averages.

Unit II :

Ratio and Proportion, Partnership.

Unit III :

Percentage , profit and loss.

Unit IV :

Simple interest , Compound interest.

Unit V :

Time and work , Time and distance.

TextBook :

Objective Arithmetic – R.S.Agarwaal. (chapters 4,6,12,13,10,11,21,22,15,17)

SEMESTER- VI	
Self Study Course III– ASP.NET	
Sub Code: 18UCSSS3 (compulsory)	**Credits :2**

Vision:

To create dynamic webpages.

Mission:

Use DotNET technology to create server side web applications.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	Understand the Microsoft .NET Framework and ASP.NET page structure	2	Un
CO-2	Compare C# and VB programming Languages	5	An
CO-3	Build and debug well-formed Web Forms with ASP. NET Controls.	6	Cr
CO-4	Understand the Visual studio .NET environment	6	Un
CO-5	Create and Use Viewstate, Query String and cookies	7	Cr
CO-6	Implement appropriate data transfer between pages	7	Ev
CO-7	Use Microsoft ADO.NET to access data in web Application	10	Ap
CO-8	Develop dynamic Websites	10	Cr

Unit I:

The.Net Framework- The .NET Programming Framework-VB.NET, C#, and the .NET Language- The Common Language Runtime-The .NET Class Library-ASP.NET-Visual Studio.NET.

Learning The .Net Language-Data Types-Declaring Variables-Scope and Accessibility-Variable Operations-Object-Based Manipulation-Conditional Structures-Loop structures-Functions and Subroutines

Unit II:

Asp.Net Applications- ASP.NET Applications-Code-Behind-The Global.asax Application File-Understanding ASP.NET Classes-ASP,NET Configuration

Web Form Fundamentals- A Simple Page Applet-Improving the Currency converter-A deeper Look at HTML Control Classes-The Page Class-Assessing HTML Server Controls.

Unit III:

Web Controls-Stepping Up to Web Controls-Web Control Classes-Auto Post Back and Web Control Events-A Simple Web Page Applet-Assessing Web Controls.

Using Visual Studio .Net-The promise of Visual Studio. NET-Starting a Visual Studio .NET Project-The Web Form Designer-Writing Code-visual Studio .NET Debugging-Working Without Visual Studio .NET.

Unit IV:

State Management-The Problem of State-Viewstate-Transferring Information-Custom cookies-Session State-Session State Configuration-Application State.

Tracing And Logging-Logging Exceptions-Error Pages-Page Tracing

Unit V:

Database Connectivity: Overview of ADO.NET:9 Introducing ADO.NET and data Management− characteristics of ADO.NET –The ADO.NET Object Model. ADO.NET Data Access SQL Basics –The SQL Select Statement – The SQL Update Statement – The SQL Insert Statement − The SQL Delete Statement–Creating a connection –Defining a Select Command – Updating Data – Accessing Disconnected Data –Updating Disconnected Data –Data Binding –Introducing Data Binding –Single Value Data Binding –Repeated Value Data Binding –Data Binding with Databases−The DataLiIst, DataGrid and Repeater.

Text Book:

1. MATHEW MACDONALD, The Complete Reference ASP.NET, TMH 2002

Books for Reference:

1. G. Andrew Duthie,Microsoft ASP.NET Step by step, Microsoft Press, 2003
2. Kogent Learning Solutions Inc., ASP.NET 2.0 Black book, DreamTechPress, 2006.
3. NitinPandey ,” Microsoft ASP.NET”, PHI,2002
4. MridulaParihar, YeshSingal and NitinPandey, “Visual Studio .Net Programming”, PHI, 2002
5. C. Muthu,”ASP.NET”, 2nd Ed., Vijay Nicole Imprints Pvt.Ltd., 2008.

Semester- I			
Allied II – Economics Of Advertising			
Code: 18UECA12	**Hours / week :3**	**Hrs / Semester: 45**	**Credits :3**

Unit I: Introduction 10 Hrs

Meaning, Definition, Features and Types of Advertising - Importance of advertising

Unit II: Advertising Copy 5 Hrs

Meaning– Qualities of good advertising copy– Elements of advertising copy

Unit III: Advertising Media 10 Hrs

Meaning– Print Media –Outdoor Media – Electronic Media- Trade Expo

Unit IV: Advertising Budget10 Hrs

Meaning– Methods of Budgeting – Importance and factors affecting advertising Budget

Unit V: Advertising Agency 10 Hrs

Meaning– Types and structure of advertising agency – Functions, Selection and remuneration of advertising agency

Text Book:

K.Pazhani&S.Jesi, Advertising, J.P.Publishers, Nagarcoil, 2001

Books for Reference:

1. Belch and Belch,*Advertising and Promotion*, Tata McGraw Hill Co.
2. Sharma, Kavita, *Advertising: Planning and Decision Making*, Taxmann Publication Pvt. Ltd.
3. Mahajan, J.P., and Ramki, *Advertising and Brand Management,*Ane Books Pvt Ltd, New Delhi.
4. Burnett, Wells, and Moriatty, *Advertising: Principles and Practice,* Pearson Education

Semester- I			
ALLIED II – ECONOMICS OF ADVERTISING			
Code: 18UECA12	**Hours / week :3**	**Hrs / Semester: 45**	**Credits :3**

Vision: Appreciate the importance of advertising in business

Mission: Synthesize broader liberal arts knowledge with the principles of advertising to create effective advertising campaigns

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO - 1	understand what advertising is and its role in advertising and brand promotion and the economic effects of advertising.	4	Un
CO – 2	create advertisement copy and appreciate the growth of modern advertising	4	Cr
CO – 3	comprehend the role and importance of advertising in society	4, 5	Ev
CO – 4	create and conduct ethically sound and socially responsible advertising strategies and campaigns	1, 4	Cr
CO – 5	identify, analyze, and understand the advertising environment	1, 5	An
CO – 6	prepare the advertising message and fully integrate the creative process.	1	Cr
CO – 7	understand the importance of placing the message in conventional and “new” media.	1, 5	Ev
CO - 8	know the importance of budget and analyse the factors affecting budget.	4	An

SEMESTER- II			
ALLIED III - PRINCIPLES OF MARKETING			
Code: 18UECA21	**Hours / week :3**	**Hrs / Semester: 45**	**Credits :3**

UNIT I INTRODUCTION TO MARKETING **10 Hrs**

Meaning and Definition – Features of Marketing – Objectives of Marketing – Modern Marketing Concept – Global Marketing – Role of Marketing in Economic Development

UNIT II FUNCTIONS OF MARKETING **10 Hrs**

Classification of Marketing Functions – Buying – Assembling – Packing - Selling – Transportation – Storage –Grading and Standardization.

UNIT III PRODUCT PLANNING **10 Hrs**

Meaning - Definition of Product- Features of Product - Importance of Product mix – Factors determining Product mix

UNIT IV PRODUCT LIFE CYCLE **10 Hrs**

Meaning – Benefits of Product Life Cycle – Consumer Behaviour – Factors influencing Consumer behaviour

UNIT V MARKET SEGMENTATION **5 Hrs**

Meaning and need for Market Segmentation – Criteria for Market Segmentation – E –Marketing

Text Book:

R. S. N. Pillai&Bhagavathi, *Modern Marketing*

Books for Reference:

1. Lamb, Charles W.; Hair, Joseph F., and Carl McDaniel, *Principles of Marketing*, South Western Publishing, Ohio
2. Chhabra, T.N., *Principles of Marketing*, Sun India Publication.
3. Kumar, Arun& N. Meenakshi, *Marketing Management*,Vikas Publications.
4. Palmer, Adrian, Introduction to Marketing, Oxford University Press, UK

SEMESTER- II			
ALLIED III - PRINCIPLES OF MARKETING			
Code: 18UECA21	**Hours / week :3**	**Hrs / Semester: 45**	**Credits :3**

Vision:

Provide the knowledge on social, legal, ethical and technological forces relating to marketing decision-making

Mission:

Enable students to appreciate the global nature of marketing and appropriate measures to operate effectively in national and international settings

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**C L**
CO – 1	identify core concepts of marketing and the role of marketing in business and society	4	Un
CO – 2	develop marketing strategies based on product, price, place and promotion objectives.	1, 4 & 5	Ev
CO – 3	create an integrated marketing communications plan which includes promotional strategies and measures of effectiveness.	5	Cr
CO – 4	communicate the unique marketing mixes and selling proporsitions for specific product offerings.	1, 5	Ap
CO – 5	construct written sales plans and a professional interactive oral sales presentation.	1, 4	Cr
CO – 6	formulate marketing strategies that incorporate psychological and sociological factors which influence consumers.	1, 5	Cr
CO – 7	collect, process, and analyze consumer data to make informed marketing decisions	1, 3	Ev
CO – 8	analyze marketing problems and provide solutions based on a critical examination of marketing information	3	An

SEMESTER- III	
SELF-STUDY / ON-LINE COURSE (OPTIONAL) BANKING PRACTICES	
Code: 18UECSS1	**Credits :2**

UNIT –I BANKING LAW

Banking Regulation Act, 1949 (Definition of Banking, Licensing, opening of branches, Functions of Banks, Inspection)

UNIT –II BANKING TECHNOLOGY

Commercial Banks – Functions – Accepting Deposits – Lending of Funds, E-Banking, ATM– Online Enquiry and update facility- Electronic Fund Transfer- Electronic Clearing System.

UNIT –III ACCOUNTS

Opening of an Account – Types of Deposits Account – Types of Customers: (individuals, firms, Trusts, and Companies) – Importance of customer relations – Customer grievances and redressal

UNIT-IV E-BANKING AND CARDS

Types of E-Banking: Telephone Banking, Computerized Home Banking, Computerized Corporate Banking, On-Line Banking -Types of Cards: Debit Cards, Credit Cards and Smart Cards

UNIT-V NEGOTIABLE INSTRUMENTS

Negotiable Instruments: Promissory Notes, Bills of Exchange, Cheque, Draft – Definitions, Features – Crossing – Endorsement – Material Alteration – Paying Banker – Rights and Duties – Statutory Protection – Dishonour of Cheques - Role of Collecting Banker

Text Book:

Sundaram and Varshney, Banking Law, Theory and Practice – Sultan Chand Co

Books for Reference:

1. K. Nirmala Prasad, *Banking Theory,Law and Practice*– Himalaya Publishing House; (2014)
2. B. Santhanam - *Banking and Financial Systems*–(Margham Publishers)
3. S.N. Maheswari, *Banking Law, Theory and Practice*- Kalyani Publications
4. Parameswaran –*Indian Banking* –S.Chand and Co,
5. Tannan,*Banking Law and Practice in India* - Lexis Nexis

SEMESTER- III	
SELF-STUDY / ON-LINE COURSE (OPTIONAL) BANKING PRACTICES	
Code: 18UECSS2	**Credits :2**

Vision: To provide for taking up higher studies in Management, and banking related areas.

Mission:

The course provides a foundation for commerce and banking related areas of study to enable students to take up general banking jobs.

Course Outcome:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	understanding of Indian Banking System structure, functions of banks.	1	Un
CO – 2	analysis of RBI functions, working and policy.	6,8	An
CO – 3	describe the contribution of electronic finance to financial globalization and international regulation of electronic finance.	6	An
CO – 4	analyse banking products and services in relation to the bank customer's needs and describe the distribution channels	5,7	An
CO – 5	perform a matching of customer needs with specific banking products and services	5	Un
CO – 6	understand the procedure for operations of types of cards	1,5	Un
CO – 7	discuss the knowledge about telephone banking and On - line banking.	1,2	Ap
CO – 8	know the statutory protection available to the paying banker and collecting banker.	1,2	An

SEMESTER V			
Core IX American Literature			
Code: 18UENC53	**Hrs/Sem:90**	**Hrs/Week: 6**	**Credits:5**

Vision: To familiarise students with the representative writers in American literature.

Mission: To explore the inherent voices of individualism, nature, imagination, creativity, and emotions in American literature.

Course Outcome:

Co. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	highlight the important social condition of each period in order to understand the authors.	1	Re
CO-2	understand the important features of American literature.	2	Un
CO-3	identify and interpret the representative works of American writers.	2	Un
CO-4	assess the significant themes in American Literature.	4	Ev
CO-5	appraise the literary devices employed by the major writers.	2	Ev
CO-6	interpret the historical perspective of American Literature.	4	Un
CO-7	review the dimensions of American literature in the universal context.	8	Ev
CO-8	formulate imagination to a wider range of voices across cultures.	8	Cr

SEMESTER V			
Core IX	**American Literature**		
Code: 18UENC53	**Hrs/Sem:90**	**Hrs/Week: 6**	**Credits:5**

Unit I - Poetry

Walt Whitman (1819-1892) : Out of the Cradle Endlessly Rocking
Robert Frost (1874-1963) : After Apple-Picking
Wallace Stevens (1879-1955) : Of Modern Poetry
Langston Hughes (1902-1967) : The Negro Speaks of Rivers
Sylvia Plath (1932-1963) : Mirror

Unit II - Prose

Ralph Waldo Emerson (1803-1882) : The American Scholar (Duties of the scholar).
Henry David Thoreau (1817-1862) : Where I Lived and What I Lived For

Unit III - Fiction

Ernest Hemingway (1899-1961) : *Across the River and into the Trees*

Unit IV - Drama

Tennessee Williams (1911-1983) : *The Glass Menagerie.*

Unit V - Short-story

Edgar Allan Poe (1809-1849) : The Cask of Amontillado
Mark Twain (1835-1910) : Eve's Diary
Henry James (1843-1916) : The Last of the Valerie

Text Books:

1. Baym, Nina. (ed). *The Norton Anthology of American Literature 5e. V 1*. NewYork: W.W.Norton & Company, 2003. Print.
2. Hemingway, Ernest. *Across the River and into the Trees*. London: Arrow Books, 2004. Print.
3. Williams, Tennesse. *The Glass Menagerie.* New York: Penguin Classics, 2014. Print.

Books for Reference:

1. Burt, Daniel.S. *The Chronology of American Literature: America's Literary Achievements from the Colonial Era to Modern Times*. Boston: Houghton Mifflin Publishers, 2004. Print.
2. Hover, Janet Gabler & Robert Sattelmeyer. *American History through Literature, 1820-1870.* Detroit: Charles Scribner's Sons, 2006. Print.

SEMESTER-VI			
Core XII	**New Literatures in English**		
Code : 18UENC63	**Hrs/ week :6**	**Hrs/ Sem : 90**	**credits :4**

Vision: To introduce students to the literature of the third world nations and make them familiarise with the socio cultural issues

Mission: To expose the students to relate and appreciate the aesthetics expressed in their work of art

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge about contemporary literature across cultures.	1, 2	Un
CO-2	recognize similarity of experiences of Post-Colonial writers	8	Un
CO-3	identify the various themes presented in New Literatures in English.	1	Ap
CO-4	appreciate the diversity of literary and social voices.	1, 2	Ev
CO-5	develop a penchant for New Literatures in English.	1, 8	Cr
CO-6	understand texts in their cultural and historic contexts.	4	Un
	develop a critical understanding of how literature can both uphold and resist existing structures of power.	8, 10	Un
CO-8	critically analyse different literary texts across cultures	8	An

SEMESTER-VI			
Core XII	**New Literatures in English**		
Code : 18UENC63	**Hrs/ week :6**	**Hrs/ Sem : 90**	**credits :4**

Unit I Poetry

A. D. Hope (1907-2000)	:	Australia
David Diop (1927-1960)	:	Africa
Derek Walcott (1930-2017)	:	A Sea Chantey
Joseph Brodsky (1940-1996)	:	The End of a Beautiful Era

Unit II Prose

E.R. Braithwaite (1912-2016)	:	To Sir, with Love
Ngugi wa Thiong'o (b 1938)	:	Decolonising the Mind- The Language of African Literature
Chimamanda Ngozi Adichie (b1977)	:	The Danger of a Single Story

Unit III Fiction

Orhan Pamuk (b 1952)	:	A Strangeness in My Mind

Unit IV Drama

Wole Soyinka (b 1934)	:	The Swamp Dwellers

Unit V Short Story

Hal Porter (1911-1984)	:	Francis Silver
Lee Kok Liang (1927- 1992)	:	When the Saints Go Marching
Gita Hariharan (b 1954)	:	The Remains of the Feast

Text Books:

1. Pamuk, Orhan. *A Strangeness in My Mind*. India: Penguin Random House, 2016. Print.
2. Thiong'o, Nhugi wa. *Decolonising the Mind: The Politics of Language in African Literature*. Nairobi: East African Educational Publishers, 1986. Print.
3. Soyinka, Wole. Three Short Plays: *The Swamp Dweller, The Trials of Brother Jero, The Strong Breed.* London: Oxford University Press, 1969. Print.

Books for Reference:

1. Gibbs, James, ed. *Critical perspectives on Wole Soyinka*. Washington: Three Continents Press, 1980. Print.
2. McDonald, Ian and Stewart Brown, eds. *Caribbean Poetry*. New Hampshire: Heinemann, 1992. Print.

SEMESTER-VI			
Core Integral III	**World Classics**		
Code : 18UENI61	**Hrs/ week :6**	**Hrs/ Sem : 75**	**Credits :4**

Vision: To familiarize students with literature written across the culture in various languages

Mission: To enable students to analyse, evaluate and appreciate literary texts written across nations

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	relate to the ideologies and psychological impact of diverse people through the classics	1	Un
CO-2	appraise literary texts of great masters	2, 3	Ev
CO-3	analyze the rhetorical pattern and themes of the classics	1,2	An
CO-4	compare and evaluate Literature of diverse cultures	2	Ev
CO-5	improve the skill of analyzing the language used in prose and poetry.	3,7	An
CO-6	evaluate the text against its socio-cultural historic background	1, 8	Ev
CO-7	analyse the literary devices and techniques in different genres of the classics	1	An
CO-8	develop a critical analyses of translations	4, 8	Ev

SEMESTER-VI			
Core Integral III	**World Classics**		
Code : 18UENI61	**Hrs/ week :6**	**Hrs/ Sem : 75**	**credits :4**

Unit I Poetry

Tiruvalluvar	:	Knowing the Fitting Time
Omar Khayyam (1048-1131)	:	The Rubaiyat-1-12 quatrains
Johann Wolfgang Von Goethe (1749-1832)	:	The Dance of the Dead
Tagore (1861-1941)	:	*Gitanjali*- Where the mind is without fear

Unit II Prose

Plutarch (AD 46- AD 120)	:	*Plutarch's Lives* - Antony (Translated by John Dryden)
Montaigne (1533-1592)	:	Of Idleness, Of Constancy

Unit III Drama

Moliere (1622-1673)	:	The Doctor in Spite of Himself

Unit IV Fiction

Kahlil Gibran (1883-1931)	:	The Broken Wings

Unit V - Short Story

Leo Tolstoy (1828-1910)	:	How Much Land Does a Man Need?
Anton Chekhov (1860- 1904)	:	Vanka
Franz Kafka (1883-1924)	:	A Country Doctor

Text Books:

1. Gibran, Kahlil. *The Broken Wings*. New Delhi: Sterling Publishers, 2007. Print.
2. Khayyam, Omar. *Rubaiyat of Omar Khayyam*. New Delhi: Rupa Publications, 2000. Print.
3. Moliere. *The Doctor In Spite of Himself*. Applause Theatre Book Publishers, 1987. Print.
4. Neider, Charles. *Great Short Stories of the Masters*. New York: Cooper Square Press, 2002. Print.
5. Plutarch. *Lives*. Trans. John Dryden. *The Internet Classics Archive*. Web.
6. Tagore, Rabindranath . *Gitanjali.* New Delhi: Sterling Publishers, 2007. Print.
7. Thiruvalluvar. *Tirukural*. Trans. G.U.Pope. New Delhi: Vaigarai Publishing house, 1980. Print.

Books for Reference:

1. Dashti, Ali. *In Search of Omar Khayyam*. Trans. L.P.Elwell-Sutton. New York: Routledge Library edition, 2012. Print.
2. Wright, C. H. C., ed. *Selections from Montaigne*. Boston: D.C. Heath &Co, 1914. Print.

SEMESTER VI			
Core Integral IV	**Diasporic Literature**		
Code: 18UENI62	**Hrs/Week: 6**	**Hrs/Sem:90**	**Credits:4**

Vision: To familiarise the students with the various diasporic experiences and questions surrounding multiculturalism, colonialism and post-colonialism, immigration, and varieties of English.

Mission: To enhance students' understanding of contemporary transnational and transcultural themes and issues through a study of the prescribed texts.

Course Outcome:

Co. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	highlight the important social condition of each culture in order to understand the authors.	1	Re
CO-2	understand the important features of diasporic literature.	2	Un
CO-3	identify and interpret the representative works of the writers of diaspora.	2	Un
CO-4	assess the significant themes in diasporic literature.	4	Ev
CO-5	appraise the literary devices employed by the major writers.	2	Ev
CO-6	interpret the historical perspective of diasporic literature.	4	Un
CO-7	review the dimensions of diasporic literature in the universal context.	8	Ev
CO-8	formulate imagination to a wider range of voices across cultures.	8	Cr

SEMESTER VI			
Core Integral IV	**Diasporic Literature**		
Code: 18UENI62	**Hrs/Week: 6**	**Hrs/Sem:90**	**Credits:4**

Unit I – Poetry

Psalm 42 : As the hart panteth after the water brooks...
Psalm 137 : By the rivers of Babylon

Unit II – Prose

Edward Said (1935-2003) : The Mind of Winter: Reflections on Life in Exile
William Safran (b 1930) : Diasporas in Modern Societies : Myths of Homeland and Return

Unit III – Drama

Bertolt Brecht (1898-1956) : Fear and Misery of the Third Reich

Unit IV – Fiction

Toni Morrison (b 1931) : Home

Unit – V- Short Stories

Wolfgang Borchert (1921-1947) : The Kitchen Clock
Bharati Mukherjee (1940-2017) : The Tenant
Suneeta Peres Da Costa (b 1976) : The Long Division

Text Books:

1. Brecht, Bertolt. *Fear and Misery of the Third Reich*. London: Bloomsbury Publishing Company, 2000. Print.
2. *Holy Bible King James Version*. Tennessee: World Bible Publishing, 1981.Print.
3. Morrison, Toni. *Home*. London: Vintage Publishers, 2013. Print.
4. Safran, Williams. "Diasporas in Modern Societies: Myths of Homeland and Return." *Diaspora: A Journal of Transnational Studies*1. Spring (1991): 83-99. Print.

Books for Reference:

1. Braziel, J.E. & A. Mannur, *Theorizing Diaspora.* New Jersey: Blackwell Publishing, 2003. Print.
2. Shackleton, Mark. *Diasporic Literature and Theory – Where Now?* Newcastle: Cambridge Scholars Publishing, 2008. Print.

Semester -V			
Core VIII	**History of India from AD 1857 to 1947**		
Code:18UHIC52	**Hrs/Week: 6**	**Hrs/sem:90**	**Credits:5**

Vision: To enhance the noble ideals of our freedom fighters.

Mission: To cherish the patriotic spirit of Indians against foreign yoke.

Course Outcome:

Co. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	uphold the noble ideals of our leaders and render selfless service to our nation.	1	Un, Re
CO - 2	understand the work of Indian National Congress.	1	Un, Re
CO - 3	know the various stages of Indian Independence.	1	Un, Re
CO - 4	study the Constitutional development of India.	1	Un, Re
CO - 5	trace out the causes of nationalism.	1	Un, Re
CO - 6	highlight the nationalist spirit.	2	Re
CO - 7	assess the sacrifice of Freedom fighters.	4	An
CO - 8	understand the value of Independence.	1	Un. Re

Semester -V			
Core VIII	**History of India from AD 1857 to 1947**		
Code:15UHIC52	**Hrs/Week: 6**	**Hrs/sem:90**	**Credits:4**

Unit I – India under the Crown: Queen's Proclamation of 1858 Act – Indian Council Act of1861 – Lord Ripon – Local Self Government – Ilbert Bill Controversy – Indian Councils Act of 1892.

Unit II – Birth of the Indian National Congress – Moderates and Extremists– CurzonAligarhMovement – Muslim League.

Unit III – Minto-Morley Reforms 1909 – Home Rule League – First World War and its effects – Montague-Chelmsford Reforms 1919 – Gandhian Era – Rowlatt Act and Jalianwalla Bagh Tragedy – Non – Co-operation Movement - Chauri-Chaura incident. The Swarajya Party.

Unit IV – Simon Commission – Civil Disobedience Movement – Gandhi-Irwin Pact – RoundTable Conferences – Government of India Act 1935.

Unit V – Cripps' Mission – Quit India Movement – Nethaji and the Indian National Army –Wavell Plan – Cabinet Mission –Mountbatten Plan - Independence Act 1947.

Text Book:

1. K.L.Khurana. *History of India from 1526 to 1967 A.D.* Agra: Lakshmi Narain Agarwal, 2005

Books for Reference:

1. Grover B.L. and Alka Mehta. *A new look at Modern Indian History*. New Delhi: S.Chand and Company Ltd. 2010.
2. Nanda S.P. *History of Modern India.* New Delhi: Dominant Publishers and Distributors, 2003.
3. Sen S.P. *Studies in Modern Indian History*. Calcutta: Institute of Historical studies, 1969.
4. Sharma L.P. *Indian National Movement and Constitutional Development.* Agra: Lakshmi Narain Agarwal, 2007

Semester – VI			
Core – XII	**International Relations from A.D.1945 to 2000 A. D**		
Code : 18UHIC63	**Hrs / Week : 6**	**Hrs / Sem : 90**	**Credits : 4**

Vision: To familiarize the developments of contemporary world.

Mission: To promote International understanding to every

individual.**Course Outcome:**

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the ideals of International Relations.	1	Un, Re
CO-2	understand the current international affairs.	1	Un, Re
CO-3	promote better international understanding.	1	Un, Re
CO-4	analyse the means to promote international peace.	4	An
CO-5	analyse the international issues and ways to solve it.	4	An
CO-6	analyse the disintegration of USSR.	4	An
CO-7	evaluate the Apartheid policy of South Africa.	5	Ev
CO-8	understand the oil diplomacy of Middle East.	1	Un, Re

Semester – VI			
Core – XII	**International Relations from A.D.1945 to 2000 A. D**		
Code : 18UHIC63	**Hrs / Week : 6**	**Hrs / Sem : 90**	**Credits : 4**

Unit I – United Nations Organisation – Its Structure and Functions – Achievements of the U.N.O – Disarmament – Nuclear Test Ban Treaty – Non-Proliferation Treaty –SALT – CTBT.

Unit II – Cold War – Truman Doctrine – Marshall Plan – NATO – CENTO – SEATO – Warsaw Pact – Anzus Pact – Cold War in Korea, Vietnam, Cuba - Berlin Crisis.

Unit III – European Economic Community – European Common Market – OAU – G8 – ASEAN – SAARC.

Unit IV – Soviet Union – Gorbachev – Glasnost and Perestroika- Soviet Disintegration – Apartheid in South Africa.

Unit V – Middle East Crisis – Arab-Israel War – Palestinian Liberation Organisation (P.L.O) – Oil Diplomacy – Gulf War.

Text Book :

1. Khurana. K.L. *The Twentieth Century World.* Agra: Lakshmi Narain Agarwal,2005.

Books for Reference

1. Burton J.W. *International Relations.* Bombay: George Allen and Unwin Pvt.Ltd.1971.
2. Frankel Joseph. *International Relations*. New Delhi: Oxford University Press,1967.
3. Holsti. *International Politics.* New Delhi: Prentice Hall of India Pvt. Ltd., 1978.
4. Palmer and Perkins. *International Relations.* New Delhi: AITBS Publishers &Distributors, 2000.
5. Sen A.K. *International Relations since 1919.* New Delhi: S. Chand & Co., Ltd,1993.

Semester – VI			
Core Integral III	**Historiography**		
Code : 18UHIIC61	**Hrs / Week : 5**	**Hrs / Sem : 75**	**Credits : 4**

Vision: To develop historical writing skills and critically analyse the work of various historians.

Mission: To ensure historical writing skills and apply it for writing project.

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the various disciplines of history.	1	Un, Re
CO-2	appreciate the significance of historical writings.	1	Un, Re
CO-3	enhance historical writing skills.	1	Un, Re
CO-4	analyse the various works of historians.	4	An
CO-5	know the recent trends in historical writing.	1	Un, Re
CO-6	evaluate the sources in historical writings.	5	Ev
CO-7	apply methodology in historical writings.	3	Ap
CO-8	promote thesis writing and articles.	1	Un, Re

Semester – VI			
Core Integral III	**Historiography**		
Code : 18UHIIC61	**Hrs / Week : 5**	**Hrs / Sem : 75**	**Credits : 4**

Unit I – History – Meaning and Scope – Nature – Purpose. History – Science or Art? - ItsUses, Abuses and Lessons.

Unit II – History and its allied subjects - Theory of Causation – Role of Individuals, Ideas.

Unit III – Reputed Historians: Herodotus, Thucydides, Cornelius Tacitus, Livy, St. Augustin,Edward Gibbon, Kalhana, Karl Marx, Arnold J. Toynbee, K.A.N. Sastri, K. K. Pillai, N.Subramanian and K. Rajayyan.

Unit IV– Sources for the study of Indian History – Archaeological, Epigraphic, Numismaticsand Literary.

Unit V– Selection of Topic – Collection of sources, Objectivity and Subjectivity Criticism –Stages of Thesis Writing – Footnotes, Bibliography.

Text Book:

1. Rajayyan K. *History in Theory and Method.* Madurai: Ratna Publications, 2004.

Books for Reference:

1. Ali Sheik. *History – Its Theory and Method.* New Delhi: Macmillan India Ltd.,1993.
2. Khurana K.L. *Concepts and Methods of Historiography.* Agra: Lakshmi NarainAgarwal, 2006.
3. Sreedharan E. *A Text book of Historiography 500 B.C to A.D. 2000.* New Delhi:Orient Longman, 2000.
4. Subramanian N. *Historiography.* Madurai: Koodal Publishers, 1993.

Semester – IV			
Non-Major Elective	**Constitution of India**		
Code : 18UHIN41	**Hrs / Week : 2**	**Hrs / Sem : 30**	**Credits : 2**

Vision: To abide the rules and regulations of the Constitution.

Mission: To respect and appreciate the constitution.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	respect the fathers of Constituent Assembly	3	Ap
CO-2	analyse the salient features of the Constitution	4	An
CO-3	follow and respect the Constitutional rules and regulations	3	Ap
CO-4	analyse the constitutional framework in the present scenario	4	An
CO-5	aware of the Constitutional amendments	1 ,2	Un, Re
CO - 6	highlight the decentralization of power in administration	1 ,2	Un, Re
CO-7	appreciate fundamental rights and duties of citizens	1 ,2	Un, Re
CO-8	enumerate the ideals of democracy	1 ,2	Un, Re

Semester – IV			
Non-Major Elective	**Constitution of India**		
Code : 18UHIN41	**Hrs / Week : 2**	**Hrs / Sem : 30**	**Credits : 2**

Unit – I Framing of the Indian Constitution – Salient Features of the Indian Constitution – Preamble.

Unit – II Fundamental Rights and Fundamental Duties – Directive Principles of State Policy.

Unit – III The Executive – President – Prime Minister – The State Government – Governor – Chief Minister – The Council of Ministers – Cabinet Ministers.

Unit – IV The Legislature – Lok Sabha – The Speaker – Rajya Sabha – State Legislature.

Unit – V The Judiciary – The Supreme Court – Judicial Review.

Text Book

Kapur A.C., *Constitutional History of India*, S.Chand and Co. (Pvt) Ltd., New Delhi,1983.

Books for Reference

1. Agarwal, *Constitutional History of India and National Movement*, S. Chand and Co. (Pvt) Ltd, New Delhi, 1981.
2. Gokhale, B.K.., *Political Science*, A.R.Sheth & co, Bombay, 1972.
3. Mahajan V.D., *Constitutional History of India and the Nationalist Movement*, S.Chand and Company Ltd, New Delhi,1982.
4. Sharma, M.P., *The Government of Indian Republic*, Kitab Mahal, Allahabad, 1968.

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Code: 18UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Vision: To familiarize the students to Archives and Museums for proper understanding of History.

Mission: To know, analyse and appreciate our history and its heritage through archives and museums.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	visit of Archives and Museums.	2	Un, Re
CO-2	understand the organisations and functions of Archives and Museums.	1	Un, Re
CO-3	highlight the primary sources of Archives and Museums.	2,4	Un, An, Ev
CO-4	apply the uses of Archives and Museums in historical writings.	1	Un, Re
CO-5	respect and preserve Archives and Museums.	2	Un
CO-6	witness the evidences of History.	2,4	Un, Ev, Re
CO-7	develop more collaborative approaches.	2,4	Un, An, Ev
CO-8	identify good practice and skills of professionals.	1	Un, Re

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Code: 18UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I – Definitions: Archives - Museums – Definition.

Unit II – Kinds of Museums and Archives: Archaeology museum-Architecture museum-Biographical museum-Palace museum - Private Archives-Public Archives.

Unit III – History of the setting up of Museums: Indian Museums, Calcutta – Salar Jung Museum, Hyderabad - National Museum, Delhi, Chhatrapati Shivaji Maharaj Vastu Sangrahalaya – Mumbai, Gandhi Museum-Madurai, Saraswathy Mahal Museums – Tanjore.

Unit IV – History of the setting up of Archives: National Archives of India, Delhi – Tamil Nadu Archives, Chennai – Shenbaganoor Archives - Kodaikanal, Kerala State Archives – Trivandrum.

Unit V - A visit to a Museum and Archive is a part of this course.

Books for Reference:

1. *A Guide to the National Museum.* New Delhi: National Museum, 1997.
2. Agarwal, O.P. *Essentials of Conservation and Museology*, Delhi: Sundeep Prakasan, 2007.
3. Edson & David Routledge. *Handbook for Museum*. 1986.
4. Thiyagarajan J. *Archives Keeping.* Madurai: Prabha Publications, 2007.
5. Macdonald Sharon (ed). *A Companion to Museum Studies*. UK: Blackwell Publishing Ltd, 2006.

SEMESTER – I			
Core II	**Calculus**		
Code :18UMAC12	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Vision:

We will have high expectations of ourselves and of our students, be willing to take risks and to be challenged, work collaboratively and be patient in the learning process of calculus.

Mission:

To prepare the students for success in Calculus while helping them to develop an appreciation and proficiency with mathematical thinking which can be applied to real life situations.

Course Outcome :

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	state the concept of curvature of a plane curve.	5	Re
CO-2	calculate the curvature of various curves in plane and space	5 , 9	Ev
CO-3	apply the fundamental concepts of Calculus to variety of real world problems.	4	Ap
CO-4	find surface area using a double integral.	3 ,8	Un
CO-5	evaluate triple integrals and use them to find volumes in rectangular, cylindrical and spherical coordinates.	4 ,10	Ev
CO-6	compute definite and indefinite integrals of algebraic and trigonometric functions using formulae and substitution	10	Cr
CO-7	know the relationship between the Gamma and Beta functions	6 , 7	An
CO-8	use Beta and Gamma function to solve different type of integrals and to understand Gamma function as a generalization of factorial function.	7	Un, Ev

SEMESTER– I			
Part III Core II	**Calculus**		
Code :18UMAC12	**Hrs/week :5**	**Hrs/Semester :75**	**Credits :4**

Unit I

Curvature and radius of curvature – Cartesian form-Centre of curvature

(Vol I,Chapter X, Sec 2.1 - 2.4, Pages : 291-309)

Unit II

Evolute and Involute-Pedal Equation -Asymptotes

(Vol I Chapter X, Sec 2.5 - 2.8, Pages : 309-317,Exercises 45: 1-11, Chapter XI, Pages 324-341)

Unit III

Singular Points(Node,cusp,conjugate points)and Tracing of curves (Cartesian only)

(Vol I, Chapter XII, Chapter XIII, Pages : 342-372)

Unit IV

Double and Triple Integrals - Changing the order of integration.Jacobians and Change of variables

(Vol II , Chapter V, Pages : 203-213,219-223,Chapter VI, Pages : 251-269)

Unit V

Beta and Gamma functions – Application of Beta and Gamma Functions in evaluation of Double and Triple Integrals, Improper Integrals.

(Vol II,Chapter VII, Pages : 278-300)

Text Book

1. S.NarayananandT.K.ManicavachagomPillay, Calculus Vol I and Vol II,S.Viswanathan (Printers & Publishers) PVT. LTD. (Edition-2015)

Books for Reference

1. Kandasamy P and K. Thilagavathi, Mathematics for B.Sc., Volume II – 2004, S. Chand & Co., New Delhi.
2. Apostaol T.M., Calculus, Vol. I (4th edition) John Wiley and Sons, Inc., Newyork 1991.
3. Apostaol T.M., Calculus, Vol. II (2nd edition) John Wiley and Sons, Inc., New York 1969)
4. Stewart.J, Single Variable Calculus (4th edition) Brooks / Cole, Cengage Learning 2010.

Semester – V			
Part III Core VIII		**Modern Algebra**	
Code :18UMAC52	**Hrs/week :5**	**Hrs/Semester :75**	**Credits :4**

Vision

To give an introductory knowledge of the basics abstract systems of mathematics

Mission

To train the students to generalize the known concepts and to develop analytical thinking.

Course Outcome

CO No	Upon completion of this course, students will	PSO addressed	CL
CO-1	explain the theory behind relations and functions and how functions may relate dissimilar structures to each other.	3	Cr
CO-2	describe and generate the basic algebraic structures such as Groups, Rings, Fields, Integral Domain, Euclidean Domain, etc., and will identify examples of these specific constructs.	1	Ev
CO-3	have a working knowledge of important mathematical concepts such as order of Group, order of an element, generator of a cyclic group, index of a subgroup, characteristic of a Ring, Maximal and Prime Ideals etc.,	2	Un
CO-4	analyze relationship between abstract algebraic structures with familiar number system such as integers, complex and real numbers	2	An
CO-5	critically analyze and construct mathematical arguments that relate to the study of introductory linear algebra. (Proof and Reasoning).	8	An
CO-6	develop ability to form and evaluate conjectures.	1, 5	Ap
CO-7	produce the group concepts in other science disciplinary	3	Ap
CO-8	illustrate the isomorphic structures	8	An

Semester – V			
Part III	**Core VIII**	**Modern Algebra**	
Code :18UMAC52	**Hrs/week :5**	**Hrs/Semester :75**	**Credits :4**

Unit I

Relations and Mappings - Relations - Equivalence Relations - Functions – Binary Operations

(Chapter 2, Sec 2.1 - 2.5, pages 2.1 – 2.18)

Unit II

Permutation groups - Sub groups - Cyclic Groups - Order of an Element - Cosets and Lagrange's theorem - Euler's theorem - Fermat's theorem

(Chapter 3, Sec 3.4 - 3.8, pages 3.12 – 3.31)

Unit III

Normal Subgroups and Quotient Groups - Isomorphism - Cayley's theorem - Homomorphism - Automorphism - Fundamental theorems of Homomorphism

(Chapter 3, Sec 3.9 - 3.11, pages 3.31 – 3.50)

Unit IV

Rings - definition and examples – Elementary properties of rings- Isomorphism – Types of rings - Characteristic of a ring - Sub rings

(Chapter 4, Sec 4.1 - 4.6, pages 4.1 – 4.18)

Unit V

Ideals - Quotient Rings - Maximal and PrimeI – Homomorphism of rings - Unique factorization domain(U.F.D.) – Euclidean domain.

(Chapter 4, Sec 4.7 - 4.10, 4.13- 4.14, pages 4.18 – 4.26, 4.31-4.36)

Text Book

1. Arumugam S. and Thangapandi Isaac A - Modern Algebra, Scitech Publications (India) PVT Ltd. Chennai Edition, 2003

Books for Reference

1. Bhattacharya P.B., Jain S.K., Nagpaul S.R., Basic Abstract Algebra, Second Edition, Cambridge University Press.
2. Santiago M.L., Modern Algebra, Arul Publications, Madras, 1988

Semester – V			
Part III Core IX Modern Analysis			
Code :18UMAC53	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Vision

To introduce the basic concepts in Analysis and to enable the students to understand fundamental ideas and theorems on Metric spaces

Mission

To develop the application of the concepts.

Course Outcome

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	gain knowledge of concepts of modern analysis, such as open sets ,closed sets, completeness, connectedness and compactness in metric spaces	1	Un
CO-2	be able to write simple proofs on their own and study rigorous proofs	5	Ap
CO-3	develop a higher level of mathematical maturity combined with the ability to think analytically	2	Un
CO-4	develop a broad understanding encompassing logical reasoning, generalization, abstraction, and formal proof.	5	Ap
CO-5	formulate proofs and structure mathematical arguments.	6	Ap
CO-6	explain the basic theory of metric spaces and its application to function spaces.	3	Ev
CO-7	follow more advanced treatments of real analysis and study its applications	3	Ap
CO-8	apply the theory to solve mathematical problems including the construction of simple proofs.	2	An

SEMESTER – V			
Part III Core IX	**Modern Analysis**		
Code :18UMAC53	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Unit I

Metric spaces - Bounded sets - open ball - open sets - diameter of a set - interior of set

(**Chapter 2, Sec 2.1-2.6, pages 17-58)**

Unit II

Closed sets - closure - limit point - dense sets

(**Chapter 2, Sec 2.7-2.10, pages 59-79)**

Unit III

Complete metric space - Cantor's intersection theorem - Baire's Category Theorem

(Chapter 3, Sec 3.1-3.2, pages 80-100)

Unit IV

Connectedness - equivalent conditions - connected subsets of R - connectedness and continuity - continuous image of a connected set is connected - Intermediate mean value theorem

(**Chapter 5, Sec 5.1-5.3, pages 139-150)**

Unit V

Compactness - definition of open cover - compact metric space – Heine Borel theorem - compactness and continuity - continuous image of a compact set is compact - uniform continuity – Continuous function on a compact metric space is uniformly continuous – equivalent characterizations of compactness–compactness and continuity.

(Chapter 6, Sec: 6.1-6.4, pages: 150-178)

Text Book

1. Arumugam S. and Issac, Modern Analysis New Gamma Publishing House, Edition 2010.

Books for Reference

1.Richard R Goldberg, Methods of Real Analysis, Oxford & IBH Publishing Co, New Delhi, Reprint 1973.

2.Robert G.Bartle and Donald R.Sherbert, Introduction to Real Analysis Fourth Edition Wiley India Edition, Reprint 2017.

Semester VI			
Part III Core Integral III Graph Theory			
Code :18UMAI61	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Vision

To learn basic concepts in graph theory.

Mission

To translate situations to diagrammatic representations and to develop problem solving skills.

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	interpret the basics of graphs.	1	Un
CO-2	identify induced subgraphs, paths,cycles ,independent sets and coverings in graphs	1	Re
CO-3	determine whether graphs are Hamiltonian and/or Eulerian and to solve problems involving vertex and edge connectivity, planarity and crossing numbers	5	An
CO-4	combine theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.	8	Un
CO-5	inspect the applications of graph theory	7	An
CO-6	model and solve real-world problems using graphs both quantitatively and qualitatively.	4	Ap
CO-7	develop an appropriate level of mathematical literacy and competency.	6	Cr
CO-8	formulate problems in terms of graphs, solve graph theoretic problems and apply algorithms.	5	Cr

Semester VI			
Part III Core Integral III Graph Theory			
Code :18UMAI61	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Unit I

Graphs and sub graphs:

Introduction - Definition and examples - Degrees - Sub graphs –Isomorphism - independent sets and coverings - intersection graphs - Line graphs - Matrices - Operation on graphs

(Chapter 2, Sec 2.1-2.4, 2.6-2.9, pages 5-17, 19-27).

Unit II

Degree Sequences: Introduction –Degree sequences - Graphic Sequence **Connectedness** - introduction-walks - trails and paths - Connectedness and components - blocks - connectivity.

(Chapters 3 and 4 Sec 3.1-3.2, 4.1-4.4, pages 29-47).

Unit III

Eulerian and Hamiltonian graphs:

Introduction - Eulerian graphs - Hamiltonian graphs - Trees – introduction - Characterization of trees - Centre of a tree .

(Chapters 5 and 6, Sec 5.1-5.2, 6.1-6.2, pages 48-65).

Unit IV

Planarity:

Definition and properties, Characterization of planar graphs – thickness,crossing and outer planarity

(Chapter- 8, Sec 8.1-8.3, pages 73-84).

Unit V

Colourability:

Chromatic number and Chromatic index - the five colour theorem –Chromatic polynomials

(Chapter- 9, Sec 9.1-9.4, pages: 85-98).

Text Book

1. S. Arumugam , S. Ramachandran - Invitation to Graph theory, Scitech Publications (India) Pvt. Ltd., (2001) Chennai - 17.

Books for Reference

1.Parthasarathy K.R., Basic Graph Theory, Tata McGraw Hill Publishing Company Limited, New Delhi

2.John Clark and Derek Allan Holton A First Look at Graph Theory, World Scientific Publishing Co.Pte.Ltd, Singapore, Reprint 2013.

SEMESTER – V			
Part III Core XI (Common Core) - Human Resource Management			
Code:18UMCC51	Hrs/Week: 6	Hrs/Sem: 90	Credit : 4

Vision:

To enable the students to understand the basic concepts in HRM.

Mission:

To familiarize students on the various aspects of HRM.

Course Outcome:

CO No.	Upon completion of this course, students will be able to:	PSO addressed	CL
CO – 1	gain knowledge on the basic concepts of planning human resource and help them to understand basic techniques of business.	1,2	Un
CO – 2	understand the basic selection process in human resource management.	1,2,3	Un
CO – 3	know the importance of training and development in human resource management.	2,3,4	Ap
CO – 4	know about the transfer policies	2,3,5	Un,Re
CO – 5	gain knowledge on compensation methods.	3,4	Un,An
CO - 6	understand the promotional policies in business	3,4	Un,Re
CO – 7	know and apply the significance and problems in performance appraisal.	3,4,5	Ap
CO - 8	know and apply the methods of performance appraisal	3,4,5	Ap

SEMESTER – V			
Part III Core XI (Common Core) - Human Resource Management			
Code:18UMCC51	Hrs/Week: 6	Hrs/Sem: 90	Credit : 4

Unit-I : Introduction

Human Resource Management: Meaning - Objectives - Nature and Scope - Importance – Functions - and Problems of HRM - Personnel Management Vs. HRM - Qualities and Qualifications of Human Resource Managers.

Unit-II : Human Resource Planning, Recruitment And Selection

Human Resource Planning: Meaning - Need and Importance - Objective - Problems - Process – Recruitment: Meaning - Factors Influencing Recruitment - Sources of Recruitment - Problems in Recruitment – Selection: Meaning - Factors Affecting Selection Decisions - Selection Policy - Steps in Selection.

Unit-III : Training And Development

Training: Need and Importance - Objective - Types - Steps in Training Programme – Methods of Training - Evaluation of Training Programmes – Development: Meaning - Concept and Essentials of Management Development Programmes.

Unit-IV : Transfer, Promotion & Compensation

Transfer: Objective - Transfer Policy - Promotion: Purpose - Promotion Policy-DemotionCompensation: Objective – Principles.

Unit-V : Performance Appraisal

Performance Appraisal: Meaning - Need and Importance - Objective - Problems in Performance Appraisal - Factors Influencing Performance Appraisal – Methods of Performance Appraisal.

Text Book:

Chitra Atmaram Naik, Human Resource Management, Chennai: Ane Books Pvt.Ltd.

Books for Reference:

1. Dr..Gupta C.B, Human Resource Management, New Delhi: Sultan Chand & Sons.
2. Memoria C.P., Personnel Management, Mumbai: Himalaya Publishing House.
3. Prasad L.M., Human Resources Management, New Delhi: Sultan Chand & Sons,

SEMESTER – III			
Allied – III – Genetic Engineering			
Code:18UMIA31	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit: 3**

Vision:

To impart basic level information in the novel subject of Genetic Engineering.

Mission:

To enhance the knowledge on the applications of Genetic Engineering in various fields.

Course Outcome:

CO NO	Upon completion of this course, students will be able to	PSO Addressed	CL
CO - 1	infer basic knowledge about cloning	2	Un
CO- 2	identify the applications of genetic engineering in various fields	4	Ap
CO -3	explain cloning vectors	2	Un
CO-4	interpret the techniques used in genetic engineering	2	Un
CO -5	compare different types of vectors	4	An
CO- 6	explain Genetically modified food	2	Un
CO- 7	demonstrate the hazardous and potential risk in releasing transgenic into environment	6	Un
CO -8	make use of DNA Libraries	4	Ap

SEMESTER – III			
Allied – III – Genetic Engineering			
Code:18UMIA31	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit: 3**

Unit–I

Genetic engineering – History – Tools of Genetic Engineering - Gene cloning- Steps in cloning- Gene transfer methods - Screening of chimeric DNA.

Unit–II

Cloning vectors for rDNA (Plasmids, Phages, Cosmids, Transposons)- Binary and Shuttle vectors.

Unit–III

Techniques in Genetic Engineering - Southern, Western, Northern blotting - PCR and its modification - DNA finger printing - DNA libraries.

Unit–IV

Applications of genetic engineering - Transgenic plants - Development of crops for disease resistance (Bt cotton) - herbicide tolerance- Medicine (Insulin) – Environment - role of superbug in biodegradation.

Unit-V

Genetically modified organisms – Advantages and disadvantages - Ecological impact of transgenic plant – Release of GMO into environment.

Text books:

1. Dr. Verma P.S and Dr. Agarwal. V. K . 2009. *Genetic Engineering* – S. Chand and Company Ltd. New Delhi.
2. Dubey R.C. 2014. *A Text Book of Biotechnology*. Fifth revised Edition. S Chand & Co. New Delhi.
3. Dr.Prakash. S Lohar 2005. *Text Book of Biotechnology* - MJP Publishers, Chennai.

Books for Reference:

1. Glick. B.R. and Pasternak, J.J. 2017. *Molecular Biotechnology – Principles and Applications of Recombinant DNA.* ASM Press, Washington D.C.
2. Brown, T.A. 2016. *Gene Cloning*. Third Edition. Seventh edition - Chapman and Hall Publications, USA.
3. Satyanarayana .U. 2013. *Biotechnology*. Books and Allied (P) Ltd.Kolkata.
4. Rastogi S.C, 2007. *Biotechnology Principles and applications.* Narosa Publishing House Pvt. Ltd. New Delhi.
5. Mohan P.Arora. 2005. *Biotechnology.* Himalaya Publishing House, Mumbai.
6. Jogdhand. S.N. *Gene Biotechnology.* 2009. Himalaya Publishing House Pvt.Ltd. Mumbai.

SEMESTER –VI			
Core - XII - Microbial Biotechnology			
Code: 18UMIC63	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits: 4**

Vision

To impart advanced level information in the subject of Microbial Biotechnology.

Mission

To give an in-depth knowledge in the various microbial biotechnology process and products of biotechnology.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define the history & concepts of biotechnology.	2	Re
CO-2	assess the intellectual property right & protection.	2	Ev
CO-3	illustrate the knowledge on the production of biotechnological products.	3	Un
CO-4	interpret about the concepts and applications in enzyme biotechnology.	3	Un
CO-5	assume the mechanisms involved in biodegradation of pollutants.	6	An
CO-6	illustrate the cloning process	2	Un
CO-7	analyse the production of biotechnological products	2,3	An
CO-8	recall the concept of biogas, bioleaching, biodegradation of petroleum.	4	Re

SEMESTER –VI			
Core - XII - Microbial Biotechnology			
Code: 18UMIC63	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits: 4**

Unit-I

Biotechnology - Definition – Concepts - History – Achievements - Milestones in biotechnology - Enzyme biotechnology – enzyme production from microbes – applications – enzyme immobilization.

Unit-II

Cloning - History of cloning – Transgenic Plant (Golden Rice) – Transgenic Animal (Dolly) – Genetically Engineered Microorganism (Super bug).

Unit-III

Production of biotechnological products.Food - SCP (Algae, Yeast, Mushroom). Fuel (Ethanol) – Pharmaceuticals – Interferons, Vaccines, Edible vaccines, Hormones and Gene therapy methods – Hybridoma and Monoclonal antibodies .

Unit- IV

Bioconversions – Lignocellulosic waste to ethanol, Bioleaching – microorganisms involved – Mechanism of Bioleaching – Commercial process - Bioleaching of Copper and Uranium, Bio gas – Microbes involved - Factors influencing methane production – stages of methane generation, Biodegradation of Petroleum, Waste water treatment, Solid waste treatment.

Unit- V

Intellectual Property Rights (IPR) and Protection (IPP) – Forms of protection – Patents (reading a patent – description, claims, patenting strategies) – Copy right, Trade mark, Plant variety protection – WTO, GATT, TRIPs.

Text books:

1. Dr.Verma P.S and Dr.Agarwal. V. K. 2009. *Genetic Engineering* – S. Chand and Company Ltd. New Delhi.
2. Dubey R.C. 2014. *A Text Book of Biotechnology*. 5th revised edition. S Chand & Co. New Delhi.
3. Dr.Prakash. S Lohar. 2005.*Text Book of Biotechnology* - MJP Publishers, Chennai.
4. Dubey R.C. and D.K. Maheshwari. 2013. *A Text Book of Microbiology*. S. Chand & Co. New Delhi.

Books for Reference:

1. Glick, B.R. and Pasternak, J.J. 1998. *Molecular Biotechnology* - Principles and Applications of Recombinant DNA. ASM Press, Washington D.C.
2. Satyanarayana,U. 2005. *Biotechnology*.Books and Allied (P).Ltd. Kolkata.
3. Kalaichelvan. P.T., Arul Pandian. I., 2007.*Bioprocess Technology*. MJP Publishers, Chennai.
4. Singh.B.D., *Biotechnology*. 2008. Kalyani Publishers.
5. Shiva Aithal, C. 2010. *Modern approaches in Soil, Agricultural and Environmental Microbiology.*Himalaya Publishers, New Delhi.

6. Rastogi S.C.2007. *Biotechnology Principles and applications*. Narosa Publishing House Pvt. Ltd. New Delhi.
7. Mohan P. Arora. 2005. *Biotechnology*.Himalaya Publishing House, Mumbai.
8. Jogdhand. S.N. *Gene Biotechnology*. 2009. Himalaya Publishing House Pvt. Ltd. Mumbai.

SEMESTER –V			
Core Integral - I – Microbial Nanotechnology			
Code: 18UMII51	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credit: 4**

Vision:

To create the ability to be multi-skilled in the field of nanotechnology with good technical and instrumentation knowledge on various concepts and providing standard education and enabling the students to become entrepreneurs and socially responsible.

Mission:

To aware the basic knowledge about the basic nanotechnology and developing young students with active and creative minds in the field of nanotechnology.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO- 1	acquire basic knowledge on nanotechnology	4	Un
CO -2	explain the basics of microbial applications of nanotechnology.	4	Un
CO -3	appreciate the structural and functional principles of nanomatreials.	4	An
CO- 4	grasp the fundamental knowledge about synthesis of nanomaterials.	4	Un
CO- 5	acquire basic knowledge about biosensors and types.	2	Ap
CO- 6	get knowledge about analysis of biomolecular nanostructures.	4,2	Un
CO -7	acquire knowledge on cancer diagnosis and treatment.	2,4	Ap
CO- 8	get knowledge about drug designing and delivery	2,4	Ap

SEMESTER –V			
Core Integral - I – Microbial Nanotechnology			
Code: 18UMII51	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credit: 4**

Unit I

Introduction to nanotechnology - Structural and functional principles of nanotechnology - Applications of nanotechnology. Bionanoparticles – Carbon nanotubes, Carbon nanocones.

Unit II

Nanotechnology : Nanoparticle synthesis by plants, bacteria and yeast. Methods of Nanobiotechnology - Analysis of bimolecular Nanostructures by Atomic Force Microscopy, Scanning Probe Electron Microcopy and XRD.

Unit III

Biosensors – optical nanosensors, multi-functional biochip (MFB) and Detection of the *Mycobacterium by MFB.*

Unit IV

Application of Nanobiotechnology in medicine – Cancer diagnosis and treatment, Drug designing and delivery.

Unit V

Nanotechnology and Food safety – Food Packaging and Processing. Nanotechnology in Agriculture – crop improvement and Pest management. Bio security

Text Books:

1. David. S. Goodsell. Jhonwiley 2006.*Bionanotechnology*: Lessons from Nature.
2. R. K. Rathi, 2009, *Nanotechnology* 1st Edition. S. Chand & Company Ltd, New Dehli.

Books for Reference:

1. Bernd Rehm, 2006.*Microbial Bionanotechnology*: *Biological Self-assembly Systems and Biopolymer-based Nanostructures*, Horizon Scientific Press.
2. Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen and Jack E.Lemons. *Biomaterials Sciences: An Introduction to Materials in Medicine* 2nd Edition.
3. Christof M. Niemayer, Chad A. Mirkin, 2004. *Nanobiotechnology:* Concepts, Applications and perspectives, Wiley VCH publishers.
4. Fulekar M.H., 2010, *Nanotechnology: Importance and Applications*, I. K. International Pvt Ltd, New Delhi
5. JainK.K., Tailor L.,*Nanobiotechnology: Molecular Diagnosis*. Francis Group.

SEMESTER- V			
Core VII (Common Core) Solid State and Material science			
Code : 18UPCC51	**Hrs/Week : 6**	**Hrs/ Sem : 90**	**Credits : 4**

Vision: Understand the usage of the appropriate materials while designing electronic system.

Mission: Enrich the students to know the background theory and properties of different materials.

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	understand the basic symmetry elements and operations of crystals.	1, 2	Un
CO - 2	distinguish the types of crystals and enumerate the various crystal imperfections.	3,4	An
CO - 3	get a clear knowledge about metallic glasses, ceramics and biomaterials.	1, 3, 5,7, 8	Re
CO - 4	justify the wave nature of matter and its experimental study.	1,3	Ev
CO - 5	apply Bragg's law for x-ray study.	2	Ap
CO - 6	distinguish magnetic materials based on susceptibility.	2	An
CO - 7	usage of magnetic materials in various field.	2	Ap
CO - 8	discuss the synthesis methods of nano materials.	2	Un

SEMESTER- V			
Core VII (Common Core) Solid State and Material science			
Code : 18UPCC51	**Hrs/Week : 6**	**Hrs/ Sem : 90**	**Credits : 4**

Unit-I Crystal structure and crystal imperfections

Crystal lattice -primitive and unit cell- Basic symmetry elements and operations - Plane of symmetry, centre of symmetry & axis of symmetry -Types of crystals - Bravais lattices - Simple cubic, body centered cubic, FCC, structures with an example - miller indices, inter planar spacing – crystal imperfections – point defects – Schottky and Frenkel defects – line defects – Edge & screw dislocations – surface defects – volume defects (imperfection).

Unit-II New materials

New materials – metallic glasses – Fiber reinforced plastics – Fiber reinforced metals – Bio materials – Ceramics – Cements – High temperature materials – intermetallic compounds - Alloys - Smart materials.

Unit-III Wave nature of matter and X-ray diffraction

Wave nature – introduction – De Broglie Hypothesis – experimental study of matter waves – Davison – Germer's experiment – Heisenberg's Uncertainity principle.

Bragg's law – Derivation of Bragg's equation - Experimental methods of X-ray study – Laue, rotating crystal and powder methods.

Unit-IV Magnetic and dielectric materials

Classification of magnetic materials – Langvein theory of diamagnetism – theory of paramagnetism– Domain theory of ferromagnetism – Antiferro magnetic materials – Application of Different magnetic materials.

Dielectric materials – Types of dielectric materials – different types of electric polarization –-Internal field – Clausius-Mossotti equation – Frequency and temperature dependence of dielectric constant.

Unit- V Nanomaterials

Nanomaterials- Synthesis- Plasma arcing – Chemical vapour deposition – Sol gels- Electro deposition – Ball milling –Properties of nano particles and applications. Carbon nanotubes fabrication – Arc method –Pulsed laser deposition- Chemical vapour deposition- Structure- Properties- Applications.

Text books

1. M.Arumugam, Material Science, Anuradha Publication 2008.
2. C M Sri Vasta & C Srinivasan, Science of Engineering materials, New Age International (P) Ltd, Second Edition,1999.
3. P. K. Palanisamy, Solid state Physics Copyright (2003), Scitech Publication (India) Pvt Ltd Chennai, 3rd reprint 2008.

4. R.Mureghesan, Modern Physics, Kiruthiga Sivaprasath, S.Chand & Co Ltd, 17th Edition, 2013.
5. Dr. P.Mani, A Text Book of Engineering Physics, Dhanam Publications Chennai, Revised Edition, 2008.

Books for Reference

1. Charles Kittel, Introduction to solid state Physics, John Wiley and Sons 2010
2. P. K. Palanisamy, Material Science, Scitech Publication (India) Pvt Ltd., Chennai, 2005.
3. M.H Fulekar, Nano Technology Importance and applications, I.K International Publishing House Pvt Ltd,2010.

SEMESTER IV			
Core VI	**Electronics and Communication**		
Code : 18UPHC41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Vision: To develop competent technocrats who can strive continuously in pursuit of professional excellence in the field of Electronics and Communication

Mission: Establish a unique learning environment to enable the students to face the challenges in Electronics and Communication Engineering field

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall semiconductors	2	Re
CO –2	design a voltage regulator using Zener diode.	2,4,6	Cr
CO –3	construct Colpitt's oscillator, Hartley oscillator.	2,4,6	Cr
CO –4	design a single stage transistor amplifier and an oscillator	2,4,6	Cr
CO –5	list out the types of networks	2	Re
CO –6	differentiate monostable and bistable multivibrator	2,4,6	An
CO –7	describe Satellite Communication	2	Un
CO –8	apply the principle of Doppler effect to Radar	2,3	Ap

SEMESTER IV			
Core VI	**Electronics and Communication**		
Code : 18UPHC41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Linear Circuit Analysis

Linear and non – linear circuit elements – Active and Passive elements – Ideal voltage source and current source – Superposition theorem – Thevenin's theorem – Norton's theorem – Maximum power transfer theorem – h-parameters.

Unit II: Semiconductor Devices

Diodes: Semiconductors – P and N type semiconductors – PN junction diode under forward bias, reverse bias – Silicon and Germanium diodes – Energy band diagram of PN diode – V-I characteristics of a PN diode – Experimental determination of knee voltage, ac forward resistance and reverse saturation current of a PN diode – Diode rectifier – Half wave rectifier – Expression for I_{dc}, I_{rms} , efficiency and ripple factor – Bridge rectifier – Zener diode – V-I characteristics – Voltage regulator.

Transistor: Junction transistor – Three modes of transistor connection – Relation between alpha and beta of transistor – Transistor parameter calculation for CE mode – Single stage transistor amplifier.

Unit III: Oscillators

Feedback – Negative voltage feedback amplifier – Principle – Gain – Advantages – Feedback circuit. Negative current feedback – Principle – Current gain – Effects – Emitter follower – D.C. analysis – Voltage gain – Input impedance – Output impedance – Applications – Sinusoidal oscillator – Types – Oscillatory circuit. Positive feedback amplifier – Barkhausen criterion. Colpitt's oscillator, Hartley oscillator.

Unit IV: Operational Amplifier

Operational amplifier basic ideas – Inverting amplifier – Summing amplifier – Differential amplifier – Integrator & Differentiator using Op amp – Instrumentation amplifier using Op amp – Differential Instrumentation amplifier using transducer bridge – Application to measurement of temperature and as analog weight scale – Multivibrator (Astable, Monostable and Bistable using Op amp).

Unit V: Modulation and Demodulation

Radio Amplitude modulation – Modulated power output – Single side band transmission: A.M – Frequency Modulation – FM transmitter – Demodulation – Transmission of radio waves – Reception of radio waves – Superhetrodyne Receiver – Characteristics of a receiver.

Text Books:

1. V. K. Mehta and Rohit Mehta, Principles of Electronics, S. Chand & Co. Ltd. 2006.
2. G. Jose Robin and A. Ubald Raj, Electronics (I Edition), Indira Publication, Marthandam, 2000.

Books for Reference:

1. R. S. Sedha, A text book of applied electronics, S. Chand & Co. Ltd. 2006.
2. B. L. Theraja, Basic Electronics (solid state), S. Chand & Co. Ltd. 2003.
3. N. N. Bargava, D. C. Kulshreshtha, S. C. Gupta, Basic Electronics and linear circuits, Tata McGraw Hill Publishing company Ltd, Reprint 2012.

SEMESTER V			
Core VIII	**Digital Electronics**		
Code : 18UPHC52	**Hrs/Week : 5**	**Hrs/Sem : 75**	**Credits : 4**

Vision: To enlighten our students on the concepts of digital electronics

Mission: To make our students understand number systems, logic gates and semiconductor devices and memories

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	define binary numbers	2	Re
CO –2	explain number system	2	Un
CO –3	construct logic gates	2, 4,6	Cr
CO –4	recall the fundamental concepts and techniques used in digital electronics	2	Re
CO –5	analyze the construction of shift register	2,5	An
CO –6	design registers, interpret logic functions, circuits and truth tables.	2, 4	Cr
CO –7	design counters, understand the concepts of decimal number system.	2,5	Cr
CO –8	differentiate A/D and D/A conversions	2, 4	An

SEMESTER V			
Core VIII	**Digital Electronics**		
Code : 18UPHC52	**Hrs/Week : 5**	**Hrs/Sem : 75**	**Credits : 4**

Unit I: Arithmetic Circuits

Binary to decimal system – Decimal system to binary system – Octal system – Hexadecimal System – Excess 3 Code – Gray Code – Binary addition – Subtraction – Unsigned Binary numbers 2's complement – Half adder – Full adder –Half subtractor – Full subtractor.

Unit II: Logic circuits

Boolean algebra – OR, AND and NOT operation – Boolean equation – Logic circuits – Boolean theorems and Basic laws – De Morgan's theorem – Duality theorem – Sum of products – Product of sums – Karnaugh map – Pairs, Quads and Octets – Karnaugh map simplification.

Unit III: Data processing circuits

Flip –Flops: R –S flip flop – Clocked RS flip flop – JK flip flop – JK master slaveflip flop – Schmitt trigger.

Multiplexer – Demultiplexer – 1-16 decoder – BCD to decimal decoders – Sevensegment decoder – Encoder – Parity checker and generator.

Unit IV: Shift registers and counters

Serial in register – Serial out register – Serial in–parallel out register – Parallel in-serialout register – Parallel in–parallel out register.

Ring counter – Binary counter – Decade counter UP/DOWN counter – Mod 3 counter –Mod 5 counter.

Unit V: Semiconductor memories:

ROM– RAMS – SRAMS – Dynamic RAMS.

A/D and D/A conversion:Variable resistor network – Binary ladder – A/D conversion –D/A conversion – Simultaneous conversion – Continuous AD conversion.

Text Books:

1. G. Jose Robin, A. Ubald Raj, Integrated Electronics, Indira Publications,Marthandam, second edition, 2002.
2. Albert Paul Malvino and Donald P. Leach, Digital principles and applications,7th edition 2013.

Books for Reference:

1. Millman and Taub, Integrated Electronics, International student edition, (TMH)

R. P. Jain, Modern digital Electronics, Tata Mc Graw Hill Pvt. Ltd., 4th Reprint1988.

SEMESTER VI			
Core X	**Modern Physics**		
Code :18UPHC61	**Hrs/Week : 5**	**Hrs/Sem : 75**	**Credits : 4**

Vision: To enlighten our students on the Atomic, molecular, optical and quantum physics

Mission: To understand the theory and applications of emission, absorption and scattering of electromagnetic radiation.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	describe Michelson –Morley experiment	2	Un
CO –2	list the Postulates of special theory of relativity	2	Re
CO –3	apply Pauli's exclusion principle to periodic table	2	Ap
CO –4	illustrate L –S coupling	2	Ap
CO –5	differentiate the Characteristic and continuous X – ray spectrum	2,5	An
CO –6	define Bragg's law	2,5	Re
CO –7	evaluate Davisson and Germer's experiment	2	Ev
CO –8	apply Bohr's quantization of angular momentum to the hydrogen atom	2	Ap

SEMESTER VI			
Core X	**Modern Physics**		
Code :18UPHC61	**Hrs/Week : 5**	**Hrs/Sem : 75**	**Credits : 4**

Unit I: Relativity

General theory – Michelson – Morley experiment – Postulates of special theory of relativity – Lorentz transformation – Length contraction – Time dilation – Relativistic condition of velocities – Simultaneity – Relativistic mass – Relativistic momentum – Mass and energy equivalence – Relation between total energy and rest mass, rest mass energy and momentum.

Unit II: Atomic Structure and Spectra

The vector atom model – Quantum numbers associated with vector atom model – coupling schemes – L-S coupling – j-j coupling – Pauli's exclusion principle – Application to periodic table – Magnetic dipole moment due to orbital and spin motion of the electron – Stern and Gerlach experiment – Zeeman effect – Experimental study of Zeeman effect – Larmor's theorem – quantum mechanical explanation of normal Zeeman effect.

Unit III: X – Rays

Production of X – rays – Coolidge tube – Properties of X –rays – Bragg's law – Bragg spectrometer – X-ray spectra – Characteristic and continuous X- ray spectrum – Moseley's law and its significance – Compton Effect – Compton Effect and its experimental verification.

Unit IV: Wave Properties of Matter

Wave velocity and group velocity – Relation connecting them – Basic postulates of quantum mechanics – Derivation of time dependent and time independent Schrodinger's equation – Physical interpretation of the wave function – Properties of wave function – Operators in quantum mechanics – Eigen functions, Eigen values and Eigen value equations – Expectation values – Transition probability.

Unit V: Development of Quantum Mechanics

Introduction – Black body radiation – Theoretical laws of black body radiation – Plank's quantum theory – Photo-electric effect – Einstein explanation of photo electric effect – The Ritz combination principle in spectra – Stability of an atom, Bohr's quantization of angular momentum and its application to the hydrogen atom – Particle in one dimension and three dimensional box.

Text Books:

1. R. Murugeshan, Kiruthiga Sivaprasath, Modern Physics, S. Chand & Co. Ltd. 12threvised edition 2006.
2. Kamal Singh, S.P. Singh, Quantum Mechanics, S. Chand & Co Ltd., 1998.

Books for Reference:

1. Brijlal and Subramanyam, Modern Physics, 8th edition, 2007
2. J.B. Rajam, Atomic Physics, 8th edition, S. Chand & Co.1981.

SEMESTER VI			
Core Integral II	**Advanced Physics**		
Code :18UPHI61	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Vision: To make our students experts in areas of advanced Physics

Mission: To train our students in the areas of laser, microprossor, nanotechnology and nuclear spaced materials

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall laser and its applications in medicine industry	3	Re
CO –2	list out the applications of Holography	3	Re
CO –3	solve arithmetic operations using 8085	5,6	An
CO –4	draw 8085 MPU	5,6	An
CO –5	formulate a program to write two hexadecimal numbers using 8085	5,6	Cr
CO –6	discuss BCS theory	2	Un
CO –7	assess the usage of Superconductors	3	Ev
CO –8	list the materials and its properties for nuclear and space applications	2	Re

SEMESTER VI			
Core Integral II	**Advanced Physics**		
Code :18UPHI61	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Applications of Laser

Application of laser in material processing – Laser drilling – laser cutting – Laser welding – Experimental welding – Air pollution monitoring – Water pollution monitoring – Propagation of laser radiation through atmosphere – Laser remote sensing – LIDAR – Raman LIDAR – Sensing wind velocity using laser – Holography

– Applications.

Unit II: Microprocessor architecture

Microprocessor – Microprocessor instruction set and computer language – Microprocessor architect and its operations – Input and output devices – Microcomputer system – Logic devices for interfacing – 8085 MPU.

Unit III: Programming the 8085

8085 programming model – Instruction classification – Instruction and data format

– How to write, assemble and execute simple programs – Instruction set – Data transfer operations – Addressing modes – Arithmetic operations – Logical operations – Branching operations.

Unit IV: Superconductors

Superconductivity – Effect of magnetic field– The Meissner effect – Effect of current

– Type I and Type II superconductors – Thermal properties – Isotope effect – London equations – BCS theory– flux quantisation – Josephson's effect – Application of superconductors – High Tc superconductor – Application of superconductor.

Unit V: Materials For Nuclear and Space Applications

Nuclear fuels – Fuel cladding – Moderators, control materials – Coolants – Shielding materials – Space programme – Structural material and their properties – System requirements – Extreme high temperature materials for thermal protection – Pressure vessels – Lubrication.

Text Books:

1. R. Murugeshan, Optics and spectroscopy, S. Chand & Co. (1995).
2. Ramesh Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, Penram International Publishing (India) Private Limited, Fifth edition, (2011).
3. P.K. Palanisamy, Solid state Physics, Scitech publication (India) Pvt

Ltd., Chennai. 3rd Reprint (2008).

4. CM Sri Vastava, C & C. Srinivasan, Science of Engineering materials and Carbon Nanotubes, New Age International Publishers, Third Edition.

Books for Reference:

1. Physics education, volume 19, No.1, April – June 2002
2. Dr. Arumugham, Bio medical instrumentation, Anuradha Agencies, Reprint 2014.
3. M.H Fulekar, Nano Technology: Importance and Application, I K International Publishing House Pvt Ltd, 2010.

SEMESTER III			
Core Skill Based	**Instrumentation**		
Code : 18UPHS31	**Hrs/Week : 4**	**Hrs./Sem : 60**	**Credits : 4**

Vision: To enrich our students with the knowledge of instrumentation physics

Mission: To make our students to understand the basic principles of instrumentation physics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO–1	identify the errors of instruments.	3.4	Un
CO–2	find out the arithmetic mean, deviation from the mean, average deviation, standard deviation.	3,8	Cr
CO–3	list out the characteristics of resting potential	3	Re
CO–4	compare active and passive transducers	3	Ev
CO–5	understand the working of bio medical equipments such as electron microscope.	3	Un
CO–6	read and interpret the output of bio potential recorders such as ECG and EEG.	3,6	Ev
CO–7	recall the functional elements of measuring instruments	3,6	Re
CO–8	describe the applications of Physics in the field of medicine	3	Un

SEMESTER III			
Core Skill Based	**Instrumentation**		
Code : 18UPHS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Measurement and error

Definition – Accuracy and precision – Significant figures – Types of error (Gross error, Systematic error, Random error) – Statistical analysis (Arithmetic mean, Deviation from the mean, Average deviation, Standard deviation) – Probability of errors (Normal distribution of errors, Probable error) – Limiting errors.

Unit II: Electrodes

Electrode potential – Purpose of the electrode paste – Electrode material – Types of electrodes – Microelectrodes (metal microelectrode) – Depth and needle electrodes – Surface electrodes – Chemical electrodes (Hydrogen electrode, pH electrode, pCO_2 electrode).

Unit III: Transducers and Microscope

Active transducers: Piezoelectric type transducers and Photovoltaic type transducer – Passive transducer – Photoelectric type resistive transducers – Inductive transducers – Optical and Electron microscope – Comparison between optical and electron microscope – Resolving power – Magnification power – Depth of focus – Types of electron microscope – TEM – SEM – Comparison between TEM and SEM.

Unit IV: Specialized and advances in medical instruments

Angiography – Digital thermometer – Endoscopes – EEG – ECG – Computed Tomography (CT scan) – X-ray machine – Comparison of Fluoroscopy and Radiography – Computers in medicine – Lasers in medicine – Cryogenic surgery – MRI (basics and instrumentation).

Unit V: Displays and Oscilloscope

Classification of displays – Display devices – Liquid crystal diode – Incandescent display –Liquid vapour display – Oscilloscope – Basic principle – CRT features – Block diagram of oscilloscope –Simple cathode ray oscilloscope.

Text Books:

1. Albert D. Helfrick and William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, Prentice- Hall of India Pvt. Limited, Reprint 2002.
2. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies, Reprint 2002.
3. H.S.Kalsi, Electronic Instrumentation, Tata McGraw Hill Education Pvt. Limited, Reprint 2012.

Books for Reference:

1. P. Mani, A text book of Engineering Physics- I, Dhanam Publications, Reprint 2013.
2. G. Jose Robin and A. Ubald Raj, Applied Physics, Indira Publications, Marthandam, 1998

SEMESTER IV			
Core Skill Based	**Physics for Competitive Examinations**		
Code : 18UPHS41	**Hrs./Week : 4**	**Hrs./Sem : 60**	**Credits : 4**

Vision: To motivate students to face and pursue higher education through competitive examinations

Mission: To equip our students with the basic principles of physics and apply the same in solving problems

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall units and dimensions	8	Re
CO –2	solve problems in gravitation and escape velocity	1,8	An
CO –3	solve problems in magnetic effect of current	1,8	An
CO –4	solve problems in Surface Tension and Viscosity	1,8	An
CO –5	solve problems related to Kirchhoff's laws & Steady current	1,8	An
CO –6	solve problems in Electrostatics & Electric potential	1,8	An
CO –7	solve problems in Electromagnetic Induction	1,8	An
CO –8	solve problems in Zener diode & Transistor	2,8	An

SEMESTER IV			
Core Skill Based	**Physics for Competitive Examinations**		
Code : 18UPHS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I: Fundamentals of Physics

Units – Trignometric – Numerical constants – Derivative and Integrals – Unit conversion factors – Some fundamental physical constants – Units and dimensions.

Unit II: Properties of matter

Gravitation, Escape velocity and artificial satellite – Surface Tension and Viscosity – Elasticity.

Unit III: Heat and Optics

Calorimetry – Kinetic theory of gases - Laws of thermodynamics - Conduction and radiation.

Interference – Diffraction, Resolving power (Prism & Grating) and Polarisation.

Unit IV: Electricity and Electromagnetism

Kirchhoff's laws and Steady current – Alternating Current – Electrostatics and Electric Potential .

Magnetic Properties of matter – Magnetic Effects of Current – Electromagnetic Induction.

Unit V: Electronics

Semiconductors – PN junction diode – Zener diode – Transistor: Transistor as an amplifier, Transistor as an oscillator.

Text Books:

1. Dr. S.L. Kakani, Objective Physics, Sultan Chand and sons Ltd.,10^{th} revised edition, 2001.

Books for Reference:

1. Satya Prakash, Er. Vibhav Saluja, Objective Physics, A.S.Prakashan publications, Meerut 27^{th} revised edition 2010.

SEMESTER V			
Core:IX	**Counselling Psychology**		
Code:18UPSC53	**Hrs/Week:5**	**Hrs/Sem: 60**	**Credit:4**

Vision:

To acquaint the students with the nature and process of counselling.

Mission:

To elaborate on the different fields and application of counselling.

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain the process of counselling and the Ethics in counselling.	5	Un
CO-2	analyse the counselling process and its various stages.	5	An
CO-3	understand the concepts and theories in counselling.	5	Un
CO-4	know the meaning, person centered counselling and behavioural counselling.	5	Un
CO-5	use the theories of counselling in a practical way.	5	Ap
CO-6	understand the concept applications of counselling.	5	Cr
CO-7	evaluate the knowledge on counselling skills.	3,4	Ev
CO-8	analyze the various crisis in counselling.	5	An

SEMESTER V			
Core:IX	**Counselling Psychology**		
Code:18UPSC53	**Hrs/Week:5**	**Hrs/Sem: 60**	**Credit:4**

Unit I Introduction

Counselling: Definition, process and goals.- Guidance and counselling – Need for counselling – Emergence and growth of Guidance and Counselling – Status of Guidance ND Counselling Movement in India.

Unit II Counselling Approaches and Practices

Directive or authoritarian approach – Relevance of Psychoanalysis – Non Directive approach: Humanistic-Existential approach – Roger's Self Theory – Behaviouristic approach: Reciprocal inhibition, Behaviour modification – Eclectic approaches.

Unit III Counselling Processes

Preparation for counselling – Counselling relationship – Content and process of counselling, counselling interactions, Counsellor-counselee relationship, factors affecting counselling process – Effective counsellor's skills: Characteristics and attitudes; Counselling Interview – Nature and significant features, setting and types of counselling interview, appropriate use of communication and interviewing techniques, degree of lead, silence, relationship techniques, sharing of experiences, resistance.

Unit IV Counselling Issues

Professional preparation and training for counselling: Counselling preparation and professional issues, academic preparation, practical skills, selection and training of counsellors, preparation of counsellors; Ethics in Counselling: Codes of professional ethics, Common ethical violations by Mental Health Professionals.

Unit V Psychological Testing and Diagnosis

Tools and techniques used in counselling and guidance: Testing and Non testing devices, Tools used in assisting individuals towards self-discovery; Test interpretation in counselling, Issues of diagnosis in counselling – Limitations.

Text books

1. Gibson & Mitchell (2003). *Introduction to Counselling and Guidance*. VI Edition. Pearson Education.

2. Nelson-Jones, R. (2011). *Theory and Practice of Counselling and Therapy*. V Edition. Sage Publications, New Delhi.

3. Rao S. Narayanan (1992). *Counselling and Guidance. II Edition*, Tata McGraw-Hill Publications.

Books for Reference

1. Parischa, Prem (1976). *Guidance and Counselling in Indian Education.*

2. Baron, R.A. & Byrne, D. *Social Psychology (9th ed).* Delhi :Pearson Education 2000.

SEMESTER - III			
NME I - Basic Biotechnology			
Code :18UZON31	**Hrs /Week: 2**	**Hrs/ Sem : 30**	**Credits : 2**

Vision:
To impart a comprehensive understanding of Biotechnology for successful career in industry and research institutes.

Mission:
To develop basic concepts of modern Biotechnology with an emphasis on tools, techniques for manipulation of genes and molecules.

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
Co-1	understand the basic principles of Biotechnology	1	Un
CO-2	distinguish between prokaryotic and eukaryotic cells from their structural studies	2	An
CO-3	understand the restriction enzymes and cloning vectors and assess their use in genetic engineering.	4	Un, Ev
CO-4	demonstrate the structure of DNA, its replication, amplification and separation of fragments	4, 5	Un
CO-5	analyse different culture media and techniques to cater the need for cell culture.	6	An
CO-6	evaluate techniques of gene delivery and cloning to adapt in manipulation of genes	5	Ev
CO-7	discuss the preparation and characterization of appropriate nano materials in the field of nanotechnology	7	Cr
CO-8	develop proficiency in aseptic laboratory techniques and standard procedures for cell culture.	8	Cr

SEMESTER - III			
NME I - Basic Biotechnology			
Code :18UZON31	**Hrs /Week: 2**	**Hrs/ Sem : 30**	**Credits : 2**

Unit I Cell

General structure - prokaryotic eukaryotic cells. Structure of DNA, RNA and replication of DNA. (Practical- Spotters - Structure of Bacteriophage, DNA model, tRNA)

Unit II Tools of Recombinant DNA Technology

Restriction Modification Systems – enzymes - polymerase I, II, III, DNA ligase and Type II restriction enzymes in genetic engineering. Cloning vectors - *E. coli* – Plasmid vectors – pBR 322 and M13 and Cosmids. (Practical- Spotters - Southern blotting, pBR322)

Unit III Animal Cell Culture

Cell culture media – natural and synthetic. Cell culture – primary culture, secondary culture, continuous cell lines, cryopreservation of cultures.(Practical:Sterilization of glass wares for cell culture & Preparation of culture media)

Unit IV Techniques and Applications of Biotechnology

Cloning – steps involved. Gene delivery – microinjection, electroporation, biolistic method (gene gun), liposome and retro viral mediated delivery. Gene amplification by PCR technique - Agarose Gel Electrophoresis.(Practical- Agarose Gel Electrophoresis& SDS -PAGE)

Unit V Nanobiotechnology

Classification of nanoparticles, synthesis of nanoparticles - RF plasma, chemical method, thermolysis. Properties and applications of nanofluids and nanocrystals. (Practical- Spotters -Dendrimer)

Text Book :

Kumaresan, V. 2012. *Biotechnology*. 6th edition, Saras publication, Kottar P.O, Nagercoil.

Books for Reference :

1. Dubey, R.C. 2009. A *Textbook of Biotechnology*. S.Chand and Company Ltd.

2. Rastogi, S.C. 2012. *Biotechnology Principles and Applications*. Reprint 2012, Narosa Publishing House. Chennai.

3. Singh, B.D. 2015. *Biotechnology*. Kalyani Publishers. New Delhi.

4. Sathyanarayana,V. 2013. *Biotechnology*. 8th Edition. Books and Allied (P) Ltd. Kolkatta.

5. Harisha S. 2007. *Biotechnology Procedures and Experiments Hand Book*. Infenity Science Press, LIC, Hinghum, Massachusett, New Delhi, India

6. Asish Verma, Surajit Das, Anchal Singh. 2008. *Laboratory Manual for Biotechnology*. S.Chand and Company, Ltd., New Delhi.

SEMESTER - V			
Core Integral I	**Biostatistics and Biological Techniques**		
Code: 18UBOI51	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Vision:

- To understand the basic statistical principles and techniques used in biology.

Mission:

- To introduce the common statistical techniques and terminology.
- To familiarize the students with different instruments to carry out basic research.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the fundamentals of statistical analysis	4	Un
CO-2	apply the learned procedure for collecting data, presenting data and analyze the same.	6	An
CO-3	able to interpret the results and find solution to the problems.	8	Ev
CO-4	understand the principles, working methodology and applications of instruments used in biology	4	Cr
CO-5	apply micro techniques for permanent mounting of biological samples.	8	Cr
CO-6	apply the learned techniques to carry out basic research in biology.	4	Ap
CO-7	understand the importance of data collection and their organization	8	Un
CO-8	communicate the results of statistical analyses accurately and effectively	8	Ev

SEMESTER - V			
Core Integral I	**Biostatistics and Biological Techniques**		
Code:18UBOI51	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Unit I: Introduction and scope of biostatistics. types of data – primary and secondary, Collection of data, sampling - random sampling methods and sampling error. Classification of data, preparation of frequency distribution table (discrete and continuous series).

Unit II: Presentation of data: Tabular (parts of table, types); diagrammatic – bar, pie diagram and pictogram; graphic – line graph, histogram, cumulativefrequency curve.

Unit III: Measures of central tendency: simple arithmetic mean, median and mode (direct method). Measures of dispersion: standard deviation (direct method), standard error. Chi-square test (goodness-of-fit, independence of attributes). Student t-test (comparison of means of two small samples).

Unit IV: Principle and working mechanism of simple, compound and electron microscope (TEM). Microtomy – fixation, dehydration, infiltration, embedding, sectioning and staining (safranin, fast green, haematoxylin only) mounting.

Unit V: Principle, working mechanism and applications of - pH meter, spectrophotometry – colorimeter and UV spectrophotometer. Separation techniques – clinical centrifuge, electrophorosis and adsorptionchromatography.

Text Books:

1. Gurumani N. 2005. *An Introduction to Biostatistics. II Edition*. M.J.P. Publishers, Chennai.
2. Gurumani N. 2006. *Research Methodology for Biological Sciences*. M.J.P. Publishers, Chennai.

Books for Reference:

1. Bryan C. Williams Keith Wilson, 1983. *A biologists guide to practical techniques of practical biochemistry second edition.* Edward Arnold publications.
2. Jayaraman J., 1985. *Laboratory manual in biochemistry,* Wiley Eastern Ltd., New Delhi.
3. Johansen,M., 1940. *Plant Microtechnique* Mc. Graw Hill.
4. Kothari C.R., 2004. *Research Methodology – Methods and techniques* New age International (P) Ltd., Publishers. New Delhi.
5. Palanisamy, S. and Manoharan, 1991. *Statistical methods for biologists*. Palani paramount publishers.

6. Plummer, D., 1987. *An introduction to practical Biochemistry*, Tata Mc. GrawHill.
7. Pranab Kumar Banerjee, 2004. *Introduction to Biostatistics*. S. Chand &Company Ltd., New Delhi.
8. Satguru Prasad, 2003. *Fundamentals of Biostatistics*. 4th edition. EmkayPublications.
9. Subramanian, 2005. *Biophysics principles and Techniques.* MJP Publishers,Chennai.
10. Veera Bala Rastogi, 2009. *Fundamentals of Biostatistics*. II Edition. Ane BooksPvt. Ltd. Chennai.
11. Veerakumari, L., 2004. *Biochemistry* M.J.P. Publishers, Chennai.
12. Wilson, K. and J. Walker, 1997. *Practical biochemistry IV edition*, Cambridgeuniversity press.

Semester IV			
Allied IV - International Business			
Code : 21UBAA41	**Hrs/Week: 4**	**Credit : 4**	**Hrs/Sem:60**

Objectives:

- To give international perspective to learners as to establishment of business and running of business in the era of Globalization.
- To enable students to have an adequate knowledge on international business.

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	communicate the nature theories and competitive advantages of international business.	3, 4	Un
CO-2	describing the modes of entering into international business-licensing, franchising, exporting and key projects.	4, 6	An
CO-3	Elaborate the detailed study on MNC'S-growth, structure, merits and demerits.	5, 8	Ap
CO-4	Impart the international marketing Intelligence-sources, characteristics and process of IMI'S	3, 6, 8	An
CO-5	Identify the financing foreign Trade-functions of ECGC,EXIM.	1, 4, 8	An
CO-6	Elaborate the procedure to be implemented for STC,AEPC,TTCI	3, 8	Ap
CO-7	Understand the nature of international business	1	Un
CO-8	find the method of sharing gains in productivity with workers by rewarding them financially	5	An, Re

Semester IV			
Allied IV - International Business			
Code : 21UBAA41	**Hrs/Week: 4**	**Credit : 4**	**Hrs/Sem:60**

Unit – I Nature Theories and Competitive Advantage:

Evolution – nature of international business – reasons and stages of internationalization – approaches and theories of international business – comparative advantages and problems of international business.

Unit – II Modes of Entering International Business

International business analysis – modes of entry – exporting – licensing – franchising – contract manufacturing – turn key projects – foreign direct investment modes of entry.

Unit – III Multinational Corporations

Meaning of MNC, international companies, global company, and transnational corporation – Factors for the growth of MNCs – organizational design and structure of MNCs – merits and demerits of the MNCs – role of MNCs in India.

Unit – IV International Marketing Intelligence

Meaning – information required – sources of information – characteristics of sounds IMIs – meaning of marketing research – scope and process of marketing research.

Unit – V Promotion and Financing Foreign Trade

Functions of ECGC, EXIM bank , STC, TTCIL, ITPO, AEPC.

Text Book

- Introduction to International Business – P.Subha Rao [Himalaya publishing House]

Reference Books

- Cherunilam Francis, Internatioanl Trade and Export Management - Himalaya Publishing House - Mumbai.
- T.T. Sethi, Money Banking & International Trade - S.Chand & Co., - Delhi.
  Robert J.Carbaugh, International Economics - Thomson Information Publishing Group –

Semester II			
Core VI	**Business Statistics**		
CourseCode:21UBAC22	**Hrs/Week:6**	**Hrs/Sem:75**	**Credits:4**

Objectives:

- To create a responsive and sustainable statistical system.
- Provide excellent training in scientific data collection- data management- methods and procedures of dataanalysis.

Course Outcomes:

CO.No.	Upon completion of this course- students will be able to	PSO addressed	CL
CO-1	understand the meaning- nature and methods of statistics.	1	Un
CO-2	identify population- sample parameter and sampling frame.	6	An
CO-3	determine the sample as a voluntary response sample or a convenience sample.	1-6	An
CO-4	determine the approximate location of the median and quartiles.	6	An
CO-5	describe the characteristics of the correlation coefficient.	4-6	Ap
CO-6	state the assumptions of inference about the regression model.	1	An-Cr
CO-7	measure the degree of economic changes overtime.	3	An-Ap
CO-8	measure the combined fluctuations in a group related variables.	1-3	Cr

Semester II			
Core IV	**Business Statistics**		
CourseCode:21UBAC22	**Hrs/Week:6**	**Hrs/Sem:75**	**Credits:4**

Unit - IIntroduction to Statistics:

Statistics as a Subject of Study- Describing Characteristics by numbers- Information and Data- Processing information and use of statistical procedures- Statistical variables: Qualitative and QuantitativeMean- Median and Mode.

(15 hours)

Unit - IIFrequency Distribution and Graphs:

Frequency- Stem and Leaf Display- Frequency Distributions- Data Grouping: Discrete and Continuous- Introduction to Graphs- Graph for Qualitative variables- Graph for Quantitative variables.

(15 hours)

Unit - III Measures of Dispersion- Skewness and Kurtosis:

Measures of Dispersion- Range- Co-efficient of Range- Quartiles- Inter-Quartile Range and Quartile Deviation- Co- efficient of Quartile Deviation- Mean Deviation- Co- efficient of Mean Deviation- Standard Deviation- Co- efficient of Variation- The Lorentz Curve- Skewness and Kurtosis; Measures of Skewness: Absolute and Relative; Co-efficient of Skewness: Karl Pearson's- Bowley's and Kelly's; Moments and Moments based measures of Skewness (β_1)and Kurtosis (β_2)

(15 hours)

Unit - IV Correlation and Regression:

Introduction to Correlation- Karl Pearson's product moment Co-efficient of Correlation- Positive-negative and zero correlation- Correlation through Scatter diagrams- Interpretation of Correlation Co-efficient- Simple and Multiple Correlation; Regression - Multiple Regression.

(15 hours)

Unit – V Index Number:

Construction of Price and Quantity index numbers -Laspeyres'- Paasche's - Edgeworth - Marshall's- Fisher's method - Relative methods -Tests of index number formulae: Time and Factor reversal tests - General index number - Chain base index number - Cost of living index number (CLI) - Analysis of Time Series.

(15 hours)

Note: Theory 25%- Problems 75%

Text Book:

1. Roger E. Kirk *Statistics: An Introduction*-United States, Thomson-Wadsworth Publication, Fifth Edition 2008.

Books for Reference:

1. Vittal P.R- *Business Mathematics & Statistics*- Chennai, Margham Publications, 5th Edition 2018.

2. Gupta S.C. and Kapoor V.K.- *Statistics*- New Delhi: Sultan &Chand, 11th Edition 2008.
3. Pillai R. S. N. &Bagavathi V.- *Business Statistics*- New Delhi: Sultan &Chand, 7thRevised Edition 2008.

SEMESTER III			
Core V – Business Economics			
Course Code : 21UBAC31	**Hrs/Week : 6**	**Hrs/Sem : 90**	**Credits : 6**

Objectives

- To understand the applications of economics theories in business decisions
- To determine the profit maximizing price and output for a firm operating different forms of market

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	Understand the concept of economics	1,3,5	Un
CO-2	Analysis of demand and supply	7	An
CO-3	Learn about the concept of production and cost function	5	Un
CO-4	An awareness of market structure and competition	8	Ap
CO-5	Evaluate the elements of money and inflation	1,2,3	Ev
CO-6	Exhibit ability to perfect competition	9	Un, Ap
CO-7	Gain a knowledge of fundamentals of economics	1,5	Ap
CO-8	Evaluate national income	1,2,3	Ev

SEMESTER III			
Core V – Business Economics			
Course Code : 21UBAC31	**Hrs/Week : 6**	**Hrs/Sem : 90**	**Credits : 6**

Unit –I Fundamentals of Economics

Business Economics – Meaning – Definition – Nature – Scope – Role of business economics - Scarcity and Efficiency – Fundamentals of economic problem – Central economic problem – Relationship of business economics with other disciplines –Opportunity Cost - Production Possibility Frontires (PPF) – Productive Efficiency Vs Economic Efficiency – Economic growth & stability – Micro economics and Macro economics – Positive and Normative economics – Economic cycle

Unit –II Demand and Supply Analysis

Meaning – Definition – Nature – Scope – Function - Law of Demand – Expectation to the law of demand – Determinants of demand – Elasticity of demand – Factors influencing elasticity of demand - Demand Schedule and demand curves – Advertising and Demand – Advertising Elasticity of demand – Factors affecting advertising elasticity of demand – Demand Forecasting – Meaning – Methods – Significance- Supply - Meaning – Definition – Nature – Scope – Function - Law of Supply – Supply curve – Determinants of supply – Contraction and expansion of supply – Increase and decrease in supply – Elasticity of supply –Determinants of Elasticity of supply

Unit – III Theory of Production and Cost Function

Meaning – Definition – Function – Continuous aggregate production function – Cobb Douglas production function – Translog production function – Use of production function in Decision –making –Law of production – Law of variable

proportion – Least Cost Combination Principle – Limitation – Cost Function – Theory of cost – Basic concepts – Short –run Total cost curve – Fixed and variable cost – Semi-variable cost – Total cost- Average and marginal cost

Unit – IV Market Structure and Competition

Market – Meaning – Definition – Classification of markets – Perfect and Imperfect market –Different market structure - Competition – Perfect competition – Feature of perfect competition – Monopoly – Features of monopoly – Discriminating monopoly – Degree of monopoly – Social cost of monopoly - Monopolistic competition – Features of monopolistic competition – Oligopoly – Characteristics of oligopoly

Unit –V Introduction to Macro Economics

Money –Meaning – Definition – Function – Measurement of money supply – Demand and supply of money - Money market Demand and supply – Money market equilibrium – Inflation –Impact – Reason for inflation – Inflation Vs Unemployment tradeoff – National Income – Definition – Concept of national Income – Computation of national income – Difficulties in measurement of national income – National income and Real income -

Text Book

1. P.L.Mehta, *Managerial Economics*, New Delhi, Sultan chand & sons, 2016.

Books for Reference

2. S . Shankaran, *Managerial Economics* Chennai, Margham Publications, 5th Edition, 2016
3. Karl E. Case and Ray C. fair, *Principles of Economics*, New Delhi, Pearson Education Asia, 12th edition, 2014.

4. A. H. L. Ahuja, *Business Economics* New Delhi, S.Chand, 11th edition, 2013
5. Paul A. Samuelson, William D. Nordhaus, Sudip Chandhuri and Anindya Sen, *Economics* New Delhi, Tata McGraw Hill, 19th edition, 2010.
6. G.S.Gupta, *Macro Economics*, New Delhi, McGraw Hill Education, 2017.

SEMESTER I			
Part IV	**Professional English for Management - I**		
Course Code:21UBAPE1	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits :2**

Objectives

- Create competent and skilled professionals who can control and manage business enterprise.

- To enable students to understand the importance of communication in business and train them to exhibit thinking, writing and speaking skills.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	recognize their own ability to improve their own competence in using the language.	1,4	Un
CO – 2	understand the importance of reading for life	3	Un
CO – 3	read independently unfamiliar texts	1,4,5	Un
CO – 4	understand the importance of writing in academic life	1,2	Un
CO – 5	write simple sentences without committing error of spelling or grammar	1,8	Ap
CO - 6	develop critical thinking skills	2	Ap,Cr
CO - 7	know the difference between brainstorming and brain writing	1,8	Un,Ap
CO - 8	demonstrate reading and writing skills	4,8	Ap,Cr

SEMESTER I			
Part IV	**Professional English for Commerce & Management - I**		
Course Code:21UBAPE1	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits :2**

Unit I – Communication

Meaning – Objectives – Process – Importance of Effective Communication in Business – Media – Reading Passages and Answering Questions – Developing Content with Pictures/Hints.

(6 hours)

Unit II – English for Effective Communication I

Essence of Business English – Words often Confused – Single Word for Group of Words – Prefixes and Suffixes – Synonyms and Antonyms

(6 hours)

Unit III – English for Effective Communication II (6 hours)

Some Spelling Rules – Some Words Commonly Misspelt – Aids to Correct Writing – Words Followed By Appropriate Prepositions

(6 hours)

Unit IV – Reading & Writing Skills

Listening to process description k- Drawing a flow chart – Role play (formal context) – **Reading** practice : Skimming / Scanning – Reading passages on products, equipments and gadgets – Writing : process description – compare and contrast – Paragraph – Sentence – Definition and Extended Definition – Free Writing

(6 hours)

Unit V – Critical Thinking Skills

Brainstorming – Importance – Types – Rules – Elements – Advantages – Disadvantages - Brainwriting – Importance – Types – Rules – Elements – Advantages – Disadvantages – Difference between brainstorming and brainwriting

(6 hours)

TextBook:

1. Rajendra Pal and Korlahalli. - *Essentials of Business Communication.*New Delhi,SultanChand&Sons, 13th Edition 2011

Books forReference:

1. TANSCHE - English for Commerce and Management, 1st Edition 2019.
2. UrmilaRai&S.M.Rai. *Business Communication.* NewDelhi, Himalaya Publishing House,2nd Edition2011.
3. Balasubramanyan.*Business communication.* NewDelhi, Vikas Publication, 2nd Edition 2016.

4. R.S.N.Pillai & Mrs.Bagavathi. Modern *Commercial Correspondence*. New Delhi, S.Chand &Co, Edition 2006.

SEMESTER II			
Part IV Professional English for Commerce & Management - II			
CourseCode:21UBAPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits :2**

Objectives:

- Create competent and skilled professionals who can control and manage business enterprise.
- To enable students to understand the importance of communication in business and train them to exhibit thinking, writing and speaking skills.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	understand the internet in business	2	Un
CO – 2	know the different modes of online communication	1,2	Un
CO – 3	draft letters pertaining to business activities	4,6	Ap,Cr
CO – 4	demonstrate speaking skills	3	Ap,Cr
CO – 5	prepare power point presentations	1,8	Ap,Cr
CO - 6	demonstrate presentation skills	6,8	Ap,Cr
CO - 7	develop content with Pictures/Hints	1,2,8	Un,An, Cr
CO - 8	use language for speaking with confidence in an intelligible and acceptable manner	1,2,8	Un ,Ap

SEMESTER II			
Part IV	**Professional English for Commerce & Management - II**		
Course Code:21UBAPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits :2**

Unit I – Electronic Communication

The internet: Understanding the internet in Business – Uses of the internet – Different modes of online communication – E-mail : Writing effective e-mails – The Language of e-mails – Golden Rules for effective e-mails – forwarding e-mails – e-mail attachments – specimen e-mails – latest trends in e-communication

(6 Hours)

Unit II -Business Letters I

Layout – Need – Functions of a Business Letter – Specimen Letters

(6 Hours)

Unit III – Business Letters II

Drafting of Letters: Enquiries and Replies – Orders and their execution – Complaints and Adjustments

(6 Hours)

Unit IV– Speeches

Introduction – Characteristics of a Good Speech – Profile of a Good Speaker – Planning to Speak – Model Speech

(6 Hours)

Unit V – Presentation Skills

Introduction – Specifying the objective – Planning – Preparation – Practice and Rehearsal Getting Ready – Making the Presentation

(6Hours)

TextBook:

Rajendra Pal and Korlahalli. - *Essentials of Business Communication.* New Delhi:

Sultan Chand&Sons, 13th edition 2011.

Books for Reference:

1. TANSCHE - English for Commerce and Management, 1st Edition 2019.

2.Urmila Rai& S.M.Rai. *Business Communication.* NewDelhi: Himalaya Publishing House, 2nd Edition 2011.

3. Balasubramanyan. *Business communication.* New Delhi: Vikas Publication, 2nd Edition 2016.

4. R.S.N.Pillai & Mrs.Bagavathi. Modern *Commercial Correspondence*. New Delhi: S.Chand&Co, 2006 Edition

SEMESTER III			
CORE SB – Logistics Management			
Course Code :21UBAS31	**Hrs/Week : 4**	**Hrs/Sem :60**	**Credits :4**

Objectives

- To enable students to have knowledge in shipping field operation.
- To familiarize students on the various aspects of logistics.

Course outcome:

CO.No.	Upon completion of this courses, students will be able to	PSO addressed	CL
CO - 1	Understand the concept of logistics management and its evolution	1	Un
CO – 2	Impart the knowledge on logistics transportation	7	Un
CO – 3	Understand the importance of logistics to the economy	2	Re
CO – 4	Gain knowledge on performance measurement and logistics audit	5	Un,Cr
CO – 5	Provide knowledge on types of inventory	7	Cr
CO – 6	Know about supply chain management	2,4	Cr
CO – 7	Demonstrate about global logistics	3,5	Re

CO - 8	Describe about international distribution channel strategies	1	Ap

SEMESTER III			
Core SB - Logistics Management			
Course Code : 21UBAS31	**Hrs/Week :4**	**Hrs/Sem: 60**	**Credits :4**

Unit I Introduction to Logistics management

Logistics management – meaning – definition - The Evolution Of Logistics – Importance Of Logistic to the economic development - Current trends in Logistics- Logistics in the Supply Chain Context

Unit II Logistics Delivery and Fulfilment

Unitization, Palletization And Containerization –Cannel and water Transportation. Air Transportation - Road Transport - Rail Transport - Ports and Facilities – Inland container depot – Export clearance freight station

Unit III Costs and Performance Measurements

Performance measurement – meaning, internal and external, need system, level and dimensions, logistics audit –Procedure, Characteristics- total logistics cost –Concept, Accounting methods in logistics

Unit IV Logistics Strategy and Supply Chain Management

Logistics Strategy- Warehousing - Inventory- types –material handling – order

processing – supply chain management–Meaning, Characteristics, Essential, Process, Types, Elements- Logistics Intermediaries And Outsourcing

Unit V Global Logistics

Introduction - International Distribution Channels Strategies – Exporting – Licensing – Joint Ventures – Controlling Logistics Activity - Strategic logistics planning – green logistics - E logistics –Global logistics scenario - Technology in Logistics

Text Book:

1. Ganapathy , Nandi *Logistics Management*, New Delhi, Oxford University Press, 6 January 2015

Books for Reference:

2. Martin Christopher *Logistics and Supply Chain Management* Mumbai, FT Publishing international 5th edition.

3. Paul A Myerson *Lean Supply Chain and Logistics Management* New Delhi, MCGraw Hill, 1st Edition.

4. Doughan Lambert, *Fundamentals of logistics management* New Delhi, Mc Graw Hill, 1998

SEMESTER –I			
Part III Core II	**Corporate Culture and Practices**		
Course Code:21UCCC12	**Hrs/Week: 5**	**Hrs/ Sem: 75**	**Credits : 4**

Objectives:

- To create an understanding to the students of the importance of Corporate Culture and
  Practices
- To provide the macro-socio-cultural factors that influence corporate culture

Course Outcome :

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	study the value in shaping Corporate Culture	1,2	Un
CO-2	impart with the knowledge of cultural variables, mission & vision	2,3	Un
CO-3	develop the operational values and vision to the students	2,4	Un
CO-4	learn the socio cultural factors that influence corporate culture	5,8	Ev
CO-5	familiarize the students on different models of corporate culture	1,5,7	Un
CO-6	provide knowledge on the growth of corporate culture	1,5	Ap

SEMESTER –I			
Part III Core II	**Corporate Culture and Practices**		
Code:21UCCC12	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Unit I: Introduction **15 Hrs**

Meaning - Definition - Importance and scope - Role of values in shaping Corporate Culture. Cultural variables: Individual –Social -National and Professional variables.

Unit II: Creating Corporate Culture **15 Hrs**

Establishing values - Creating Vision –Operationalising Values and Vision – Socialization of employees to the Corporate Culture.

Unit III: The Cultural Web **15 Hrs**

Organizational structure – rituals& routines - stories& symbols – Heros & power structures – control systems. Edgar Schien' approach to organizational culture - Hofstead's findings on cross-cultural dimensions.

Unit IV: Managing Cultural Change **15 Hrs**

Managing Cultural Change: Introduction to Cultural change – Meaning - key elements of change - the change process – creating and sustaining corporate culture.

Unit V : Typologies of Corporate Culture **15 Hrs**

Deal &Kennedy's Corporate Tribes model - Handy's Typology: Power culture – role – Task culture - Entrepreneurial – strategic -. Amarchand & Jayaraj's model - Growth – Person-oriented - Mixed and Weak culture.

Text books:

1. Ulrich. *Managing Corporate Culture*.Bengaluru:Macmillan publications.2016
2. Terrence E.Deal& Allen A. Kennedy. *Corporate cultures the rites and rituals of corporate life*.New Delhi.Sultan Chand: 2016
3. Addison-Wesley.*Corporate Culture*.International Book house:2018

Books for References:

1.Amarchand&B.D ,J. Jayaraj. *Corporate Culture & Organisational Effectiveness*. New Delhi:Global Business Press.2011

2. Biswas R.K. *Organisational Climate and Culture*.New Delhi: Altar Publishing House.2017

SEMESTER –IV			
Part III Core Skill Based	**Corporate Law and Secretarial Practice**		
Course Code: 21UCCS41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives:

The students will be able to :

- identify the various documents required to bring the company into administration
- know the basic practices and concepts of company management

Course Outcome:

S. No.	Upon the completion of this course, the students will be able to	PSO addressed	CL
CO1	understand the concepts and principles of company law	1,2	Ap
CO2	understand the secretarial duties regarding the formation of company	1,2,5	Ap
CO3	gain knowledge through different documents in the company	1,2,5	Ap
CO4	familiarize the doctrine of memorandum	1,2,5	Ap
CO5	state the relevant law and discuss the secretarial duties	1,5,8	Ap
CO6	analyze different types of companies	1,8	Ap

SEMESTER IV			
Part III Core Skill Based Corporate Law and Secretarial Practice			
Course Code : 21UCCS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit-I Companies Act **(12 hrs)**

Companies Act 2013 - History of Company Law – Definition of Company Characteristics - Formation of company – Incorporation – Effects of Registration – Promoter –Preliminary contracts- Secretarial Duties

Unit-II Kinds of Companies **(12 hrs)**

Types of companies - Private company – Public Company – Distinction – Special privileges of private company – Holding company - subsidiary company – Government company– Foreign company – one person company – Secretarial Duties

Unit-III Legal Documents of the Company **(12 hrs)**

Memorandum of Association – it's clauses – Alterations - Articles of Association –contents– alterations - Distinction between the two - Doctrine of ultravires – Secretarial duties. – Functions and Legal status - Secretarial Duties

Unit-II Kinds of Meetings **(12 hrs)**

Annual General Meeting – Annual report –Secretarial duties connected with meetings –proxies – Extraordinary General Meeting - Meetings of Board of Directors – Resolutions –Motions– Minutes – Agenda – Secretary's duties with regard to preparation of minutes and reports.

Unit-III Company Secretary and Responsibilities **(12hrs)**

Company Secretary – Types of Secretaries – Importance – Functions – Appointment, qualification, Rights - Duties and Liabilities - Scope of secretarial work.

Text Book:

1. Kapoor. N.D. *Elements of company Law.* New Delhi: Sultan Chand & Sons.

Books for Reference:

1. Kuchal M.C. *Company Law.* Noida: VikasPublications.2006.
2. Avtarsigh. *Company Law.* Lucknow: Eastern BookCompany.2018.
3. Dr. G.K. Kapoor, Dr. Sanjay Dhamija, Dr. Vipan Kumar. *Company Law.* New Delhi: Taxmann(P) PublicationsLtd.2021.

SEMESTER I			
Skill Enhancement Course – I Professional English for Chemistry - I			
Course Code: 21UCHPE1	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

OBJECTIVES:

- To enhance the language skills of first year chemistry students.
- To acquire knowledge about the effective communication.
- To create competence level of I year students.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	express their capability in using the language English in Chemistry.	9,10	Un
CO 2	understand the importance of learning English.	9,10	Un
CO 3	express the Language in a confident manner.	9,10	Un
CO 4	compare the need of the English language and its role.	9,10	An
CO 5	demonstrate the importance of writing English.	9,10	Ap
CO 6	familiar with the texts.	9,10	An
CO 7	interpret the importance of listeningand to develop knowledge and to improve competency..	9,10	Cr, Ev
CO 8	know about the professional skills and identify the language level by themselves.	9,10	Re

SEMESTER I			
Skill Enhancement Course –I Professional English for Chemistry - I			
Course Code: 21UCHPE1	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

UNIT 1: Communication

Listening: Listening to audio text and answering questions - Listening to Instructions

Speaking: Pair work and small group work.8

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures.

Vocabulary: Register specific - Incorporated into the LSRW tasks

Why Carrot is orange in colour? - Antoine Lavoisier -Father of Chemistry - The invention of Saccharine - Invention of Hydroxychloroquinone - Marie Curie.

UNIT 2: Description

Listening: Listening to process description-Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning- Reading passages on products, equipment and gadgets.

Writing: Process Description –Compare and Contrast Paragraph-Sentence Definition and Extended definition- Free Writing.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

The spirit of chemical sciences- the effect of greenhouse gas emission- History of matches and lighters, Invention of Vaseline.

UNIT 3: Negotiation Strategies

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming.(Mind mapping). Small group discussions (Subject – Specific)
Reading: Longer Reading text.

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

Alfred noble- his life and work- The soap Bubble- an introduction to nuclear chemistry- Synthetic polymers -biomass and biofuels.

UNIT 4: Presentation Skills

Listening: Listening to lectures.

Speaking: Short talks.

Reading: Reading Comprehension passages

Writing: Writing Recommendations Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

Bhopal disaster - Xrays- J.J. Thomson Biography and Noble prize - Invention of Anaestheia - Acid Base Chemistry - Home Volcanoes. .

UNIT 5: Critical Thinking Skills

Listening: Listening comprehension- Listening for information.

Speaking: Making presentations (with PPT- practice).

Reading: Comprehension passages –Note making.

Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)

Writing: Problem and Solution essay– Creative writing –Summary writing

Vocabulary: Register specific - Incorporated into the LSRW tasks

First hydrogen bomb –Detecting Hazards - How molecules are formed ? - Industrial chemistry- Food Adulteration.

References:

Britannica, T. E. (Ed.) Marie Curie from Encyclopædia Britannica, (2020, April 16).

Wikipedia, T. E. (Ed.).. Marie Curie, (16, June 2020)

https://en.wikipedia.org/wiki/Carrot

https://www.historyofinformation.com/detail.php?id=2928

https://www.britannica.com/biography/Antoine-Lavoisier

Audio and Video link

https://www.acs.org/content/acs/en/molecule-of-the-week/archive/s/saccharin.html#:~:text=Saccharin%20was%20the%20first%20widely,sweet%20taste%20on%20his%20hand.

https://en.wikipedia.org/wiki/Marie_Curie

https://en.wikipedia.org/wiki/Hydroxychloroquine

https://www.ukessays.com/essays/chemistry/green-chemistry-and-its-applications.php

https://www.discovermagazine.com/the-sciences/the-accidental-inventor

https://theconversation.com/a-short-history-of-anaesthesia-from-unspeakable-agony-to-unlocking-consciousness-74748

https://edu.rsc.org/resources/collections/on-this-day-in-chemistry

SEMESTER II			
Skill Enhancement Course – II Professional English for Chemistry - II			
Course Code: 21UCHPE2	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

Objectives:

- To elevate the students creativity and innovation skills.
- To mould the students to develop employability skills.
- To enhance the mind flexibility to meet the workplace competence.
- To improve the writing reports and language skills.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	discuss with the groups effectively.	9,10	Un
CO 2	understand the importance of writing English.	9,10	Un
CO 3	express the Language without fear.	9,10	Un
CO 4	adapt easily into the workplace environment.	9,10	An
CO 5	inculcate the real values of English and to identify the hidden potential of their own competence.	9,10	Ap, Re
CO 6	familiar with the comprehensional activities and exercises.	9,10	An
CO 7	attend the interview with boldness and enthusiastically.	9,10	Cr
CO 8	know about the impact of English in education.	9,10	Re

Unit 1: Communicative Competence

Listening – Listening to two talks/lectures by specialists on selected subject specific topics - (TED Talks) and answering comprehension exercises (inferential questions).

Speaking: Small group discussions (the discussions could be based on the listening and reading passages- open ended questions.

Reading: Two subject-based reading texts followed by comprehension activities/exercises

Writing: Summary writing based on the reading passages.

Nano technology and applications, Natural and Artificial dyes, Green chemistry and its applications.

Unit 2: Persuasive Communication

Listening: Listening to a product launch- sensitizing learners to the nuances of persuasive communication.

Speaking: Debates – Just-A Minute Activities.

Reading: Reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions.

Writing: Dialogue writing- writing an argumentative /persuasive essay.

Process of photosynthesis- Alchemist - Periodic table for Chemist, Cements.

Unit 3: Digital Competence

Listening to interviews (subject related)

Speaking: Interviews with subject specialists (usingvideo conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging tonurture interests – subject related)

Reading: Selected sample of Web Page (subject area)

Writing: Creating Web Pages.

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area.

Polymers - Applications of Spectroscopy -fly ash bricks, Composites, Chemistry – The Central Science.

Unit 4: Creativity and Imagination

Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites .

Speaking: Making oral presentations through short films – subject based

Reading: Essay on Creativity and Imagination (subject based)

Writing – Basic Script Writing for short films (subject based)

- Creating blogs, flyers and brochures (subject based)
- Poster making – writing slogans/captions(subject based)

Photochemistry, Environmental Chemistry, Glass, Abrasives

Unit 5: Workplace Communication& Basics of Academic Writing

Speaking: Short academic presentation using PowerPoint.

Reading & Writing: Product Profiles, Circulars, Minutes of Meeting.

Writing an introduction, paraphrasing.

Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis)

Capitalization (use of upper case)

Role of Chemist,Antibiotics, Industrial Chemistry, Paints.

References:

1. https://www.nano.gov/you/nanotechnology-benefits
2. https://www.google.com/search?q=natural+and+artificial+dyes&rlz=1C1CHBD_enIN868IN868&oq=natural+and+artificial+dyes&aqs=chrome..69i57j0i22i30l3j0i390l2.1894j0j7&sourceid=chrome&ie=UTF-8
3. https://en.wikipedia.org/wiki/Photosynthesis
4. https://en.wikipedia.org/wiki/Periodic_table
5. https://www.psd1.org/cms/lib/WA01001055/Centricity/Domain/30/The_Spirit_of_Chemical_Science.pdf
6. https://en.wikipedia.org/wiki/The_Alchemist_(novel)
7. https://www.livescience.com/60682-polymers.html#:~:text=Polymers%20are%20materials%20made%20of,tough%2C%20like%20epoxies%20and%20glass.
8. https://en.wikipedia.org/wiki/Pharmaceutical_industry

SEMESTER –I			
Part III **Allied I** **Business Information System**			
Course Code: 21UCOA11	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives

- To equip the students on the use of computers in business.
- To acquire hands-on experience in the use of Micro soft office programs.

Course Outcomes :

CO. No.	Upon completion of this course, students will beable to	PSO addressed	CL
CO – 1	gain thorough knowledge about the fundamentals of MS Word	2,4,5	Un
CO – 2	practice the applications of computer inadministration level	1,2,3	Ap
CO – 3	familiarize the calculations made in excel sheets	1,2,4	Ap
CO – 4	present skills with power point	1,3,5	Ap
CO – 5	design the documents with various formats and designs	1,3,4,5	Ap
CO – 6	exhibit knowledge on important application in Internet and email	2,3,5	Ap
CO – 7	analyse the importance of MS Office in business enterprises.	1,2,6	An
CO – 8	create the methods of forming MS Access	1,3,5	Cr

SEMESTER –I			
Part III Allied I Business Information System			
Course Code: 21UCOA11	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I – MS-Word (12 hours)

Basic Computing Skills: Word Insert Menu - Comment, Header, Footer, Page Number, Text Box, Quick parts, Word Art, Date and Time -Design and Page Layout Themes, Colors, Fonts, Paragraph Spacing, Effects, Water Mark, Page Color, Page Border - Introduction to mail merge-Mail Merge with labeling.

Unit II – MS – Excel (12 hours)

MS – Excel: Entering and Editing Cell Entries- Applications of Formula, Calculations of Commission and Inserting chart – Chart types - Working with Numbers– Changing - Worksheet Layout.

Unit III – MS- PowerPoint (12 hours)

MS- Power Point: Creating a basic presentation – Formatting and checking text- Applying Transition and Animation effects.

Unit IV – MS- Access (12 hours)

Introducing Access: Database – Tables, Queries, Forms, and Other Objects - Creating a Database Table – Opening and Viewing Tables – Entering and Altering Table Fields – Field Properties for Making Sure that Data Entries are Accurate – Finding and Replacing Data.

Unit V – Internet and Email (12 hours)

Creating an E-mail account- Sending and Receiving messages with attachments - Mail merge - Multimedia and its Applications in various sectors advantages – Emerging technologies in Multimedia.

Practical: 30 hours

Text Book:

Vikas Gupta.*Comdex Computer Course Kit,Windows XP with Office* ,New Delhi: Dreamtech Press 1st Edition 2017.

Books for Reference:

1. Srivastava T. N. *Introduction to Computers and their Applications to Banking,* New Delhi:Macmillan India, Ltd. , 1st Edition 2000.
2. Sanjay Saxena. *MS Office XP to Everyone* ; *1st Edition*, Chennai: Vikas Publishing HousePvt. Ltd., 2009.

SEMESTER II			
Part III Allied II Business Management			
Course Code: 21UCOA21	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives

- To equip students with skills of managing a business enterprise.
- To enable students to have thorough knowledge in principles of management.

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	understand the principles of Management.	1,2,3	Un
CO – 2	understand nature of management and apply the various concepts in business.	1,2,3	Ap
CO – 3	assess the principles of direction and its importance.	1,4	Ev
CO – 4	familiarise with the controlling and co-ordination techniques.	1,4	An
CO - 5	analyse the importance of decision making in business.	1.2.3	An
CO - 6	exhibit knowledge and skills relevant to principles of direction	2,4,5	Ap

SEMESTER II			
Part III Allied II	**Business Management**		
Course Code: 21UCOA21	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I–Nature of Business Management concept: (12 hours)
Concept and Thoughts of Management—Meaning – Functions of Management– Principles of Management –Functions of a Manager–Qualities of a manager– Management by Objectives – Meaning – Features – process of MBO.

Unit II –Planning and Decision Making: (12 hours) Planning: Meaning –Objectives –Characteristics—Importance – Limitations– Types and Methods of Planning- Decisionmaking–Meaning– Characteristics –Elements–Process–Principles.

Unit III– Organisation: (12 hours)
Organisation: Definition – Principles of organization – Classification –Formal Organization – Informal Organization. Difference between Formal and Informal Organisation– Functions- Types of Organisation -Line- Line and staff-Committee Organization.

Unit IV– Staffing and Direction (12 hours)
Staffing: – Meaning - Definition – Recruitment – Meaning- Sources -Selection – Selection Procedure -Direction–Meaning–Definition–Principles–Importance.

Unit V–Co-ordination and Controlling (12 hours)
Co-ordination- Meaning -Importance –Types of Co-ordination–- Steps for effective coordination Techniques of Co-ordination. Controlling: Definition– Importance– Steps in Control process.

Text Book
Ramasamy T. *Principles of Management.* New Delhi: Himalaya Publishing House.Revised edition 2021

Books for Reference:
1. Tripathi P.C. *Principles of Management*. New Delhi: Tata MCGraw Hill Publishing Co.Fifth Edition, 2017
2. Prasad L.M. and Gulshan S.S. *Management:Principles & Practices.* NewDehi: Sultan Chand& Sons Educational Publishers. Revised Edition 2019

SEMESTER – IV			
Part III Allied IV	**Financial Services**		
Course Code: 21UCOA41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives:

- To familiarise on different financial services available in India.

Course outcome:

CO.No.	On completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	appraise the services offered by Indian Financial Sectors.	1,3	An
CO – 2	analyse the functions of Financial Services	2,4	An
CO – 3	discuss on the avenues of financial services	3,6	Un
CO - 4	examine Merchant Banking	1,8	Ap
CO – 5	understand the duties and qualifications of Merchant Banker	1,8	Ap
CO – 6	use Lease Financing	4,6	Ap
CO – 7	differntiate functions of venture capital and scope of venture capital.	5,7	Ap
CO - 8	appraise Mutual Funds and credit rating institutions	5,7	An

SEMESTER – IV			
Part III	**Allied IV**	**Financial Services**	
Course Code: 21UCOA41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I Financial Services (12 Hrs)

Financial Services – Concept – Objectives – Characteristics – Classification of Financial Services – Scope – Causes – Constituents. New Financial Products and Services - Innovative Financial Instruments- Financial Service Sector in India – Growth – Problems.

Unit II Merchant Banking (12 Hrs)

Merchant Banking - Meaning - Definition - Scope- Functions - Merchant Banker's Code of Conduct – Qualities of a Merchant Banker- Merchant Banker's Commission - Problems of Merchant Bankers. Merchant Banking in India: Scope.

Unit III Lease Financing and Hire Purchase (12 Hrs)

Lease Financing – Definition - Characteristics - Types of Lease - Lease Participants - Leasing Process - Services of the Lessor - Advantages of Leasing - Limitation of Lease Financing. Hire Purchasing - Definition and Features – Concept of Hire Purchasing - Rights of Hirer – Bank Credit for Hire Purchase - Difference between Hire Purchasing and Lease Finance.

Unit IV Venture Capital (12 Hrs)

Venture capital – Origin – Meaning – Features - Scope of Venture Capital – Importance - Venture Capital Guidelines - Stages of Venture Capital Financing - The Indian Scenario: Methods of Venture Financing -Suggestions for Growth of Venture Capital.

Unit V Mutual Funds and Credit Rating (12 Hrs)

Mutual Funds – Origin - Meaning – Fund Unit vs. Share - Types of Mutual Fund - Importance, Functions, Advantages and Growth. Credit Rating: Origin - Functions – Credit Rating in India – Benefits - Credit Rating Agencies in India: CRISIL - ICRA – CARE.

Text Book:

Gordon K. and Natarajan, *Financial Markets and Services*. Mumbai: Himalaya publishing House (Revised Edition) 2014.

Books for Reference:

1. Joseph Anbarasu., Boominathan V.K., Manoharan P. and Gnanaraj G. *Financial Services.*New Delhi:Sultan Chand & Sons Edition-2007.
2. Gurusamy S. *Essentials of Financial Services.* Chennai: Vijay Nicole Imprints Pvt Ltd. Revised Edition 2014.

SEMESTER –IV			
Part III Non Major Elective E-Banking			
Course Code: 21UCON41	**Hrs/Week: 2**	**Hrs/Sem.: 30**	**Credits : 2**

Objective:

- To impart basic knowledge of the fundamental concepts in preparing final accounts.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to:	PSO Addressed	Cognitive Level
CO – 1	have a fundamental knowledge about banking system	1,2,5	Un
CO – 2	fill the forms used in banks	1,2,3,8	Ap
CO – 3	gain fundamental idea about e-banking	1,2	Un
CO – 4	use ATM, PoS and CDM	2,8	Ap
CO – 5	understand about Internet Banking	2,8	Un
CO – 6	use Internet Banking	2,5	Ap
CO – 7	describe about Mobile Banking	2,5	Un
CO – 8	use Mobile Banking	2,5	Ap

SEMESTER –IV			
Part III Non Major Elective E-Banking			
Course Code: 21UCON41	**Hrs/Week: 2**	**Hrs/ Sem.: 30**	**Credits : 2**

Unit I Banking (5 Hours)

Meaning – Definition – Bank – Banking – Origin of Bank – Steps to open bank account – Filling out the Forms - Deposit Challan – Withdrawal Challan - Requisition Forms- Cheque- Cancellation of cheques.

Unit II E- Banking (5 Hours)

Meaning – Definition – Steps to open bank account through online - Types – Advantages – Disadvantages – E-Banking in India

Unit III Automated Teller Machine, Point on Sale and Cash DM (7 Hours)

Origin of ATM – Debit & Credit Card - Procedure to use ATM – Advantages – Disadvantages – PoS – Steps to use PoS - CDM- Origin – Procedure to use CDM– Advantages – Disadvantages – Usage of ATM, PoS and CDM in India

Unit IV Internet Banking (7 Hours)

Definition – Procedure to activate internet banking – Steps to access banking transactions - Fund Transfer through NEFT and RTGS through online - Advantages – Disadvantages – Security Issues in Internet Banking

Unit V Mobile Banking (6 Hours)

Meaning – Definition – Procedure to login mobile banking – Steps to access banking transactions - Fund Transfer - Advantages – Disadvantages – Security Issues in Mobile Banking – Latest Payment Apps

Text book:

Gurusamy S. *Banking Theory Law & Practice*. Chennai: Vijay Nicole Imprints Private Ltd. 4th edition 2017.

Books for Reference:

1. Gordon and Natarajan. *Banking Theory Law and Practice*. Delhi: Himalaya Publishing House, 29th edition 2021
2. Sundaram S.M. *Banking Theory Law and Practice*. Karaikudi : Sree Meenakshi Publications, 1st Edition 2014
3. Maheshwari S.N. and Maheshwari S.K. *Banking Theory Law and Practice*. Kalyani Publishers, 11 Edition January 2014

SEMESTER I			
Part IV Professional English for Commerce and Management - I			
Course Code: 21UCOPE1	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits : 2**

Unit I – Communication (6 hrs)

Meaning – Objectives – Process – Importance of Effective Communication in Business – Media – Reading Passages and Answering Questions – Developing Content with Pictures and Hints.

Unit II – English for Effective Communication I (6 hrs)

Essence of Business English – Words often Confused – Single Word for Group of Words – Prefixes and Suffixes – Synonyms and Antonyms

Unit III – English for Effective Communication II (6 hrs)

Some Spelling Rules – Some Words Commonly miss spelt – Aids to Correct Writing – Words Followed by Appropriate Prepositions

Unit IV – Reading & Writing Skills (6 hrs)

Listening to process description - Drawing a flow chart – Role play – Reading practice : Skimming - Scanning – Reading passages on products, Equipment and Gadgets – Writing : Process description – Compare and Contrast – Paragraph – Sentence – Definition and Extended Definition – Free Writing

Unit V – Critical Thinking Skills (6 hrs)

Brainstorming – Importance – Types – Rules – Elements – Advantages – Disadvantages - Brain writing – Importance – Types – Rules – Elements – Advantages – Disadvantages – Difference between Brainstorming and Brain writing

Text Book :

Rajendra Pal and Korlahalli. *Essentials of Business Communication.* New Delhi: Sultan Chand &Sons,13th Revised edition; 2019

Books for Reference:

1. TANSCHE - *English for Commerce and Management*
2. Urmila Rai & Rai S.M. *Business Communication.* New Delhi: Himalaya PublishingHouse, 9th Revised Edition,2015

SEMESTER - I			
Ability Enhancement Course -Value Education			
Code : 21UAVE11	**Hrs/Week : 2**	**Hrs / Semester: 30**	**Credits : 2**

Unit I: Introduction to Value Education

Concept of Values -Types of Values- Approaches to values - Benefits of Value Education- Characteristics of Values

Unit II: Human Values

Human Values -Sources of Human Values - Love -Compassion - Gratitude - Courage - Optimism - Forgiveness- the need and urgency to reinforce Human Values

Unit III: Social Values

Role of family and society in teaching values - Role of educational institutions in inculcating values- Three general functions of education for society-Self-Reflection- Our society's needs - Social Responsibilities of a student

Unit IV: Spiritual Values

Spiritual Values - Spiritual Development -Moral Development - Importance of Spiritual Values - Cultivation of Spiritual Values -Five most common spiritual values -Spiritual Resources

Unit V: Values for Life Enrichment

Goal Setting - Building relationship **-** Friendship - Love relationship - Family relationship - Professional relationship Interpersonal Relationship -Essential Life Skills that Help in Students Future Development-Life Enrichment Skills Domain

Books for Reference:

1. Sneha M. & K. Pushpanadham Joshi. *Value Based Leadership in Education Perspective and Approaches*, Anmol Publications Pvt. Limited, 2002.
2. Venkataiah.N. *Value Education*, APH Publishing, 1998
3. Pramod KumarM.*A Handbook on Value Education*, Ramakrishna Mission Institute of Culture (RMIC) 2007
4. Jagdosh Chand.*Value Education*. Shipra Publication 2007
5. Indrani Majhi (Shit)Ganesh Das, *Value Education*, Laxmi Publication Pvt. Ltd., 2017
6. Arumugam, N. S. Mohana, Lr.Palkani, *Value Based Education*, Saras Publication 2014

SEMESTER II			
Part IV Professional English for Commerce and Management - II			
Course Code: 21UCOPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits : 2**

Objectives

- Create competent and skilled professionals who can control and manage business enterprise.

- To enable students understand the importance of communication in business and train them to exhibit thinking, writing and speaking skills.

Course Outcomes:

CO No.	Upon completion of this course, students will be ableto	PSO addressed	CL
CO – 1	understand the role of internet in business	1,5,8	Un
CO – 2	examine the different modes of online communication	1,5,8	An
CO – 3	draft letters pertaining to business activities	1,5,8	Ap
CO – 4	demonstrate speaking skills	1,5,8	Ap
CO – 5	prepare PowerPoint presentations	1,5,8	Ap
CO -6	demonstrate presentation skills	1,5,8	Ap
CO -7	develop content with Pictures/Hints	1,5,8	Cr
CO -8	use language for speaking with confidence in an intelligible and acceptable manner	1,5,8	Ev

SEMESTER II			
Part IV Professional English for Commerce and Management - II			
Course Code: 21UCOPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits : 2**

Unit I – Electronic Communication (6 hrs)

The internet: Understanding the internet in Business – Uses of the internet – Different modes of online communication – E-mail: Writing effective e-mails – The Language of e-mails – Golden Rules for effective e-mails – Forwarding e-mails – e-mail attachments – Specimen e-mails– Latest trends in e-communication

Unit II -Business Letters I (6 hrs)

Layout – Need – Functions of a Business Letter – Specimen Letters

Unit III – Business Letters II (6 hrs)

Drafting of Letters: Enquiries and Replies – Orders and their Execution– Complaints and Adjustments

Unit IV– Speeches (6 hrs)

Introduction – Characteristics of a Good Speech – Profile of a Good Speaker – Planning to Speak – Model Speech

Unit V – Presentation Skills (6 hrs)

Introduction – Specifying the objective – Planning – Preparation Practice and Rehearsal– Getting Ready – Making the Presentation

Text Book :

Rajendra Pal and Korlahalli. *Essentials of Business Communication* New Delhi, SultanChand & Sons 13th Revised Edition : 2019.

Books for Reference:

1. Pillai R.S.N & Bagavathi. *Modern Commercial Correspondence*, New Delhi,S.Chand & Co., Reprint Edition, 2007.
2. Reddy C.R. *Business Communication*, Dream Tech Press, Revised Edition, 2019.
3. Module by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER –III			
Part III	**Core SB**	**E – Accounting**	
Course Code: 21UCOS31	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objective :

Create competent and skilled accounting professionals to manage business applications by using TALLY Software.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO-1	develop the computerized knowledge in accounting	1,2,3	Un
CO-2	impart the basic principles and concepts of computerized accounting	1,2	Un
CO-3	assess on the use and application of Tally	1,2	Ev
CO-4	describe about the concept of vouchers	2,4	Un
CO-5	create company in Tally	5,8	Ap
CO-6	create inventory accounting	1,5,8	Ap
CO-7	prepare final accounts	1,4	Ap
C0-8	make use of cost category and cost centers in voucher	1,5	Ap

SEMESTER –III			
Part III Core SB	**E – Accounting**		
Course Code: 21UCOS31	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I Introduction to Tally [12 Hrs]

Meaning of computerized Accounting– Importance – Computerized Accounting Vs Manual Accounting– Creation of company – Select Company Technical advantages of Tally –Alter – Edit- Delete Company – Role and Importance of Functional keys

Unit II Ledger and Voucher Creation [12 Hrs]

Creation of Groups – Various kinds of Groups – Multiple and Single groups – Creation of Ledgers – Various kinds of ledgers - Entering vouchers – Journal voucher, Purchase voucher, Sales - Vouchers, Receipt Voucher, Payment Voucher

Unit II E- Accounting [12 Hrs]

Trial Balance, Trading Account, Profit and Loss Account and Balance sheet preparation.

Unit IV Inventories [12 Hrs]

Introduction to Inventories - Creation of Stock category – Stock group – Stock item – Editing and Deletion of stock groups and stock items – Usage of stock in voucher entry – Stock voucher on Purchase order – Stock Journal entries – Rejection vouchers.

Unit V Creation of Cost Center [12 Hrs]

Introduction to cost – Creation of Cost Category – Cost Centre Category – Editing and Deleting Cost Centre – Usage of Cost Category and Cost Centers in voucher entry

Note: Theory: 60% Practical: 40 %

Text Book:

Nadhani A. K. & Nadhani K.K.*Implementing Tally*. New Delhi: BPB 4th Edition 2018

Books for Reference:

1. ICA R&D Team. *Tally 9.0*. New Delhi: Vikas Publishing House Pvt Ltd. 4th Revised Edition 2019
2. Vishu Priya Singh. *Quick Learn Tally.* New Delhi: Computech Publication Pvt ltd. 5th Revised Edition 2020
3. Sriniva Valaban. *Computer Application in Business.* New Delhi: Sultan & Sons. 3rd Edition 2017

SEMESTER- I			
Allied – I	**Mathematics for Computer Science**		
Course Code: 21UCSA11	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :3**

Objectives:

- To attain mathematical foundations this is very essential for the study of computer courses.
- To make the students capable of mathematically formulating certain practical problems.
- To understand the concept of central tendencies
- To learn about dispersions and regression
- To provide knowledge about graphs and its applications.

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	create an argument using logical notation and evaluate if it is valid or not.	1	Cr
CO-2	apply logical reasoning to solve a variety of problems.	4	Ap
CO-3	compute measures of central tendency	4	Ap
CO-4	calculate and compare dispersion , Skewness, kurtosis	4	An
CO-5	compute the shortest path	1	An
CO-6	model problems in computer science using graphs and solve problems using graphs	1	Ap

SEMESTER- I			
Allied – I	**Mathematics for Computer Science**		
Course Code:21UCSA11	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :3**

Unit I:

Logic And Propositional Calculus– Introduction – propositions and compound propositions – tautologies and contradictions – logical equivalences– algebra of propositions – conditional and bi-conditional statements – arguments – logical implication – prepositional functions, Quantifiers – Negation of quantified statements.

Self-Learning: Basic Logical operations and truth tables

Unit II:

Measures of central tendency:

Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean. Partition values: Quartiles, Deciles and percentiles**.**

Self -Learning: Types of Data, Organizing data

Unit III:

Measures of dispersion:

Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation, measures of skewness, Kurtosis.

Self-Learning: Lorenz Curve

Unit IV:

Correlation and Regression:

Correlation: Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient.**Regression**: Concept of errors, Principles of Least Square, Simple linear regression and its properties.

Self-Learning: Scatter plot, Temporal autocorrelation, spatial autocorrelation

Unit V:

Graph Theory

Introduction, data structures – graphs and multigraphs – subgraphs, Isomorphic and homeomorphic graphs – paths, connectivity – the bridges of konigsberg, traversable multigraphs – labelled and weighted graphs – complete, regular, and bipartite graphs – tree graphs.**Directed Graphs :** Introduction- Directed Graphs- Basic Definitions- Rooted Trees.

Self-Learning: Spanning tree

Text Books:

1. Seymour Lipschutz, Marc Lipson, *DiscreteMathematics,* New Delhi : Tata McGraw Hill,RevisedThird Edition, 2017.(Unit I and Unit V)

2. Gupta S.C and Kapoor V.K, *Fundamentals of Mathematical Statistics*, New Delhi : Sultan Chand &Sons,11th edition, 2014 (Unit II, Unit III, Unit IV)

Books for Reference:

1. B.S. Vatsa, *Discrete Mathematics*, New Delhi: New Age International (P) Ltd.**,** Fourth Edition, 2009.
2. K.D. Joshi, *Foundation of Discrete Mathematics,*New Delhi: New Age International (P) Ltd.**,**2014
3. Kenneth H. Rosen *,"Discrete mathematics and its application"*, New Delhi : Tata McGraw Hill,8th Edition, 2021
4. Mukhopadhyay P, *Mathematical Statistics*, Kolkata :Books and Allied (P) Ltd, 2015.
5. Agarwal B.L, *Basic Statistics*, 6th Edition, New Delhi: New Age International (P) Ltd., 2015.

SEMESTER II			
Allied II	**Digital Electronics**		
Course Code: 21UCSA21	**Hrs / week : 3**	**Hrs /Semester:45**	**Credits : 3**

Objectives:

- To Understand the basic concepts used in the design and analysis of digital systems
- To study various Boolean Functions
- To study about number systems
- To Construct digital circuits
- Acquire knowledge in Boolean functions and MSI and LSI logic circuits.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	understand various number systems and boolean functions.	1	Un
CO-2	apply various methods to simplify boolean function.	4	Ap
CO-3	construct digital circuits for boolean functions with logic gates.	4	Cr
CO-4	design combinational circuits with logic gates.	4	Cr
CO-5	define sequential logic circuits.	1	Re
CO-6	analyse the operation of various flip-flops.	1	An

SEMESTER- II			
Allied II	**Digital Electronics**		
Course Code: 21UCSA21	**Hrs / week : 3**	**Hrs / Semester: 45**	**Credits : 3**

Unit I

Binary Systems : Digital Computers and Digital Systems **–** Binary numbers – Number base conversion – Octal and Hexadecimal numbers – Complements– Binary Codes –Basic theorems and properties of boolean algebra– Boolean functions– Canonical and Standard forms .

Self Learning : Digital Logic Gates .

Unit II

Simplification of Boolean Functions : The Map method – Two and Three variable Maps – Four Variable Map– Five and Six Variable Maps – Product of Sums Simplification – NAND and NOR Implementation– Don't care conditions – The Tabulation method – Determination of Prime – Implicants – Selection of Prime – Implicants

Unit III

Combinational Logic : Introduction– Design Procedure – Adders – Subtractors – Code Conversion– Multilevel NAND Circuits – Multilevel NOR Circuits – Exclusive-OR and Equivalence Functions.

Unit IV

Combinational Logic with MSI and LSI : Introduction– Binary Parallel Adder – DecimalAdder– Magnitude Comparator– Decoders – Multiplexers

Unit V

Registers and Counters: Sequential logic -Introduction – Flip-Flops -Basic Flip-Flop Circuit-Clocked RS Flip-Flop-D-Flip-Flop-JK Flip-Flop- T-Flip-Flop- Registers – Shift Registers

Self-Learning: Counters

Text Book :

1. M. Morris Mano, *Digital Logic and Computer Design*, Noida: Pearson education India, First Edition,2016

   Chapters : 1.2-1.6, 2.3-2.5,2.7,3.1-3.11,4.1-4.5,4.7-4.9,5.1-5.6,6.1,6.2,7.1-7.3

Books for Reference:

1. Charles H.Roth, Jr. *Fundamentals of Logic Design*, New Delhi: Cengage Learning India Private Limited, 7th Edition, 2015
2. DonaldD.Givone, *Digital Principles and Design*, New Delhi: Tata McGraw-Hill, First Edition,2012.
3. Donald P.Leach and Albert Paul Malvino, *Digital Principles and Applications*, New Delhi: Tata McGraw Hill, 8th Edition, 2014.

SEMESTER- III			
Allied III	**Data Structures**		
Course Code: 21UCSA31	**Hrs / week : 3**	**Hrs / Semester: 45**	**Credits : 3**

Objectives:

- To understand the concepts of basic data structures such as stack, Queues and Linked list.
- To make the students understand the basic algorithms for searching and sorting.
- To represent real world problems using different data structures and solve them using best algorithms

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO-1	compare various search methods	4	An
CO-2	implement hashing methods	4	Ap
CO-3	discuss applications of stack	1	Un
CO-4	create an expression tree for an expression and evaluate it.	2	Cr
CO-5	implement heap concepts	4	Ap
CO-6	compare and contrast sorting methods	4	An

SEMESTER- III			
Allied III	**Data Structures**		
Course Code: 21UCSA31	**Hrs / week : 3**	**Hrs / Semester: 45**	**Credits : 3**

Unit I:

Introduction: Pseudo code – The Abstract Data Type – A Model for an Abstract Data Type Algorithms Efficiency.

Searching: List Searches – Hashed List Searches – Collision Resolution

Unit II:

Linked Lists: Linear List Concepts – Linked List Concepts – Linked List Algorithms – Processing a Linked List – Complex Linked List Structures

Unit III:

Stacks and Queues: Basic Stack operations – Stack Linked List Implementation – Stack Applications – Queue operations – Queue Linked List Design

Unit IV:

Trees: Basic Tree Concepts – Binary Trees – Binary Tree Traversals – Application of Binary tree – General Trees – Binary search Trees – Insertion ,Deletion

Unit V:

Heap and Sorting: - Heap Definition-Heap Structure – Basic Heap Algorithms. – Heap Data Structures – Heap Algorithms - General sort concepts – Quick sort – External sorts.

Text Book:

1. RichardF.Gilberg&Behrouz A. Forouzan. .*Data Structures A Pseudo code Approach with C++*. Thomson Brooks /Cole. 4thReprint, 4thedition 2006.

Chapters 11,2.1,2.3,2.4,3.1- 3.,3.6, 4.1-4.3 ,5.1 ,5.2,7.1 -7.5 ,8.1,9.1 -9.5,11.1,11.4(Quick sort only),11.5 , 12.1 -12.5

Books for Reference:

1. Ellis Horowitz &SartajSahni.*Fundamentals of Data Structures*.GalGotia publications. 2006.
2. Adam Drozdek.*Data Structures & Algorithm in Java* .Ingram .third edition2008.
3. Alfred V.Aho,JohnE.Hopcroft,Jeffrey D Ullman .*Data Structures & Algorithms*. New Delhi : Pearson Education India. 1st edition2002.
4. SeymourLipschutz. *Data Structures. New* Delhi: McGraw Hill .Schaum's Outline Series .Revised First Edition 2014.

SEMESTER- IV			
Allied – IV	**Big Data Analytics**		
Course Code: 21UCSA41	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :3**

Objectives:

- To make the students understand Big Data Analytics
- To understand the various algorithms in Big Data Analytics

Course Outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO-1	understand the concept of Big Data	1	Un
CO-2	describe Big data Analytics	4	Un
CO-3	explain Big Data Analytics Process	4	Un
CO-4	understand Machine Learning	6	Un
CO-5	understand artificial Intelligence	6	Un
CO-6	explain the Applications of Big Data	5,8	Ap

SEMESTER- IV			
Allied – IV	**Big Data Analytics**		
Course Code: 21UCSA41	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :3**

Unit I:

From Data to Big Data: Introduction - No analytics without data - Databases - Raw data - Text-Images, audios and videos - The Internet of Things - From bytes to yottabytes: the data revolution - definition - The 3Vs model - Why now and what does it bring?

Big Data: Introduction - Beyond the 3Vs - From understanding data to knowledge – Improving decision-making - Things to take into account - Data complexity - Data quality: Not all data are the right data - Data security - Big data and businesses - Opportunities - Challenges

Unit II:

Building an Understanding of Big Data Analytics: Introduction - Before breaking down the process. What is data analytics? - Before and after big data analytics - Traditional versus advanced analytics: What is the difference? - Advanced analytics: new paradigm - New statistical and computational paradigm within the big data context

Why Data Analytics and When Can We Use It? Introduction - Understanding the changes in context - When real time makes the difference - What should data analytics address? - Analytics culture within companies - Big data analytics application.

Unit III:

Data Analytics Process: Introduction - Understanding data analytics is good but knowing how to use it is better- First phase: find the data - Second phase: construct the data - Third phase: go to exploration and modelling - Fourth phase: evaluate and interpret the results -Fifth phase: transform data into actionable knowledge - Disciplines that support the big data analytics process .

Unit IV:

Machine Learning: Introduction – descriptive analysis – prescriptive analysis – artificial Intelligence –Machine learning definition – how does it work – data scientist

Unit V:

Applications and Examples: Introduction – The duo big data/ML: examples of use – Netflix-,Amazon –proof that data are a source of creativity

Text book:

Soraya Sedkaoui *Data Analytics and Big Data* -, Wiley – ISTE 2018.

Books for Reference :

1. Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "*Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today's businesses*" John Wiley , 2014.
2. *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*,EMC Education Services.
3. Avid Loshin, "*Big data analytics: From Strategic planning to enterprise integration with tools, techniques, NoSQL, and Graph*, Elsevier,2013

SEMESTER- I			
Allied-Practical I	**Office Automation Lab**		
Course Code: 21UCSAR1	**Hrs / week:3**	**Hrs / Semester: 45**	**Credits :2**

Word:

1. Type a paragraph and use various formatting.
2. Design a wedding invitation in Word Document
3. Use mail merge in word.
4. Prepare a class time table.

Excel:

5. Prepare a semester wise mark statement for a computer class of 20 students.
6. Consider the sample employee worksheet and calculate their salary. Plot it using chart
7. Use any spreadsheet to use mathematical, statistical and logical functions
8. Plot various charts for marks obtained by the students

Access:

9. Create a database named “college.mdb” and perform the following tasks:
   a. Create a table named “student info”
   b. Fill at least 5 records.
   c. Prepare a query to display all records and Name should be in ascending order.
   d. Prepare a query named “senior” to display records including fields name, class, sec, roll no, status, photo and value of “status” field must be senior.
   e. Prepare a form of above query “senior”
   f. Prepare a report of all the fields of the above table.

10. Create a database named “library.mdb” and perform the following tasks:
    a. Create a table named “Book”
    b. Add at least 5 records.
    c. Prepare a query to display only records including book name, writer name and publication name. Save the query as “q_book”.
    d. Prepare a query to display all records on the basis of price which is more than Rs.500.
    e. Prepare a form on the basis of a table.
    f. Prepare a report on the basis of a query named "q_book”.

11. Create a database named “Nepal Bank” to store information about its staffs and do the following tasks:
    a. Create a table named “staffinfo”.
    b. Create a form on the basis of “staffinfo” table and save as “entryform”.
    c. Fill at least 5 records using the “entryform”
    d. Create a query named “depinfo” to display records only including department name, staff name and mobile number.
    e. Create a query named “post” to display staff name, post, department and phone number whose post is “teller “ or“casher”.
    f. Prepare a report on the basis of a query named “depinfo”.

12. Create a database named exam.mdb and a table named class8 with the following structure.

Field name	Data type
Roll no	number (primary key)
Name	text
English	number
Science	number
Maths	number

a. Add any 5 records in the table.

b. Prepare a query named “total marks” to calculate the sum of all the marks.

c. Prepare a query named “topper” of query “total marks” to display all records whose total is more than 200.

d. Prepare a form of your query using form wizard with all the fields.

e. Prepare a report on the basis of query “Total marks”.

SEMESTER- II			
Allied-Practical II	**Open Source Multimedia Lab**		
Course Code: 21UCSAR2	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :2**

(GIMP)

1. Design a brochure.
2. Design greeting card.
3. Design a Textbook cover page.
4. Filters in GIMP
5. Design a homepage for a website
6. Design a visiting card.
7. Design a Bio data form
8. Design a CD label.
9. Create 2D logos.
10. Animate a candle flame using Liquefy filter.

SEMESTER- III			
Allied-Practical III	**Data Structures Lab**		
Course Code: 21UCSAR3	**Hrs / week : 2**	**Hrs / Semester: 30**	**Credits : 1**

1. Searching (Sequential and Binary)
2. Implement linked list and perform the following operations
   i. Add a node as first node ii. Add a node as last node iii.Add a node as middle node
3. Implement Linked list and perform the following operations.
   i. Delete the first node ii. Delete the last node iii Delete the middle node

4.Implement a stack using Linked List and perform the push and pop operations.

5.Implement a queue using Circular list and perform enqueue and dequeue operations.

6.Implement binary tree using Linked and perform the following traversal.

i. Inorder Traversal ii. Preorder Traversal iii. Post order Traversal

7. Merge sort.
8. Quick sort.

SEMESTER- IV			
Allied - Practical– IV	**Web designing Lab**		
Course Code: 21UCSAR4	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits :1**

1. Create a web page of your College.
2. Create a web page to display your marks in the following table format.

Reg No.	Name	SEMESTER I							
		Language		English		C		HTML	
		Int	Ext	Int	Ext	Int	Ext	Int	Ext

3. Write an HTML code to display a list of five cars in a frame,Link each one to a brief description in second frame. The left frame should display the list and the right frame should display the paragraph about the frame.

4.Write HTML program to create E-Mail registration form.

5. Design a Web page using CSS which includes the following:
   i. Use Different fonts and styles
   ii. Set the background image
   iii. Define styles for links as A: link, A: visited , A: active and A: hover
6. Write a Java Script to prepare EB Bill.
7. Write a Java Script to design a simple calculator to perform sum, product, difference and quotient operations.
8. Write a JavaScript to validate the following fields:
   i. Name (should contain alphabet and the length should not be less than 6 characters)
   ii. Password (should not be less than 6 characters length)
   iii. Email id (must follow the pattern)
   iv. Mobile No (should contain 10 digits)

Semester I			
Core – I	**C Programming**		
Course Code:21UCSC11	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 4**

Objectives:

- Understand the concepts of Structured programming language
- To understand the basic programming concepts.
- To develop programming skills using the C language.

Course outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	describe algorithm, flowchart, various operators and library functions of C language	1	Un
CO-2	compare and contrast loops	4	An
CO-3	understand the concept of storage classes and input /output statements and functions	1	Un
CO-4	implement different operations on arrays	2,6	Ap
CO-5	develop programs using pointers , structures and union	2,6	Ap
CO-6	describe the file operations	1,2	Un

SEMESTER- I			
Core – I	**C Programming**		
Course Code:21UCSC11	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 4**

Unit I:

Algorithms - Flow charts: Developing algorithms and flowcharts for solving simple problems. Introduction to C

C Fundamentals: The C Character Set - Identifiers and Keywords - Data Types –Constants– Variables and Arrays - Declarations - Expressions - Statements - Symbolic Constants.**Operators and Expressions:** Arithmetic Operators - Unary Operators - Relational and Logical Operators - Assignment Operators - The Conditional Operator - Library Functions

Self- learning: Bitwise Operations

Unit II:

Data Input and Output: Single Character Input-The getchar Function-Single Character Output-The putchar Function-Entering Input Data-More about the scanf function-Writing output data – The printf function- The scanf Function-More about the printf function -The gets and puts Functions.

Control Statements: Branching: The if-else Statement-Looping: The While Statement-More Looping: The do-while Statement-Still More Looping: The for Statement-Nested Control Structures-The switch Statement-The break Statement-The continue Statement-The comma Operator-The go to Statement.

Unit III:

Functions: Defining a Function-Accessing a Function-Function Prototypes- Passing Arguments to a Function- Recursion. Program Structure: Storage Classes- Automatic Variables- External (Global) Variables- Static Variables.

Arrays: Defining an Array-Processing an Array - Passing Arrays to Functions- Multidimensional Arrays - Arrays and Strings.

Self learning: Register Variables

Unit IV:

Pointers: Fundamentals-Pointer Declarations- Passing Pointers to Functions- Pointers and One-Dimensional Arrays-Dynamic Memory Allocation- Operations on Pointers-Pointers and Multidimensional Arrays -Arrays of pointers-Passing Functions to Other Functions

Structures and Unions: Defining a Structure - Processing a Structure - User Defined Data types (typedef) - Structures and Pointers - Passing Structures to Functions -Passing Structures to Functions-Unions.

Self-learning: command-line arguments

Unit V:

Opening and Closing a Data File-Creating a Data File-Processing a Data -Unformatted Data Files.

Self learning: Macros-The CPreprocessor.

Text Book:

1. Byron Gottfried, *Programming with C* .India : McGraw Hill Education Private Limited.Third[rd]Edition 2017 .
   Chapters: 2,3,4,6,7,8,9,10,11,12 and 13.

Books for Reference:

1. Ashok N. Kamthane, *Programming with ANSI and Turbo* .New Delhi :Pearson education. Third Edition 2008.
2. Venugopal K R and Sudeep R Prasad .*Mastering C*. India: Tata McGraw Hill. Second Edition, 2017.
3. E. Balagurusamy, ,*Programming in ANSI C.*India:McGraw Hill Education Private Limited, Eighth Edition 2019.
5. computer-fundamental/algorithm-and-flowchart.htm
6. https://www.geeksforgeeks.org/an-introduction-to-flowcharts

SEMESTER- II			
Core II	**C++ Programming**		
Course Code: 21UCSC21	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 4**

Objectives:

- Understand the basic concepts of object oriented programming language
- To develop programming skills using the C++ Programming language.

Course outcome:

CO No.	**Upon completion of this course, students will be able to**	**PSO Addressed**	**CL**
CO-1	know about object-oriented features.	1	Un
CO-2	develop program using inline ,friend function , overloading constructor and destructor	4	Ap
CO-3	develop the array of objects and demonstrate operator overloading	2,6	Un
CO-4	categorize various inheritance methods	1	An
CO-5	understand pointer operations	1	Un
CO-6	understand virtual function and file operations	1	UN

SEMESTER- II			
Core II	**C++ Programming**		
Course Code: 21UCSC21	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 4**

Unit I

The Big Picture: Why Do Need Object-Oriented Programming- Characteristics of Object-Oriented Languages - C++ and C-Laying the Groundwork.C++ Programming Basics: Basic Program Construction - Output Using cout - Preprocessor Directives – Comments - Integer Variables- Character Variables - Input with cin- Type float- Manipulators-Variable type Summary-Type conversion-Arithmetic Operators-Library Functions.

Unit II

Function: Simple Functions - Passing Arguments to Functions -Returning Values from Functions - Reference Arguments - Overloaded Functions - Recursion-Inline Functions - Default Arguments- Variables and Storage Classes - Returning by Reference.

Objects and Classes: A Simple Class - C++ Objects as Physical Objects - C++ Objects as Data Types-Constructors - Objects as Function Arguments -Returning Objects from unction-Structures and Classes-Classes, Object, and Memory-Static Class Data

Unit III

Arrays: Array Fundamentals - Array as Class Member Data - Array of Objects - String. Operator Overloading: Overloading Unary Operators - Overloading Binary Operators- Data Conversion-Pitfalls of Operator Overloading and Conversion.

Unit IV

Inheritance Derived Class and Base Class - Derived Class Constructors - Overriding Member Functions-Inheritance in the English Distance Class - Class Hierarchies-Public and Private Inheritance-Levels of Inheritance-Multiple Inheritance-Ambiguity in Multiple Inheritance - Containership: Classes with Classes - inheritance and Program Development.

Pointers: Addresses and Pointers - Pointer Variables - Pointers and Array - Pointers and Functions - Pointers and Strings - Memory Management: new and delete - Pointers to Objects - A Linked List Example - Pointers to Pointers - Debugging Pointers.

Unit V:

Virtual Functions: Virtual Functions - Friend Functions - Static Functions - assignment and Copy Initialization -The this Pointer.

Streams and Files: Streams -String I/O -Character I/O - Object I/O -I/O with Multiple Objects-File Pointers - Disk I/O with Member Functions -File Pointers -Error Handling - Redirection - - Printer Output - Overloading the Extraction And Insertion Operators.

Self Learning: Command Line Arguments

Text Book:

1. Robert Lafore. *Object-Oriented Programming in C++*. New Delhi : Pearson and Dorling Kindersley Publications. Fourth thEdition 2011

Books for Reference:

1. E.Balagurusamy, *Object-Oriented Programming with C++* India: Tata McGraw Hill. 8th Edition 2020.
2. D.Ravichandran, *Programming with C++*.India: Tata McGraw-Hill. Second dEdition. 2010.
3. K.R. Venugopal Rajkumar Ravishankar. *Mastering C++*. India: Tata McGraw Hill. Second Edition 2017.

SEMESTER- III			
Core – III	**Java Programming**		
Course Code: 21UCSC31	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 4**

Objectives:

- To understand the basic concepts and fundamentals of platform independent Object Oriented Language.
- To demonstrate skills in writing programs using exception handling techniques and Multithreading
- To understand streams and efficient user interface design techniques.
- To understand the concept Applets, AWT and Database.

Course Outcome:

CO.No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO-1	knowledge of the structure and model of the Java programming language	1,2	Re
CO-2	develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.	2	An
CO-3	apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.	2	Un
CO-4	design event driven GUI .	6	Ap
CO-5	Develop web related applications	8	Ap
CO-6	Develop applications using JDBC	6,8	Ap

SEMESTER-III			
Core – III	**Java Programming**		
Course Code: 21UCSC31	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Unit I:

The History and Evolution of Java: Creation of java - Operators – Control statements – Class , Methods , Inheritance

Packages and Interfaces: Packages - Access Protection – Importing Packages- Interfaces.

Self Learning: Data Types, Variables and Arrays.

Unit II:

Exception Handling: Exception-Handling Fundamentals-Exception Types-Uncaught Exceptions-Using try and catch- Multiple catch clauses-Nested try Statements-throw-throws-finally-Java's Built-in Exceptions.

I/O Basics-Reading Console Input-Writing Console Output-The PrintWriter Class-Reading and Writing Files

Multithreaded Programming:

Java Thread Model-Main Thread-Creating a Thread-Creating Multiple Threads- Using is Alive() and join ()-Thread Priorities-Synchronization - Interthread Communication-Suspending, Resuming, and Stopping Threads.

Unit III:

The Applet Class: Applet Basics -Applet Architecture - Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - HTML APPLET tag - Passing Parameters to Applet.

Event Handling: Event Handling Mechanisms - Delegation Event Model - Event Classes(The Action Event, Item Event, Key Event , Mouse Event) - Sources of Events - Event Listener Interfaces(Action Listener ,Item Listener, Key Listener, Mouse Listener).

Introducing the AWT: AWT Classes-Window fundamentals -working with Frame Windows -Working with Graphics **Self Learning:** Adapter Classes

Unit IV:

Using AWT Controls:

Controls Fundamentals -Labels-Using Buttons-Applying Check Boxes-Check Box Group-Choice Controls-Using a Text Field-Using a Textarea-Understanding Layout Managers-[Flow Layout Only]-Menu Bars and Menus.

Unit V:

JDBC: JDBC – JDBC versus ODBC – Types of JDBC drivers – Connection – Statement –PreparedStatement.- Fields of ResultSet – Methods of ResultSet – Executing a query - ResultSetMetaData – DatabaseMetaData. **Self-Learning:** Basic data types in JDBC

Text Books:

1. Herbert Schildt. *The Complete Reference Java™* . New Delhi:Tata Mc Graw Hill. 8th Edition 2011. Chapters: 1, 9, 10, 11,21,22,23,24,29,30,31(Unit I,II,III,IV)
2. S. Horstmenn and Gary Cornell, *Core Java2 Volume II Advanced Features.* The Sun Microsystems press Java Series. 2002. Chapter: 4.(Unit V)

Books for Reference:

1.Steven Holzner.*Java 2 Programming Black Book*. New Delhi: Dream Tech Press.2005.

2.Joseph O'Neil.*JavaBeans Programming from the GroundUp*. New Delhi : TMGH. 1998

3.KathyWalrath.*The J2EE Tutorial*.New Delhi:Pearson. Education Asia 2003

SEMESTER- IV			
CORE IV	**RDBMS with PHP and MySQL**		
Code: 21UCSC41	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Objectives

- To understand the basic elements of a relational database management system
- To identify the data models for relevant problems
- To design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data
- To create dynamic web pages and websites.
- To connect webpages with database.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	explain the DBMS	1	Un
CO-2	describe Data models	2	Un
CO-3	explain the variable usage in PHP	1	Un
CO-4	creating forms with conditional statements	1	Cr
CO-5	describe about arrays, files, cookies and functions.	2	Un
CO-6	create an application using php and mysql	4	Cr

SEMESTER- IV			
CORE IV	**RDBMS with PHP and MySQL**		
Code: 21UCSC41	**Hrs / week :4**	**Hrs / Semester: 60**	**Credits :4**

Unit-I

Data base System Applications, Purpose of Database Systems-Data Models – Entity Relationship Model Constructs: Entities, Attributes & Relationships, Types of entities, Types of Attributes, Types of Relationships, Degree of Relationship: Unary, Binary & Ternary. Cardinality Constraints, Examples

Unit- II

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyee/Codd normal form. Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

Unit- III

Introduction to SQL -Introduction, SQL Environment, Data Definition Commands: Create, Alter, Drop, Truncate. Data Integrity Controls: Primary Key Constraint, Unique Key Constraint, Not Null Constraint, Foreign Key Constraint, Check Constraint. Data Manipulation Commands: Insert, Update, Delete. Data Control Commands: Commit, Rollback. SQL Operators: Arithmetic, Logical, Relational and Special Operators.

Unit-IV

Introduction to PHP- history- features-variables- statements-operators-conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue- Arrays: Creating an array- user defined functions- using files- sessions- cookies

Unit-V

Working MySQL with PHP-database connectivity- usage of MYSQL commands in PHP- processing result sets of queries-formatting query output with Character- Numeric- Date and time –sample database applications.

Text Books:

1. Raghurama Krishnan*,Data base Management Systems*,Johannes Gehrke, TATA McGrawHill 3rd Edition.
2. Vikram Vaswani ,*How to Do Everything with PHP & MySQL,* TATA McGrawHill

Books for Reference:

1. Elmasri Navathe ,*Fundamentals of Database Systems*, Pearson Education.
2. C.J. Date, A.Kannan, S.Swami Nadhan,*An Introduction to Database systems*, Pearson, Eighth Edition

3.Martin Gruber,*Understanding SQL,*Manish Jain for BPB publications

4.Steven Holzner,*The complete Reference*,TATA McGraw-Hill Edition

5.Alexis Leon Mathews,*Database Management Systems*,Leon Vikas

SEMESTER- I			
Core Practical I	**C Programming Lab**		
Course Code: 21UCSCR1	**Hrs / week :4**	**Hrs / Semester:60**	**Credits :2**

1. Solve Quadratic Equation- control statements
2. Sum of Digits & reverse the number.
3. Prime number Checking
4. Sine Series evaluation
5. Sorting an Array of numbers
6. Binomial coefficient using function
7. Linear Searching using function
8. Sorting an array of names
9. Counting no. of vowels, consonants, words and white spaces in a line of text.
10. EB Bill using Structure.
11. Matrix multiplication using pointers
12. Create a file to store students details and retrieve the details from the file

SEMESTER- II			
Core Practical II	**C++ Programming Lab**		
Course Code: 21UCSCR2	**Hrs / week : 4**	**Hrs / Semester: 60**	**Credits : 2**

1. Area calculation using Function overloading (Minimum three functions).
2. Implement constructor overloading
3. Swap two values between two class objects using friend function.
4. Display the details of employees using array of objects.
5. Overload Binary + operator which adds two complex numbers.
6. Overload Relational operator = = to compare two strings.
7. Row and column total of a matrix using class and objects
8. Using class and objects, find the sum of two matrices using pointers.
9. Process students mark list using multiple inheritances.
10. Process telephone billing using multi level inheritance.
11. Program in C++ using virtual function.
12. Process mark list using binary file.
13. Open a file in output and input mode. Accept data and write to the file. Display the contents of the file.

SEMESTER- III			
Core – Practical III	**Java Programming Lab**		
Course Code: 21UCSCR3	**Hrs / week : 3**	**Hrs / Semester: 45**	**Credits : 2**

1. Implement Overloading Constructor and Overloading Method
2. Writing a Program to apply method Overriding concept.
3. Development of Java Packages
4. To create and implement an interface.
5. To create a thread i. Using Thread class ii. Using runnable interface
6. To create an applet with four Checkboxes with labels and a Text area object.
7. To create a window with a checkbox group with boxes for the colors, Violet, Indigo, Yellow, Orange, Red, Blue and Green. When the button is selected the background color must change accordingly.
8. To demonstrate the use of choice box.
9. To throw the following exception, i. Negative Array Size ii. Array Index out of bounds
10. To illustrate mouse event handling.
11. To create a File menu with options new, save, and close, edit menu with options cut, copy and paste.

SEMESTER IV			
Core – Practical IV	**PHP& MySQL Lab**		
Course Code: 21UCSCR4	**Hrs / week :3**	**Hrs / Semester: 45**	**Credits :2**

1. Creating a simple webpage using PHP.
2. Write programs using conditional-looping statements in PHP.
3. File manipulation using PHP.
4. Creating a simple table with constraints.
5. Insertion, Updation and Deletion of rows in MYSQL tables.
6. Searching for data by different criteria.
7. Sorting of data.
8. Demonstration of joining tables.
9. Usage of subqueries.
10. Validating Input.

SEMESTER –III			
Part –IV Non Major Elective - Introduction to Computers			
Course Code: 21UCSN31	**Hrs/week: 2**	**Hrs/Sem. : 30**	**Credits: 2**

Objectives

- Acquire knowledge on basic concepts, functions of computer system.
- Understand the various software and networking concepts.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	understand the various type of computers	1	Un
CO-2	practicing with the concept number system	1	Ap
CO-3	understand the input and output devices of computer and there uses	1	Un
CO-4	explain basic concepts of computer software and the various types of software	2	Un
CO-5	classify operating system software and their functions	1	Un
CO-6	outline the concepts of computer networking and the devices used in computer networking	6	Un

SEMESTER –III			
Part –IV Non Major Elective - Introduction to Computers			
Course Code: 21UCSN31	**Hrs/week: 2**	**Hrs/Sem. : 30**	**Credits: 2**

Unit I:

Introduction to Computers – Types Of Computers – Characteristics of Computers – Word Length – Speed – Storage – Accuracy – Automation – Diligence.

Five Generations Of Modern Computers – Introduction – First Generation(1945-1956) – Second Generation Computers(1956-1963) Third Generation Computers(1964-1971) - Fourth Generation Computers(1971-Present) - Fifth Generation Computers(Present and Beyond)

Unit II:

Classification Of Computer System – Introduction – Microcomputers– Personal Computers(PCs) – Workstations – Portable Computers – Minicomputers – Mainframes – Supercomputers – Network Computers.

Number System – Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal-Binary Conversion – Binary Addition\Subtraction – Gray Code – Excess-3 Code – ASCII Code – Hart Disk – Floppy Disk.

Unit III:

Input Devices – Keyboard – Mouse – Scanners – Joystick – Trackball – Light pen – graphic tablet – Barcode reader – Pointing stick – Webcam – Touchpad – Stylus .

Output Devices – Monitor – Printer – Headphones – Sound Card – GPS – Inkjet printing – Cathode-ray tube – Plotter – Projector.

Unit IV:

Introduction to Computer Software – Introduction – Operating System – Compilers & Interpreters – Word Processors – Database Management System(DBMS) – Image Processors

Operating System – Introduction – Functions of an Operating System – Classification Of Operating Systems – Introduction to UNIX , Windows NT, Mac OS , DOS , And Linux.

UNIT V:

Computer Networks – Introduction – Telecommunication Processors – Communication Processors

Types of Networks - Telecommunication Software – Network Protocols – Network Architecture – Communication Media.

Text Books:

1. Alexis Leon & Mathews Leon. *Introduction To Computers*. India: McGraw Hill Education Private Limited. Fifth Reprint, Edition 2008.

Books for Reference :

1. Dr.P.Velmani.,(Assistant Professor),M.C.A.,M.Phil.,Ph.D. *Computers Bascis to Advancements*. India: Chess Educational Publishers. First Edition.

2. Peter Norton's. *Introduction to computers* .India: New Delhi: Tata McGraw-Hill. Edition 2004

SEMESTER-IV			
Part IV Non Major Elective	**Introduction To Internet**		
Course Code:21UCSN41	**Hrs/week:2**	**Hrs/sem:30**	**Credits: 2**

Objectives:

- Introduction about internet and applications.
- Awareness on Social Networks.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	outline the History of Internet	1	Un
CO-2	understand about E-mail and how it works	6	Un
CO-3	compare different types of browser and its tools	6	Ev
CO-4	explain Blogging and it's functions	7	Ev
CO-5	describe Electronic Publishing and applications	6	Un
CO-6	explain Social Networking and awareness on Social Networking	8	Un

SEMESTER-IV			
Part IV Non Major Elective	**Introduction To Internet**		
Course Code:21UCSN41	**Hrs/week:2**	**Hrs/sem:30**	**Credits: 2**

Unit I:

Introduction to Internet –A brief History of Internet – How does Internet Work – What is special about the Internet . **How Internet works** – Introduction – People and Organizations –Hardware .

Unit II:

Introduction- Dial-up Connection- Dedicated Lines- ISDN-DSL-Cable Modem-Satellite Internet- Cellular broadband-Wireless Broadband- Wired and Wireless Broadband Internet Access-Choosing the best Internet Connection.

Unit III:

World Wide Web – Introduction-Internet and Web- How the Web Works- A Brief History of WWW. **Web Browsers and Web Browsing** – Types of Browser – Web Browsing.

Unit IV:

Websites and Web pages - Introduction-Web Design-Creating a website-Web Hosting-Website Promotion-**Blogging**-Introduction-What is a Blog-Why Blog-History of Blogs-State of the Blogosphere-Why is Blogging so popular-Blog Search Engines and Communities-Authors, Books and Blogs-Blogs and Employment-Pitfalls to avoid while Blogging-Is Blogging Good or Bad.

Unit V:

Electronic Publishing - Introduction- Electronic Publishing(E-Publishing) - E-book Readers-Economics of E-Publishing-Application of E-publishing- E-publishing--Advantages and Disadvantages.

Social Networking-Introduction-Social Networking Timeline-Why Social Networking-Dangers of Social Networking-Getting Connection.

Text Book:

1. Alexis Leon & Mathews Leon. *Internet for Everyone*. India: Leon Press.15th Anniversary Edition.

Books for Reference:

1.*Computer Literacy*, Department of Foundation Courses in collaboration with School of Computing Sciences

2.Vikas Gupta. *Internet and Web design*, India: Rematch Press I. Edition 2003.

3.Rajeev Gupta B.Tech. *Internet Guide,* India: Copyright reserved Nipun Publications. First Edition November 2000.

SEMESTER- I			
Skill Enhancement Course-I Professional English for Computer Science –I			
Course Code: 21UCSPE1	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits :2**

Objectives:

- To develop the language skills of students
- To train students in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic skills
- To improve communicative competence of students

Course Outcomes:

CO.No	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	recognise their own ability to improve their own competence in using the language	7	Un
CO-2	use language for speaking with confidence in an intelligible and acceptable manner.	3	An
CO-3	understand the importance of reading for life	3	Un
CO-4	write simple sentences without committing error of spelling or grammar	7	An
CO-5	develop critical thinking skills and get culturally aware of the target situation	4	Cr
CO-6	develop communicative skill for professional collaboration	7	Cr

NB: All four skills are taught based on texts/passages.

SEMESTER- I			
Skill Enhancement Course-I	**Professional English for Computer Science –I**		
Course Code: 21UCSPE1	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits :2**

UNIT 1: COMMUNICATION

Listening: Listening to audio text and answering questions- Listening to Instructions
Speaking: Pair work and small group work.
Reading: Comprehension passages –Differentiate between facts and opinion
Writing: Developing a story with pictures**.**
Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 2: DESCRIPTION

Listening: Listening to process description.-Drawing a flow chart.
Speaking: Role play (formal context)
Reading: Skimming/Scanning-Reading passages on products, equipment and gadgets.
Writing: Process Description –Compare and Contrast Paragraph-Sentence Definition and Extended definition- Free Writing.
Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT 3: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)
Speaking: Brainstorming.(Mind mapping). Small group discussions (Subject- Specific)
Reading: Longer Reading text.
Writing: Essay Writing (250 words)
Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 4: PRESENTATION SKILLS

Listening: Listening to lectures.
Speaking: Short talks.
Reading: Reading Comprehension passages
Writing: Writing Recommendations Interpreting Visuals inputs
Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT 5: CRITICAL THINKING SKILLS

Listening: Listening comprehension- Listening for information.
Speaking: Making presentations (with PPT- practice).
Reading: Comprehension passages –Note making.
Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)
Writing: Problem and Solution essay– Creative writing –Summary writing
Vocabulary: Register specific - Incorporated into the LSRW tasks

References:

https://www.myindiamyglory.com/2018/07/12/raman-effect-how-indian-scientist-cv-raman-discovered-why-sea-is-blue/
https://opensource.com/resources/internet-of-things
Britannica, T. E. (Ed.). (2020, April 16). *Marie Curie.* Retrieved June 18, 2020, from Encyclopædia Britannica.
Wikipedia, T. E. (Ed.). (16, June 2020). *Marie Curie.* Retrieved June 18, 2020, from Wikipedia.
https://physicsabout.com/difference- between-ac-and-dc/
http://warofcurrents.newtfire.org/
https://www.youtube.com/watch?v=ubpsosv7mHM
https://www.englishclub.com/reading/health/cell-phone.htm
https://www.britannica.com/biography/Isaac-Asimov
https://www.softschools.com/
https://www.space.com/17056-kalpana-chawla-biography.html
https://labour.gov.in/childlabour/census-data-child-labour
https://www.bu.edu/csp/Conferences/Space_Exploration/Day1/Presentations/Kalam_Space%20Exploration%20and%20Human%20Life.pdf
https://www.youtube.com/watch?v=WEKzNH09Vqs
https://www.bbc.com/news/world-europe-48616174
https://semiengineering.com/how-5g-differs-from-previous-network-technologies/
https://www.thehindubusinessline.com/info-tech/scientists-caution-government-to-go-slow-on-5g-roll-out/article28737197.ece
https://www.downtoearth.org.in/interviews/science-and-technology/-5g-is-unlikely-to-cause-health-concerns--63698
https://www.intel.com/content/www/us/en/wireless- network/5g-benefits-features.html

SEMESTER- II			
Skill Enhancement Course-II	**Professional English for Computer Science –II**		
Course Code: 21UCSPE2	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits :2**

UNIT 1: COMMUNICATIVE COMPETENCE

Listening and Speaking:

Listening and responding to complaints (formal situation)

Listening to problems and offering solutions (informal)

Reading and writing:

Reading aloud (brief motivational anecdotes)

Writing a paragraph on a proverbial expression/motivational idea.

Word Power/Vocabulary:

Synonyms & Antonyms

Grammar in Context:

Adverbs, Prepositions.

UNIT 2: PERSUASIVE COMMUNICATION

Listening and Speaking:

Listening to famous speeches and poems

Making short speeches- Formal: welcome speech and vote of thanks.

Informal occasions- Farewell party, graduation speech

Reading and Writing:

Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)

Reading poetry

Reading aloud: (Intonation and Voice Modulation)

Identifying and using figures of speech - simile, metaphor, personification etc.

Word Power/Vocabulary:

Idioms & Phrases

Grammar in Context

Conjunctions and Interjections.

UNIT 3: DIGITAL COMPETENCE

Listening and Speaking:

Listening to Ted talks

Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds Interactions during and after the presentations

Reading and writing:

Writing emails of complaint

Reading aloud famous speeches

Word Power/Vocabulary:

One Word Substitution

Grammar in Context:

Sentence Patterns

UNIT 4: CREATIVITY AND IMAGINATION

Listening and Speaking

Participating in a meeting: face to face and online

Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks.

Reading and Writing

Reading visual texts – advertisements –Writing a Brochure

Word Power/Vocabulary:

Denotation and Connotation

Grammar in Context:

SentenceTypes.

UNIT 5: WORKPLACE COMMUNICATION & BASICS OF ACADEMIC WRITING

Listening and Speaking:

Informal interview for feature writing

Listening and responding to questions at a formal interview

Reading and Writing

Writing letters of application —Readers' Theatre (Script Reading)

Dramatizing everyday situations/social issues through skits. (Writing scripts and performing)

Word Power/Vocabulary: Collocation

Grammar in Context: Working With Clauses.

References:

English for Physical sciences, Tamilnadu state council for Higher Education(TANSCHE)

https://www.collinsdictionary.com

https://youtu.be/moJjKqkn_Xs

https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3

https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/argumentative_essays

https://youtu.be/5ctbvkAMQO4

https://www.wareable.com/fitness-trackers/how-your-fitness-tracker-works-1449

https://www.hfe.co.uk/blog/a-study-of-fitness-trackers-and-wearables/

https://youtu.be/o_f7mp_tTqw

https://www.youtube.com/watch?v=IOluK9i1yiw&feature=youtu.be

https://www.sciencehistory.org/historical-profile/antoine-laurent-lavoisier

https://youtu.be/AE0kuHKoitE

https://science.howstuffworks.com/math-concepts/fibonacci-nature.html

https://youtu.be/nt2OlMAJj6o

https://youtu.be/dpSK7BMWt74

https://www.everythingrf.com/community/what-is-electronic-warfare

https://w0ww.youtube.com/watch?v=Rsa1zsOx5Mw

http://www.bhopal.com/

https://www.youtube.com/watch?v=4WZTzKu3CsY

https://www.youtube.com/watch?v=32vJxDUr-nE

https://www.youtube.com/watch?v=BLhwNhtYU5E

https://www.bbc.com/news/science-environment-55365434

https://www.ted.com/talks/ray_kurzweil_get_ready_for_hybrid_thinking?referrer=playlist-talks_on_artificial_intelligen#t-146994

https://futureoflife.org/2016/09/30/artificial-photosynthesis/

https://celebratepicturebooks.com/tag/writing-resources-for-kids/

http://guidetogrammar.org/grammar/marks/marks.htm

https://www.englishclub.com/writing/punctuation.htm

https://www.grammarbook.com/english_rules.asp

SEMESTER- III			
Skill Based Elective	**Microprocessors**		
Course Code: 21UCSS31	**Hrs / week : 2**	**Hrs / Semester: 30**	**Credits : 2**

Objectives:

- To acquire fundamental knowledge on hardware and software concepts of microcomputer and
- microprocessors architecture and design.
- To provide assembly language programming Techniques.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	explain basic components and structure of Microprocessor and Microcomputers	1	Un
CO-2	describe 8085 Microprocessor and Memory Interfacing.	1	Un
CO-3	classify the various 8085 Microprocessor instruction set.	1	Un
CO-4	develop Assembly language Programs for various arithmetic operations	2	Ap
CO-5	develop Assembly language Programs for time delays	1	Ap
CO-6	. understand stack and subroutine operations in 8085	2	Un

SEMESTER- III			
Skill Based Elective1	**Microprocessors**		
Course Code: 21UCSS31	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits : 2**

Unit I:

Microprocessor, Microcomputers, and Assembly Language:

Microprocessors-Microprocessor Instruction Set and Computer Languages-From Large Computers to Single Chip Micro Controllers.

Unit II

Introduction to 8085 Assembly Language Programming:

Instruction Classification – Instruction Format -How to Write, Assemble and Execute a Simple Program8085 Microprocessor Architecture And Memory Interfacing: The 8085 MPU- Memory Interfacing – Interfacing the 8155 memory section.

Unit III:

Introduction to 8085 Instructions:

Data transfer operations-Arithmetic Operations-Logic Operation – Branch Operations – Writing Assembly Language Programs-Debugging a Program

Unit IV:

Programming Techniques With Additional Instructions:

Programming Techniques: Looping, Counting, and Indexing- Additional Data Transfer and 16bit Arithmetic Instruction- Arithmetic Operations Related to Memory-Logic Operations: Rotate, Compare-Dynamic Debugging.

Unit V:

Counters And Time Delays:

Counters and Time Delays-Hexadecimal Counter-Modulo ten Counter-Generating Pulse Waveforms-Debugging Counter and Time Delay Programs.

Stacks And Subroutines:

Stack-Subroutine-Restart, Conditional Call and Return Instruction-Advanced Subroutine Concepts.

Text Book:

1. Ramesh Gaonkar. *Microprocessor Architecture. Programming, And Applications With The 8085*. Bangalore. Shree Hari publications .6th edition. 2020

Books for Reference:

1. P Mathur. *Introduction to Microprocessors*. India:Tata McGraw Hill. Third edition 2018.

2.Walter A.Triebel,AvtarSing.*The 8088 and 8086 microprocessors (programming, interfacing, software, hardware and Applications.* New Delhi:Pearson 2002 .

3.Kumar K. Udaya.*The 8085 Microprocessor* .India:Pearson Education. 1st Edition 2008.

SEMESTER- III			
Skill Based Elective 2	**E- Commerce**		
Course Code: 21UCSS32	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits: 2**

Objectives:

- To understand and ascertain the importance E-Commerce
- Acquire knowledge about E-marketing and E-advertising
- To Identify the key security threats in the E-commerce environment.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	Explain what is E-Commerce	6	Un
CO-2	Compare different business models of E-commerce	6	An
CO-3	Differentiate E-marketing versus traditional marketing	4	Ap
CO-4	Facilitate online marketing	5	Ap
CO-5	Implement E-advertising	5,8	Cr
CO-6	Devise security for E-Commerce	3	Cr

SEMESTER- III			
Skill Based Elective 2	**E-Commerce**		
Course Code: 21UCSS32	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits : 2**

Unit -I

E – Commerce: Meaning, definition, features, functions of E-Commerce, Scope, Benefits and limitations of E-Commerce — E-commerce opportunities and challenges for Industries.

Unit –II

Business Models for E-commerce: The Birth of Portals – E-Business Models – Business-to Consumer (B2C) – Business-to-Business (B2B) – Consumer-to Consumer (C2C) – Consumer to-Business (C2B) – Brokerage Model – Value Chain Model – Advertising Model.

Unit –III

E-marketing – Traditional Marketing Vs. E-Marketing – Impact of E-commerce on markets – Marketing issues in E-Marketing – Online Marketing

Unit –IV

E-advertising – Internet Marketing Trends – E-Branding – Marketing Strategies.
E-Commerce Legal Framework – Rights and Obligations in the World of E-commerce

Unit –V

E-Security: Security for E-commerce – Security Design – Analysing risk – E-Banks and Security

Text book:

P.T. Joseph, SJ, 'E-Commerce - An Indian Perspective', Third edition, PHI Publishing Co. Ltd., Newdelhi

Books for Reference:

1. Kamlesh K. Bajaj and Debjani Nay, 'E-Commerce - The Cutting Edge of Business' - Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2000.
2. Turban, Efraim, and David King, "Electronic Commerce: A Managerial Perspective", 2010, Pearson Education Asia, Delhi.
3. Smantha Shurety, "E–Business with Net Commerce", Addison – Wesley, Singapore.

Websites:

https://forms.iimk.ac.in/libportal/ebook/EB8.pdf

https://backup.pondiuni.edu.in/storage/dde/dde_ug_pg_books/E-%20Commerce.pdf

SEMESTER- IV			
Skill Based Elective 1	**DTP Lab**		
Course Code: 21UCSS41	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits: 2**

1. Create a rolling ball animation.
2. Create a ball bouncing in the same place.
3. Create a bouncing ball across the screen.
4. Create multiple ball bouncing with multiple colours.
5. Create an object falling to the ground.
6. Create a morphing animation.
7. Create a moving character.
8. Create an animation with sound.

SEMESTER- IV			
Skill Based Elective 2	**Cyber Security**		
Course Code: 21UCSS42	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits: 2**

Objectives:

- To understand the basic concepts of Cyber Ethics, Virtues and Values
- To design and develop a security architecture for society.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	identify how security issues in cyberspace raise ethical concerns	3	Un
CO-2	adapting Artificial Intelligence Ethics	6,8	Cr
CO-3	acquire the knowledge of Cyber laws, regulations in information Society	3	Un
CO-4	identify and explore the different types of Cyber Crimes	8	Un
CO-5	appraise the Cyber offences	5	Ev
CO-6	assess Cyber Bullying and digital literacy for protecting children from bullying.	8	Ap

SEMESTER- IV			
Skill Based Elective 2	**Cyber Security**		
Course Code: 21UCSS42	**Hrs / week :2**	**Hrs / Semester: 30**	**Credits: 2**

Unit-I:

Cyber Ethics: Ethics in Cyber Society: Core Values and Virtues: Definitions, Specificities of Cyberspace, Dimensions of Cyber Ethics in Cyber Society, Core Values and Virtues, Cyber Ethics by norms, Laws and Relations.

Unit-II:

Artificial Intelligence Ethics: "AI for Good". Cyber Ethics as Business Ethics. Cyber Law and Cyber Ethics: Importance of Cyber Law, The Significance of Cyber Ethics, and Cyber Crime is Unethical and Illegal, The need for Cyber Regulation.

Unit-III:

Ethics in the Information Society, Technologies Need Standards, Rules and Regulations, Technology
Ethics, Legal Ethics, the Nine P's of Ethics in Information Society.

Unit-IV:

Cyber Crime: Cybercrime offences, Computer Related Offences, Content Related offences, Government Efforts in Cyber security, Cyber security in the Academic world. Critical Thinking of Citizens: Ethics in Digital Age, Acting Responsibly in the Digital World, Three Dilemmas: Ethical Intelligence in Practice.

Unit-V:

Cyber Bullying: Introduction – Cyber Bullying, Peoples in Cyber Bullying, Signs of Cyber Bullying, Suicidal Tendencies, Role of Children and Duty of parents, Limiting Access of Technology, Child Bullying. Child Protection Online: Prevention through Education for Digital Literacy and Safety.

Text Book:

1. ChristophStuckelberger, PavanDuggal. *Cyber Ethics 4.0, Serving Humanity with Values*. Globethics.net Global series no 17, 2018.

Books for Reference:

1. Diane Bailey.*Cyber Citizenship and Cyber Safety: Cyber Ethics*.USA:The Rosen Publishing group 2008.
2. Kizza, Joseph Migga, Ethical and Social Issues in the Information Age, 5th edition, Springer, 2015.
3. Bynum, Terrel Ward &Rogerson, Simon, eds: *Computer Ethics & Professional Responsibility: Introductory Text & Readings*. Blackwell 2004.

SEMESTER- III	
Self Study 1 Computer Architecture	
Course Code:21UCSSS1 (Compulsory)	**Credits : 2**

Objectives:

- To study basic computer organization.
- To understand the basic Arithmetic operations algorithms.
- To understand the memory organization.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	discuss the organization of basic computer	1	Un
CO-2	explain various types of instructions.	1	Un
CO-3	explain general register organization and stack organization	1	Un
CO-4	explain algorithms for arithmetic operations of various integer number systems	1	Un
CO-5	explain algorithms for arithmetic operations of floating number systems	1,4	Un
CO-6	discuss memory hierarchy with different types of memories.	1,2	Un

SEMESTER- III	
Self Study 1	**Computer Architecture**
Course Code:21UCSSS1(Compulsory)	**Credits : 2**

Unit I:

Basic computer organization and design :

Instruction codes –computer registers –computer instructions –timing and control –instruction cycle-memory reference instructions

Unit II:

Central processing Unit:

General register organization –stack organization-instruction formats –addressing modes- data transfer and manipulation-program control-Reduced Instruction Set Computer.

Unit III:

Computer Arithmetic:

Addition and subtraction – multiplication algorithms-division algorithms

Unit IV:

Computer Arithmetic:

floating point arithmetic operations- Decimal Arithmetic unit- Decimal Arithmetic operations

Unit V:

Memory organization:

Memory hierarchy –main memory –auxiliary memory-associative memory – cache memory – virtual memory

Text Book :

1. M. Morris Mano .*Computer System Architecture.* New Delhi: Pearson Education. Third Edition 2017 .

Books for Reference:

1. P.V.S. Rao .*Computer system Architecture* .New Delhi: PHI Learnings.Second Printing. 2011
2. John P.Hayes .*Computer Organization and Architecture.* India: Tata McGraw Hill. Third Edition 2002
3. John D. Carpinelli*Computer Systems Organization & Architecture.* India: Tata McGraw Hill. First edition 2002.

SEMESTER IV	
Self Study (optional)	**Web Technology**
Course Code: 21UCSSS2	**Credits :2**

Objectives:

- Understand the principles of creating an effective Web page.
- Learn the language of the web:HTML and CSS
- Develop basic programming skills using javaScript.
- Be able to embed social media content into webpages

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	understand Internet standard and Internet protocols	1	Un
CO-2	demonstrate JavaScript	6	Ap
CO-3	develop dynamic web pages using JavaScript (client side programming).	5	Ap
CO-4	design interactive web pages using DHTML	5	Ap
CO-5	discuss how XML DTDs differ from XML schemas	1	An
CO-6	design a simple website	6	Ap

SEMESTER IV	
Self Study (optional)	**Web Technology**
Course Code: 21UCSSS2	**Credits :2**

Unit I:

Introduction What is Internet? History of Internet, Internet Services and Accessibility, Uses of Internet, Protocols, Web Concepts, Internet Standards

Unit II:

Internet protocols Introduction, Internet Protocols, Host Names, Internet Applications and Application Protocols

Unit III:

Javascript Introduction, Language Elements, Objects of Javascript, Other Objects, Arrays

Unit IV:

Dynamic HTML(DHTML) Introduction, Cascading Style Sheets (CSS), DHTML Document Object Model and Collections, Event Handling, Filters and Transactions, Data Binding

Unit V:

Extensible Mark-Up Language (XML) Introduction, HTML vs XML, Syntax of the XML Document, XML Attributes, XML Validation, XML DTD, The Building Blocks of XML Documents, DTD Elements, DTD Attributes, DTD Entities, DTD Validation, XSL, XSL Transformation, XML Namespaces, XML Schema

Text Book:

1. N.P.Gopalan, J.Akilandeseswari*, Web Technology – A Developer's Perspective*, PHI,2007

Books for Reference:

1. Achyut S Godbole, AtulKahate, *Web Technologies - TCP / IP To Internet Application Architectures*, Tata McGraw - Hill Education,2008.
2. Vipin Kumar, *Web Technologies,* A.B. Publication publisher, 2008
3. Jeffry C. Jakson, *Web Technologies by Computer Science Perspective*,pearson publication, 2005

SEMESTER- I			
ALLIED I	**STATISTICS –I**		
Code:21UECA11	**Hours / week :4**	**Hrs / Semester: 60**	**Credits :4**

Objectives:

- Introduce students to basic statistical tools and techniques
- To apply statistical tools for economic problems.
- To make the students understand the significance of Statistics and to develop their research skills.

Course Outcomes:

CO No.	**Upon completion of this course, students will be able to**	**PSO's Addressed**	**CL**
CO 1	Describe and discuss the key terminology, concepts tools and techniques used in statistics. Discuss critically the uses and limitations of statistics.	1	Un
CO 2	Gain knowledge on Organize, manage and present data. Outline the distinct method of using raw data in the form of frequency distribution	1,2	Ev
CO 3	Introduces students to the concepts and techniques of presentation and summarisation of data. It introduces students to basics of sampling and statistical inference	4	An
CO 4	Analyse statistical data using measures of central tendency. Apply knowledge of statistical measures such as Mean, Median and Mode for analysis and interpretation of data.	2,4	Un
CO 5	Analyse statistical data using measures of dispersion and location. Analyse the different measures of dispersion that are useful in the field of psychology and education	1,6	An
CO 6	Develop skills and knowledge to apply different types of data through graphs for analysing different descriptive measures.	4, 5	Cr

SEMESTER- I			
ALLIED I	**STATISTICS –I**		
Code: 21UECA11	**Hours / week :4**	**Hrs / Semester: 60**	**Credits :4**

UNIT I- INTRODUCTION **10 Hrs**

Definitions of Statistics – Meaning – Scope – Functions - Importance– Limitations

UNIT II - STATISTICAL INVESTIGATION & SAMPLING **10 Hrs**

Sources of data – Methods of collecting primary and secondary data – Questionnaire– Census and Sampling: Methods of sampling

UNIT III - STATISTICAL PRESENTATION **15 Hrs**

Classification: Types - Tabulation: Rules, Parts of tabulation and Types of tables, Presentation of statistical data: Bar diagrams, Pie diagram-Graphs: Histogram, Frequency Polygon, Frequency Curve and Ogive Curves

UNIT IV- MEASURES OF CENTRAL TENDENCIES **10Hrs**

Measures of Central Tendency: Meaning –Properties- Mean, Median, Mode, Geometric Mean and Harmonic Mean- Merits and Demerits

UNIT V-MEASURES OF DISPERSION **15 Hrs**

Measures of Dispersion: Meaning - Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Coefficient of variation, Lorenz Curve

Text Book: R.S.N. Pillai & Bhagavathi, Statistics: Theory and Practice, 7th Revised Edition, S. Chand, New Delhi, 2008.

Reference Books:

1. A.M. Gun, M.K.Gupta & B.Dasgupta, Fundamentals of Statistics, 9th Reprinted Edition, The World Press Pvt. Ltd., Kolkata, 2019.
2. S .P.Gupta, Elementary Statistical Methods, 18th Revised Edition, Sultan Chand & Sons, New Delhi, 2017.
3. S. P.Gupta, Statistical Methods, 42nd Revised Edition, Sultan Chand & Sons, New Delhi, 2012.

SEMESTER- III			
Non-Major Elective Economics for Competitive Examinations – I			
Course Code: 21UECN31	**Hours / week :2**	**Hrs / Semester: 30**	**Credits :2**

Objectives:

- To initiate the students to understand the key concepts of economics.
- To prompt students to have economic way of thinking.
- To induce critical thinking skills within the contest of subject matter of economics.

CO No.	Upon completion of this course, students will be able to	PSO's addressed	CL
CO 1	describe and illustrate basic economic concepts of scarcity and choice.	1, 2, 4	Ap
CO 2	understand the concepts used, methods to measure and difficulties encountered in the calculation of National Income	2, 4	Un
CO 3	understand the concept of economic growth and development	2, 7	Un
CO 4	illustrate how economics can be used to create or analyse alternative approaches to promote development.	4, 5, 7	Cr
CO 5	analyse both the proximate and deeper factors that trap people in poverty or assist them to escape poverty	4, 6, 7	Ap
CO 6	Identify and differentiate between the different types of unemployment	1, 4,7	An

SEMESTER- III			
Non-Major Elective Economics for Competitive Examinations – I			
Course Code: 21UECN31	**Hours / week :2**	**Hrs / Semester: 30**	**Credits :2**

UNIT I - Micro Economics **7 Hrs**

Definition of Economics – Adam Smith- Alfred Marshall, Lionel Robbins, Paul Samuelson

-Basic Concept in Economics - Micro Economics- Meaning – Importance and Uses of MicroEconomics – Macro Economics – Meaning – Difference between Micro and Macro Economics.

UNIT II - Macro Economics **7 Hrs**

Meaning- Definition – Basic concepts of National Income – Gross National Product – NetNational Product – Personal Income – Per- Capita Income – Methods of Calculation of National Income – Problems of Calculation.

UNIT III- Economic Growth and Economic Development **6 Hrs**

Meaning of Economic Growth – Meaning of Economic Development – Difference between Development and Growth – Determinants of Economic Development and Economic Growth

UNIT IV – Poverty **5 Hrs**

Meaning – Definition – Causes of Poverty –Absolute and Relative Poverty – Poverty Eradication Programmes.

UNIT V – Unemployment **5 Hrs**

Meaning – Causes of Unemployment – Kinds of Unemployment – Employment guarantee programmes.

Text Book: Dr. S. Sankaran. *Micro Economics*. Tamil Nadu: Margham Publications. 1st edition2018

Books for Reference:

1. Dr.D. Amutha. *Economics for UGC Net/Set Examinations*. New Delhi: ManglamPublications. 1st edition 2021.
2. Dr. D. Rathi. *Micro Economics*. Unites States: Lulu Publication. 1st edition 2021.
3. T.R. Jain & V. K. Ohri. *Fundamentals of Economics*. Haryana: VK Global Publications PvtLtd. 1st edition 2020.
4. M.L. Jhingan. *Micro Economic Theory*. New Delhi: Vrinda Publication Pvt. Ltd. 7th edition2012.

SEMESTER- IV			
Non-Major Elective Economics for Competitive Examinations – II			
Course Code: 21UECN41	**Hours / week :2**	**Hrs / Semester: 30**	**Credits :2**

Objectives:

- This course is designed to make the undergraduate students of other disciplines aware of the basic ideas and concepts in economics.
- To make students understand economic ideas and its implications in real time life situation.

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSO's addressed	CL
CO 1	Explain the types of public debt and how debt is repaid	2,4, 6	Un
CO 2	Describe the process of credit creation of a commercial bank, describe the balance sheet of a commercial bank, explain the functions of commercial bank	2,4	An
CO 3	Explain the main objective of monetary policy in under developed countries	4,5, 6	An
CO 4	Explain the functions and constituents of financial system, explain money market, capital market and stock market	1,4,5	An
CO 5	Explain the different concepts of terms of trade	4,7	An
CO 6	Explain the structure of BOP, disequilibrium in BOP, causes of disequilibrium	4, 5, 7	Ap

SEMESTER- IV			
Non-Major Elective	**Economics for Competitive Examinations – II**		
Course Code: 21UECN41	**Hours / week :2**	**Hrs / Semester: 30**	**Credits :2**

UNIT I- Public Finance **7 Hrs**

Meaning – Definition – Scope of Public Finance – Public Revenue – Public Expenditure -Causes of increasing Public expenditure in India-Union Budget and its Importance.

UNIT II - Reserve Bank of India **7 Hrs**

Origin of Reserve Bank of India – Functions of Reserve Bank of India – Monetary Policy -Control of Credit – Relationship between RBI and Commercial Banks.

UNIT III -Inflation& Deflation **5 Hrs**

Meaning - Definition – Types – Causes and Effects of Inflation – Controlling Measures -Deflation – Effects of Deflation

UNIT IV - Centre-State Financial Relations **5 Hrs**

Decentralization of power between centre and state-Centre-State Financial relations–Panchayat Raj System and its Importance- 73rd and 74th Amendments

UNIT V - International Trade **6 Hrs**

Meaning - Definition – Difference between Internal and External Trade – Balance ofPayment –Functions of WTO and IMF

Text Book:

H.L.Bhatia. *Public Finance*. New Delhi: Vikas Publishing House Pvt, Ltd. 30th edition, 2020.

Books for Reference:

1. Dominick Salvatore. *International Economics*. United States: Wiley Publisher, 13th edition2021.
2. M.L.Jhingan. *International Economics*. New Delhi: Vrinda Publications Pvt. Ltd. 7thedition 2020.
3. Harvey Rosen. *Public Finance*. UK: McGraw Hill Education. 8th edition 2012.
4. R.Cauvery, N. Kruparani, U.K. Sudha Nayak & A. Manimekalai. *Monetary Economics.* New Delhi: S. Chand & Co Ltd. 2nd Revised edition 2008.

SEMESTER – I			
Core – I	**Age of Renaissance (1500 to 1660)**		
Course Code: 21UENC11	**Hrs/Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Objectives:

To expose students to the significant literary features of English Renaissance.

To let them know of the significance and influence of Shakespeare and the representative writers of the age.

Course Outcome:

Co. No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive Level
CO-1	understand literary texts in their social, political, historical and cultural contexts.	3,8	Un
CO-2	practise writing as a process of motivated inquiry engaging other writers' ideas.	6,8	Ap
CO-3	appreciate and analyse the structure and content of any literary piece.	4	Ap
CO-4	analyse the structure and rhyme scheme of the sonnets.	1	An
CO-5	judge the aesthetic and ethical values of Renaissance.	1,8	Ev
CO-6	perceive the distinct qualities of the writers of the Age of Renaissance.	4	Ev
CO-7	identify and comprehend different genres pertaining to the Age of Renaissance.	3,4	Cr
CO- 8	create aesthetic taste for literary texts.	8	Cr

SEMESTER – I			
Core – I Age of Renaissance (1500- 1660)			
Course Code: 21UENC11	**Hrs/Week : 5**	**Hrs / Semester: 75**	**Credits: 4**

Unit – I Introduction of the Age

Historical background : Literary Features - Literary forms

Unit – II Poetry

Thomas Wyatt (1503 – 1542) : Forget Not Yet
Edmund Spenser (1552-1599) : Prothalamion
Philip Sidney (1554-1586) : Astrophel and Stella- Sonnet 1
Shakespeare : Shall I Compare Thee to a Summer's Day? (Sonnet 18)

Unit – III Prose

Francis Bacon (1561-1626) : Of Studies
Of Friendship
Of Parents and Children

Unit – IV Drama

Christopher Marlowe (1564-1593) : *Doctor Faustus*

Unit – V Fiction

Thomas More (1478-1535) : *Utopia* -Book 1

Text Books:

1.Blaisdell, Bob, ed. *Elizabethan Poetry: An Anthology*. New York: Dover Publications. 2005.
2.Marlowe, Christopher. *Doctor Faustus*. New York: Penguin, 1969.
3.More, Thomas. *Utopia*. David Wootton. ed. Cambridge: Hackett Publishing Company, 1999.

Books for Reference:

1. Albert, Edward. *History of English Literature*. New Delhi: OUP, 1979.
2. Chauduri, Sukanta. *An Anthology of Elizabethan Poetry*. India: OUP, 1993.
3. Harry, Berger. Spenser: *A Collection of Critical Essays*. Englewood Cliffs:Prentice-Hall,1968.
4. Leishman, J.B. *Themes and Variations in Shakespeare's Sonnets*. London: Hutchinson, 1961.
5. Morris, Helen. *Elizabethan Literature*. London: Oxford University Press, 1958.
6. Oliphant, Smeaton. *Francis Bacon's Essays*. London: J.M. Dent & Sons Ltd., 1955.
7. Saintsbury, George. *A History of Elizabethan Literature*. New York: The Macmillan Company, 1910.
8. Riggs, A. David. *The World of Christopher Marlowe*. London: Faber, 2004.

SEMESTER – I			
Core II English Grammar and Usage			
Course Code: 21UENC12	**Hrs/Week: 5**	**Hrs/Semester: 75**	**Credits: 4**

Objectives:

To equip students with a precise knowledge of the structure and patterns of the English language.

To enable students assimilate the correct usage of English grammar and gain proficiency in communication skills.

Course Outcome:

CO No.	Upon completion of this course students will be able to	PSO addressed	Cognitive Level
CO-1	understand the basic functions of the different parts of speech.	3	Un
CO-2	understand the usage of various tenses.	3, 8	Un
CO-3	employ different kinds of sentences in the oral and written communication.	3, 5	An
CO-4	apply degrees of comparison in the appropriate context.	9	An
CO-5	synthesise the structure of the sentence.	3, 9	Ev
CO-6	construct well-organized essays with appropriate usage of grammar and vocabulary with an effective introduction and conclusion, supporting the main topic.	10	Cr
CO-7	construct error free sentences.	3,10	Cr
CO-8	handle the structures of the English language effectively using phrases and clauses.	9	Cr

SEMESTER – I			
Core II	**English Grammar and Usage**		
Course Code: 21UENC12	**Hrs/Week: 5**	**Hrs/Semester: 75**	**Credits: 4**

Unit I - Parts of Speech

Nouns	:	Number and Case
Pronouns	:	Types
Adjectives	:	Determiners
Verbs	:	Kinds of Verbs
Adverbs	:	Position of Adverbs
Preposition	:	Kinds
Conjunctions	:	Kinds
Interjections		

Unit II - Tenses

Tenses and their uses
Concord

Unit III - Sentence Pattern

Word Formation
Word Order
Kinds of Sentences

Unit IV – Structure: Voice and Speech

Active Voice and Passive Voice
Direct and Indirect Speech

Unit V - Synthesis

Transformation of Sentences
Simple, Compound and Complex sentences

Text Book:

4. Sinha R.P. Current English Grammar and Usage with Composition. Oxford University Press, 2001.

Books for Reference:

1. Green, David. *Contemporary English Grammar Structures and Composition*. 2nd Edition. Bengaluru: Trinity Press, 1971.
2. Stone, Linton. *Lower Cambridge English Exercises.* Basingstoke: Macmillan Education Limited. 1969.
3. Farhathullah, T. M. *English Practice Book for Undergraduates*. Chennai: Emerald Publishers, 2002.
4. Azar, Betty Schrampfer. *Fundamentals of English Grammar*. 4th Edition.New York: Pearson Longman Publishing, 1994.
5. Murphy, Raymond. *Intermediate English Grammar: Reference and Practice for South Asian Students.* Cambridge: Cambridge University Press, 1999.
6. Dr. K.Hema. *Current English Usage*. Madurai: Shanlax Publications, 2016.

SEMESTER III			
Core Skill Based Skills for Career Advancement			
Course Code:21UENS31	**Hrs/Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Objectives:

To educate students the appropriate interpersonal and competent skills.
To help students attain employability standards and reach professional goals.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO s addressed	CL
CO-1	understand the nuances of competent skills	3	Un
CO-2	acquire communicative ability and relate with confidence	3	Un
CO-3	write and correspond in English proficiently	3	Ap
CO-4	respond and behave appropriately in diverse situations	10	Ap
CO-5	meet the requirements for career and employability	6, 9	Ap
CO-6	become original or inventive and apply lateral thinking	2	Cr
CO-7	develop the ability of emotional and stress management	5	Ap
CO-8	work constructively as a team and assume leadership skills	5	Ap

SEMESTER III			
Core Skill Based Skills for Career Advancement			
Course Code:21UENS31	**Hrs/Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Unit I: Oral Skills

Verbal Communication
Debate
Group Discussion
Interviews

Unit II: Writing Skills

Pre-Writing
Modes and Forms of Writings
Business Correspondence

Unit III: Computing Skills

Word Processing
Google Docs

Unit IV: Presentation Skills

Body Language
Effective Speaking
Videos in Power Point Presentation

Unit V: Emotional Intelligence

Successful Time Management
Stress Management
Conflict Management
Improving Interpersonal Relationship

Textbook:

Hariharan, S, N. Sundararajan and S.P. Shanmugapriya. *Soft Skills*. MJP Publishers, 2010.

Books for Reference:

1. Gupta, Nilanjana. *English for All*. Macmilan India Ltd, 1998.
2. MacKenzie, Alec, *TheTime Trap: The Classic Book on Time Management*. Fine Communications, 2002.
3. Mitra, Barun.K. *Personality Development and Soft Skills*, Oxford University Press, 2011
4. Rao, M.S. *Soft Skills: Enhancing Employability*. I.K. International Publishing House, 2011.
5. Wainer, John E. *English Composition and Grammar (First Course*), Chicago Harcourt Brace Jovanich Publishers,1998.

E-Resources

https://courses.lumenlearning.com/introductiontocommunication/chapter/defining-verbal-communication/
https://hbr.org/1964/01/strategies-of-effective-interviewing
https://www.mindtools.com/pages/article/newHTE_00.htm
https://www.managementstudyguide.com/interpersonal-relationship.htm

SEMESTER IV			
Core Skill Based Media Writing			
Course Code: 21UENS41	**Hrs/ Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Objectives:

To prepare students for employability in mass media.
To facilitate students to innovatively use the various forms of media.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	understand the requirements for appropriate journalism	4	Un
CO – 2	update learning of recent trends in media writing	1	Cr
CO – 3	distinguish the writing style for print and broadcast media	1	An
CO – 4	develop media ethics and contribute to social transformation	4	Ap
CO – 5	acquire the ability of editing, reporting and writing for media	1	Ap
CO – 6	analyze well, debating views, news, issues and events	2	An
CO – 7	review the different standards of the varied media components	1	Ap
CO – 8	evaluate different kinds of media content.	1	Ev

SEMESTER IV			
Core Skill Based Media Writing			
Course Code: 21UENS41	**Hrs/ Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Unit I Mass Media

Characteristics and Techniques, Ethics for Media Writing

Mass Communication and Society: Uses, Effects and Representations

Unit II Print Media

Language and Style

Writing Headlines, News Features, Advertisements

Writing Reviews- Book and Film

Unit III Visual Media

News Anchoring

The Indian Newsreel

The Art of Interviewing

Design an online literary Newspaper (Mini Project)

Unit IV e-Media

Creating a blog

Writing Scripts

Unit V Social Media

Writing Mobile-Friendly Web Stories

Facebook Profile, Twitter,

Youtube-Create Studio, LinkedIn Profile

Create Your Youtube Channel/ Create a LinkedIn Profile (Mini Project)

Text Books:

Adornato, Anthony. "Writing Mobile-Friendly Web Stories." *Mobile and Social Media Journalism: A Practical Guide*, CQ Press, Washington D.C., 2018.

Ahuja, B. N. "The Art of Interviewing." *Theory and Practice of Journalism: Set to Indian Context*, Surjeet Publ., Delhi, 1988.

Kumar, Keval J . *Mass Communication in India*. Jaico Publishing House, 2013.

Meera, Raghavendra Rao N. *Feature Writing*. PHI Learning Private Limited, 2009.

Miller, Daniel. "What Is Social Media?" *How the World Changed Social Media*. UCL Press, 2016.

Parthasarathy, Rangaswami. "Language and Style." *Basic Journalism*, Macmillan, 2012.

Books for Reference:

Kuehn, Scott A., and Andrew Lingwall. *The Basics of Media Writing: A Strategic Approach*. SAGE, 2018.

Nick, Ceramilla and Lee Elizabeth. *Cambridge English for the Media*. Cambridge University Press, 2008.

Schiff, Richard. *Foreword. Writing for TV and Radio: A Writers'& Artists' Companion.* Sue Teddem and Nick Warburton. Eds. Carole Angier and Sally Cline. Bloomsbury, 2016.

E- Resources:

https://bizfluent.com/facts-6852659-introduction-print-media.html

https://communications.tufts.edu/marketing-and-branding/social-media-overview/

https://sendpulse.com/support/glossary/mass-media

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Course Code: 21UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Objectives :

- To familiarize to Archives and Museums for proper understanding of History.
- To analyse and appreciate history and its heritage through archives and museums.
- To enhance the interpretative and collaborative approach in history.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	visit of Archives and Museums.	1,2	Un, Re
CO-2	understand the organisations and functions of Archives and Museums.	1,2	Un, Re
CO-3	highlight the primary sources of Archives and Museums.	1,2,4	Un, An, Ev
CO-4	apply the uses of Archives and Museums in historical writings.	1,2	Un, Re
CO-5	respect and preserve Archives and Museums.	1	Un
CO-6	witness the evidences of History.	2,4	Un, Ev, Re
CO-7	develop more collaborative approaches in history.	2,4	Un, An, Ev
CO-8	identify good practice and skills of professionals.	1,2	Un, Re

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Course Code: 21UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I Meaning & Definitions

Genesis & Evolution of Archives & Museums

Unit II Kinds of Museums

Archaeology museum - Art Museums - Biographical museum-Palace museum – Site

Museum – Memorial Museum – Temple Museum – Museum Architecture

Unit III Prominent Museums

Indian Museum, Calcutta – Salar JungMuseum, Hyderabad - National Museum, New Delhi, Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, Mumbai - - Government Museum, Chennai - Saraswathy Mahal Library Museum, Thanjavur.

Unit IV Kinds of Archives

Private Archives – Public Archives - National Archives of India, Delhi – TamilNadu Archives, Chennai – Shenbaganoor Archives, Kodaikanal - Kerala State Archives, Trivandrum.

Unit V Preservation & Conservation

Palm leaves – Books – Paintings – Sculptures – Ivory – Textiles – Metals - Stone

Text Books:

1. Jeyaraj, V. *Hand Book on Conservation in Museums*. Chennai : Commissioner of Museums, 1995.
2. Thiyagarajan J. *Archives Keeping.* Madurai: Prabha Publications, 2007.

Books for Reference:

1. A Guide to the National Museum. New Delhi: National Museum, 1997.

2. Agarwal, O.P. *Essentials of Conservation and Museology*. Delhi: Sundeep.Prakasan, 2007.

3. Edson & David Routledge. *Handbook for Museum*. 1986.

4. Macdonald Sharon (ed). *A Companion to Museum Studies*. UK: BlackwellPublishing Ltd, 2006.

5. Hari Narayana, N. *The Science of Archives keeping*. New Delhi : Penguin, 1997.

Semester IV			
Core SB	**Introduction to Archaeology**		
Course Code:21UHIS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Objectives :

- To understand the basic concepts of archaeology and its principles.
- To provide basic knowledge in the discipline of Archaeology.
- To know about the recent archaeological excavations.

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	develop the archaeological skill to reconstruct the historyof the past.	1,2	Un, Re
CO-2	learn the methods of excavation and exploration.	1.2	Un, Re
CO-3	understand the methods of conservation of excavatedmonuments.	1,2	Un, Re
CO-4	understand excavation methods and techniques.	1,2	Un, Re
CO-5	know about various dating system.	1,2	Un, Re
CO-6	analyse the disciplines of Archaeology.	4	An
CO-7	appreciate the work of Archaeologists.	1,2	Un, Re
CO-8	apply the archaeological skills in historical writing.	3	Ap

Semester IV			
Core Skill Based	**Introduction to Archaeology**		
Course Code:21UHIS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I **Introduction**

Definition – Kinds - values - Importance – Artifacts and Antiquity.

Unit II **Eminent Archaeologists**

Heinrich Schliemann – Pitt Rivers – Flinders Petrie - Gordon childe – William Jones – Alexander Cunningham – Robert Bruce Foote – Lord Curzon – Sir John Marshall – Sir Mortimer Wheeler.

Unit III **Methods**

Exploration – Excavation - Paleography – Pottery – Numismatics – Memorial Stones.

Unit IV **Dating Methods**

Radio carbon dating – Uranium and Fluorine dating – Pollen Analysis – Nitrogen Dating – Dendro chronology

Unit V **Archaeological Sites of India**

Archaeological Department of India - Harappan sites – Adichanallur – Arikamedu – Keezhadi – Korkai - Kodumanal.

Text Book:

1. Raman K.V. *Principles & Methods of Archaeology.* Chennai: Parthajan Publications, 1998.

Books for Reference:

1. Surindranath Roy. *The Story of Indian Archaeology*. New Delhi: Isha Publications, 1961.
2. Sankalia H.D. *New Archaeology – Its scope & Application to India.* Lucknow : Phaidon Press, 1974.
3. Venkatraman R. *Indian Archaeology- A Survey.* Udumalpet: Ennes Publications, 1999.
4. Ray Himanshu Prabha. *Colonial Archaeology in South Asia - The Legacy of Sir Mortimer Wheeler.* New Delhi : Oxford University Press, 2008.
5. Rajendran, R. and Santhalingam, C. *An Introduction to Archaeology.* Madurai: Pandya Nadu Centre for Historical Research, 2017
6. Rajan, K. *Understanding Archaeology – Field Methods, Theories and Practices*. Thanjavur: Manoo Pathippakam, 2016.

Semester – III			
Part III NME I- Mathematics for Competitive Examinations I			
Code : 21UMAN31	**Hrs/week : 2**	**Hrs/Semester : 30**	**Credits : 2**

Objectives

- To train the students appearing for the competitive examinations
- To inculcate the skills in Arithmetic ability

Course Outcomes

Co No	Upon completion of this course, students will be able to	PSO s addressed	CL
Co-1	solve mathematical problems using shortcut methods.	3	Cr
Co-2	develop their calculating and computing skills.	5	Ap
Co-3	solve the questions with accuracy and within the given time limit.	3	Cr
Co-4	build confidence to face the competitive examinations.	3	Cr
Co-5	enhances logical reasoning skills, arithmetic skills, aptitude skills.	6	Ap
Co-6	simplify and evaluate algebraic expressions.	3	Ev

Semester – III			
Part III NME I- Mathematics for Competitive Examinations I			
Code : 21UMAN31	**Hrs/week : 2**	**Hrs/Semester : 30**	**Credits : 2**

Unit I

H.C.F and L.C.M of Numbers

(Chapter 2, Pages 22-36)

Unit II

Simplification

(Chapters 4, Pages 58-75)

Unit III

Average

(Chapter 7, Pages 124-138)

Unit IV

Time & Work

(Chapters 11, Pages 206-222)

Unit V

Time & Distance

(Chapter 13, Pages 231-243)

Text Book

Aggarwal R.S., **Objective Arithmetic** (Edition 2004), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55

Books for Reference

1. Aggarwal R.S., **Arithmetic Subjective and Objective for Competitive Examinations** (Revised Edition 2011), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55
2. Abhijit Guha, **Quantitative Aptitude for Competitive Examinations**, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

SEMESTER-I			
Skill Enhancement Course - I Professional English for Mathematics - I			
Course Code:21UMAPE1	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

Objectives:

- To develop the language skills of students by offering adequate practice in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year physical sciencesstudents

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PO addressed	CL
CO-1	Recognise their own ability to improve their own competence in using the language	3	Un
CO-2	Use language for speaking with confidence in an intelligible and acceptablemanner	3	An
CO-3	Understand the importance of reading forlife	8	Cr
CO-4	Read independently any unfamiliar texts withcomprehension	3	Un
CO-5	Understand the importance of writing in academiclife	3	An
CO-6	Write simple sentences without committing error of spelling or grammar.	4	Un
CO-7	Develop critical thinking skills and get culturally aware of the targetsituation	3	Cr

SEMESTER-I			
Skill Enhancement Course - I Professional English for Mathematics - I			
CourseCode :21UMAPE1	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

UNIT 1: COMMUNICATION

Listening and Speaking:

Listening to audio text and answering questions

Listening toInstructions

Pair work and small group work.

Reading and writing:

Comprehension passages –Differentiate between facts and opinion

Developing a story with pictures**.**

Word Power/Vocabulary:

Register specific - Incorporated into the LSRW tasks

Grammar in Context:

Adverbs, Prepositions.

UNIT 2: DESCRIPTION

Listening: Listening to process description.-Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning-Reading passages on products, equipment and gadgets.

Writing: Process Description –Compare and Contrast

Paragraph-Sentence Definition and Extended definition- Free Writing.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT 3: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming.(Mind mapping). Small group discussions (Subject-Specific)

Reading: Longer Reading text.

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 4: PRESENTATION SKILLS

Listening: Listening to lectures.

Speaking: Short talks.

Reading: Reading Comprehension passages

Writing: Writing Recommendations

Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT 5: CRITICAL THINKING SKILLS

Listening: Listening comprehension- Listening for information.
Speaking: Making presentations (with PPT- practice).
Reading: Comprehension passages –Note making.
Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)
Writing: Problem and Solution essay– Creative writing –Summary writing
Vocabulary: Register specific - Incorporated into the LSRW tasks

Links for Reference

1. Britannica, T. E. (Ed.). (2020, April 16). Marie Curie. Retrieved June 18, 2020, from Encyclopedia
2. Britannica. Wikipedia, T. E. (Ed.). (16, June 2020). Marie Curie. Retrieved June 18, 2020, from
Wikipedia.
3. https://www.myindiamyglory.com/2018/07/12/raman-effect-how-indian-scientist-cv-raman-discovered-why-sea-is-blue/
4. https://opensource.com/resources/internet-of-things
5. http://warofcurrents.newtfire.org/
6. https://www.youtube.com/watch?v=ubpsosv7mHM
7. https://www.englishclub.com/reading/health/cell-phone.htm
8. https://www.britannica.com/biography/Isaac-Asimov
9. https://www.softschools.com/
10. https://www.space.com/17056-kalpana-chawla-biography.html
11. https://labour.gov.in/childlabour/census-data-child-labour
12.https://www.bu.edu/csp/Conferences/Space_Exploration/Day1/Presentations/Kalam_Space%2 0Exploration%20and%20Human%20Life.pdf
13. https://www.youtube.com/watch?v=WEKzNH09Vqs
14. https://www.bbc.com/news/world-europe-48616174
15. https://semiengineering.com/how-5g-differs-from-previous-network-technologies/
16. https://www.thehindubusinessline.com/info-tech/scientists-caution-government-to-go-slow-on-5g-roll-out/article28737197.ece
17. https://www.downtoearth.org.in/interviews/science-and-technology/-5g-is-unlikely-to-cause-health-concerns--63698

SEMESTER-II			
Skill Enhancement Course - II Professional English for Mathematics - II			
Course Code :21UMAPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

Objectives:

- To Increase the proficiency of students from all levels and abilities by refining their speaking, writing, reading, and listening skills.
- To provide a comprehensive and intensive course that assists students in achieving their professional, personal and educational objectives.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PO addressed	CL
CO-1	understand the basic objective of the course and obtain strong professional vocabulary for its application at different platforms	3	Un
CO-2	Apply the knowledge for writing purposes such as Presentation, drafting and project report etc.	2	Ap
CO-3	Evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication and presentation.	8	Ev
CO-4	Apply techniques for developing inter-personal communication and to respond questions at a formal interview	8	Ap
CO-5	Apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics	6	Ap
CO-6	Use critical thinking skills to face everyday life situations.	5	Cr
CO-7	Develop strategic competence that will help in efficient communication	6	Ap
CO-8	Apply the acquired knowledge and ideas in giving opinions during the meeting and making concluding remarks.	8	An

SEMESTER-II			
Skill Enhancement Course –II Professional English for Mathematics - II			
Course Code :21UMAPE2	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

UNIT 1: COMMUNICATIVE COMPETENCE

Listening and Speaking:

Listening and responding to complaints (formal situation)

Listening to problems and offering solutions (informal)

Reading and writing:

Reading aloud (brief motivational anecdotes)

Writing a paragraph on a proverbial expression/motivational idea.

Word Power/Vocabulary:

Synonyms & Antonyms

Grammar in Context:

Adverbs, Prepositions.

UNIT 2: PERSUASIVE COMMUNICATION

Listening and Speaking:

Listening to famous speeches and poems

Making short speeches- Formal: welcome speech and vote of thanks.

Informal occasions- Farewell party, graduation speech

Reading and Writing:

Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)

Reading poetry

Reading aloud: (Intonation and Voice Modulation)

Identifying and using figures of speech - simile, metaphor, personification etc.

Word Power/Vocabulary:

Idioms & Phrases

Grammar in Context

Conjunctions and Interjections.

UNIT 3: DIGITAL COMPETENCE

Listening and Speaking:

Listening to Ted talks

Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds

Interactions during and after the presentations

Reading and writing:

Writing emails of complaint

Reading aloud famous speeches

Word Power/Vocabulary:

One Word Substitution

Grammar in Context:

Sentence Patterns

UNIT 4: CREATIVITY AND IMAGINATION

Listening and Speaking

Participating in a meeting: face to face and online

Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks.

Reading and Writing

Reading visual texts – advertisements

Writing a Brochure

Word Power/Vocabulary:

Denotation and Connotation

Grammar in Context:

Sentence Types.

UNIT 5: WORKPLACE COMMUNICATION & BASICS OF ACADEMIC WRITING

Listening and Speaking:

Informal interview for feature writing

Listening and responding to questions at a formal interview

Reading and Writing

Writing letters of application

Readers' Theatre (Script Reading)

Dramatizing everyday situations/social issues through skits. (Writing scripts and performing)

Word Power/Vocabulary:

Collocation

Grammar in Context:

Working With Clauses.

Links for Reference

1. https://www.collinsdictionary.com/
2. https://youtu.be/moJjKqkn_Xs
3. https://www.collinsdictionary.com/
4. https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3
5.https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/argumentative_essays
6. https://youtu.be/5ctbvkAMQO4
7. https://www.wareable.com/fitness-trackers/how-your-fitness-tracker-works-1449
8. https://www.hfe.co.uk/blog/a-study-of-fitness-trackers-and-wearables/
9. https://youtu.be/o_f7mp_tTqw
10.https://www.youtube.com/watch?v=IOluK9i1yiw&feature=youtu.be
11.https://www.sciencehistory.org/historical-profile/antoine-laurent-lavoisier
12.https://youtu.be/AE0kuHKoitE
13. https://science.howstuffworks.com/math-concepts/fibonacci-nature.html
14.https://youtu.be/nt2OlMAJj6o
15.https://www.everythingrf.com/community/what-is-electronic-warfare
16. https://w0ww.youtube.com/watch?v=Rsa1zsOx5Mw
17. http://www.bhopal.com/
18. https://www.youtube.com/watch?v=4WZTzKu3CsY
19. https://www.youtube.com/watch?v=khc2wUBsFU4
20.http://www.bhopal.com/
21.https://www.youtube.com/watch?v=32vJxDUr-nE
22. https://www.youtube.com/watch?v=BLhwNhtYU5E
23. https://www.bbc.com/news/science-environment-55365434
24.https://www.ted.com/talks/ray_kurzweil_get_ready_for_hybrid_thinking?referrer=playlist-talks_on_artificial_intelligen%23t-146994
25.https://celebratepicturebooks.com/tag/writing-resources-for-kids/
26.http://www.englishclub.com/writing/punctuation.htm
27.http://guidetogrammar.org/grammar/marks/marks.htm
28.http://www.grammarbook.com/english_rules.asp

Semester - III			
Part III Skill Based Elective Introduction to Python Programming			
Course Code :21UMAS31	**Hrs/week :2**	**Hrs/Sem :30**	**Credits : 2**

Objectives:

- To acquire Programming skills and Object Oriented Skills in Python
- To develop the ability to write database applications in Python

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	apply decision and repetitions structures in programme design	5	Ap
CO-2	demonstrate the use of Python	5	Ap
CO-3	write python programs to solve problems	8	Cr
CO-4	distinguish various Python Objects	8	An
CO-5	use string function in Python	7	Ev
CO-6	understand the fundamental concepts to write a Python Program	1	Un
CO-7	demonstrate how to read and write files Programs in Python	4	Ap
CO-8	use compound data using Python lists and tuples	5	Ev

Semester - III			
Part III Skill Based Elective Introduction to Python Programming			
Course Code :21UMAS31	**Hrs/week :2**	**Hrs/Sem :30**	**Credits : 2**

Unit I

Introduction to Python – Operations – Variables and Assignment – Numbers and Strings – Errors and Exceptions – Python Basics

(Chapter II Sec 2.1 – 2.16 , Chapter III Sec 3.1 – 3.6)

Unit II

Python Objects – Internal Types – Standard Type Operators – Standard Type Built-in Functions

(Chapter IV, Sec 4.1 – 4.5)

Unit III

Introduction to Numbers – Integers – Complex Numbers – Built-in and Factory Functions – Other Numeric Types

(Chapter V, Sec 5.1 – 5.7)

Unit IV

Strings – Strings and Operators – Built-in Functions – String Built-in Methods –Lists – List Type built-in Methods – Tuples – Tuple Operators and Built-in Functions

(Chapter VI, Sec 6.2 – 6.6, 6.11 -6.17)

Unit V

Conditionals and Loops – if, else if – Conditional Expressions – while, for, break, pass Statements

(Chapter VIII, Sec 8.1 – 8.10)

Text Book

Wesley J.Chun, *Core Python Programming*, Pearson Education, Second Edition, 2012.

Web Resources : 1.https://www.tutorialspoint.com/python/index.htm
2.https://youtu.be/kqtD5dpn9C8
3. https://youtu.be/_uQrJ0TkZlc

Reference Books:

1. Charles Dierbach, *Introduction to Computer Science Using Python*, Wiley, 2015
2. Jeeve Jose & P. SojanLal, *Introduction to Computing and Problem Solving with Python,* Khanna Publishers, New Delhi, 2016.

Semester – III			
Part III Skill Based Elective Quantitative Aptitude I			
Course Code : 21UMAS32	**Hrs/week : 2**	**Hrs/ Semester : 30**	**Credits : 2**

Objectives:

- To bring out the mental ability and skill of the students
- To train the students for competitive and professional examinations

Course outcome:

Co No	Upon completion of this course, students will be able to	PSO s addressed	CL
Co-1	solve the problems easily by using short-cut method with time management to face the competitive examinations	4	Ap
Co-2	develop their calculating and computing skills.	5	Ap
Co-3	acquires the ability to understand and analyze the problem	2	Un
Co-4	apply quantitative methods to solve a variety of business problems	5	Ap
Co-5	solve the questions with accuracy and approach the problems in different manner	3	Cr
Co-6	enhances logical skills, arithmetic skills and aptitude skills.	5	Ap
Co-7	simplify and evaluate algebraic expressions.	3	Ev
Co-8	use mathematical concepts in real world situations.	8	Ap

Semester – III			
Part III Skill Based Elective Quantitative Aptitude I			
Course Code :21UMAS32	**Hrs/week : 2**	**Hrs/ Semester : 30**	**Credits : 2**

Unit I

Numbers – Square roots & cube roots

(Chapters 1& 5, pages 1-24, 96-122)

Unit II

Time & Distance – Polygons

(Chapters 17 & 25, 343-360, pages 478-484)

Unit III

Problems on Numbers – Problems on Ages

(Chapters 7 & 8, pages 143-163)

Unit IV

True Discount – Banker's Discount – Calendar

(Chapters 26, 27 & 29, pages 485-493, 500-503)

Unit V

Simplification-Average

(Chapters 4 & 6, 68-95, pages 123-142)

Text Book

Agarwal R.S., *Arithmetic Subjective and Objective for Competitive Examinations* (Revised Edition 2011),S.Chand and Company Ltd. , Ram Nagar, New Delhi – 55.

Semester - IV			
Part III Skill Based Elective Documentation using LaTeX			
Course Code :21UMAS41	**Hrs/week :2**	**Hrs/ Semester:30**	**Credits :2**

Objectives:

- To give deep knowledge of the LaTeX for Mathematical documentation
- To train the students to use LaTeX skills in documenting and preparing for publications.

Course Outcome:

Co No	Upon completion of this course, students will be able to	PSO s addressed	CL
Co-1	know the difference between MS Word and LaTeX	3	Un
Co-2	understand the uses of LaTeX	2	Un
Co-3	apply LaTeX in their typing work	1	Un
Co-4	handle math symbols and tables	3	An
Co-5	create documents and make small presentations.	3	Ap
Co-6	become proficient in the use of software applications as used in an office environment.	3 and 8	Ap
Co-7	manipulate with the real life needs in preparing documents	3	Ap
Co-8	prepare projects in updating with the new updates and versions	8	Cr

Semester - IV			
Part III Skill Based Elective Documentation using LaTeX			
Course Code :21UMAS41	**Hrs/week : 2**	**Hrs/ Semester: 30**	**Credits : 2**

Unit I

Typing text : Words, sentences, and paragraphs - Symbols not on the keyboard - Comments and footnotes - Changing font characteristics - Lines, paragraphs, and pages – Spaces – Boxes. **(Chapter 5, Sec 5.1 - 5.9, pages: 61 - 115)**

Unit II

Text environments: Some general rules for displayed text environments - List environments - Styleand size environments -Proclamations (theorem-like structures) - Proof environments - Tabular environments - Tabbing environments - Miscellaneous displayed text environments **(Chapter 6, Sec 6.1 to 6.8, pages 117 - 149)**

Unit III

Typing math: Math environments - Spacing rules - Equations - Basic constructs - Arithmetic operations - Delimiters - Operators - Math accents -Stretchable horizontal lines - Formula Gallery **(Chapter 7, Sec 7.1 to 7.9, pages 151 - 186)**

Unit IV

More math**:** Spacing of symbols Building new symbols - Math alphabets and symbols - Vertical spacing - Tagging and grouping - Generalized fractions - Boxed formulas **(Chapter 8, Sec 8.1 to 8.6, pages 187 - 206)**

Unit V

LaTeX documents: The structure of a document - The preamble - Abstract -Sectioning - Cross-referencing - Bibliographies. **(Chapter 10, Sec 10.1 to 10.6, pages 245 - 270)**

Text Book:

George Gratzer, *More Math into LaTeX*, 4th Edition, Springer, 2007.

https://www.javatpoint.com/latex

https://www.overleaf.com/learn/latex/Tutorials

Books for Reference:

Helmut Kopka and Patrick W. Daly, A guide to LaTeX, Fourth Edition, Addison-Wesley.

David R. Wilkins, Getting started with LaTeX, Second Edition.

Practicals: Typing Text and Tables: Chapter 4.1 - Inserting Figures: Chapter 5.1 - Mathematical Equations: Chapter 6.3- Inserting References: Chapter 7.6 - Preparing an article for mathematical journal

Semester – IV			
Part III Skill Based Elective	**Quantitative Aptitude II**		
Course Code : 21UMAS42	**Hrs/week : 2**	**Hrs/ Semester : 30**	**Credits : 2**

Objectives:

- To bring out the mental ability and skill of the students
- To train the students for competitive and professional examinations

Course outcome:

Co No	Upon completion of this course, students will be able to	PSO s addresse d	CL
Co-1	acquires the ability to understand and analyze the problem	2	Un
Co-2	develop their calculating and computing skills.	5	Ap
Co-3	solve mathematical problems using shortcut methods.	4	Cr
Co-4	build confidence to face the competitive examinations.	5	Cr
Co-5	solve the questions with accuracy and within the given time limit.	3	Cr
Co-6	enhances logical skills, arithmetic skills and aptitude skills.	5	Ap
Co-7	simplify and evaluate algebraic expressions.	3	Ev
Co-8	use mathematical concepts in real world situations.	4 and 8	Ap

Semester – IV			
Part III Skill Based Elective	**Quantitative Aptitude II**		
Course Code : 21UMAS42	**Hrs/week : 2**	**Hrs/ Semester : 30**	**Credits : 2**

Unit I

Percentage– Time and Work

(Chapters 10&15, pages 179-218, 309-330)

Unit II

Ratio and Proportion-Chain Rule

(Chapters 12& 14, Pages 248-276, 291-398)

Unit III

Problems on Trains – Boats and Streams

(Chapters 18 &19, Pages 361-381)

Unit IV

Profit and Loss-Alligation or Mixture

(Chapters 11 &20 , Pages 219-247, 382-387)

Unit V

Line Graphs-Pie charts - Bar Diagrams

(Chapters 33,34 &35, Pages 525-549)

Text Book

1. Aggarwal R.S., *Arithmetic Subjective and Objective for Competitive Examinations*, S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55. Revised Edition 2014.

Books for Reference

1. Aggarwal R.S., *Quantitative Aptitude*,S.Chand and Company Ltd. , Ram Nagar, New Delhi.
2. Abhijit Guha, *Quantitative Aptitude for Competitive Examinations*, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

SEMESTER – IV			
Core – IV– Molecular Biology and Microbial Genetics			
Course Code: 21UMIC41	**Hrs/Week- 4**	**Hrs/Sem: 60**	**Credit: 4**

Objectives:

1. To provoke excellence about various aspects of microbial genetics and molecular biology of microorganisms.
2. To enhance knowledge about genetic material of microbes and their mutations.

Course Outcome:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain the basic knowledge about the microbial genetic material and its functions.	6	U n
CO-2	compare various types of bacterial plasmids, their types, and its functions.	5	U n
CO-3	interpret the role and properties of transposons and IS elements.	7	U n
CO-4	illustrate various mechanisms involved in bacteriophage cycle.	5	U n
CO-5	improve the knowledge about structure and classification of bacteriophage and their mode of replication.	6	Cr
CO-6	classify various mutations takes place in microbial genetics.	8	Un
CO-7	compare various gene transfer mechanisms	7	Un
CO- 8	recall transformation and transduction and their classification	5	Re

SEMESTER – IV			
Core – IV– Molecular Biology and Microbial Genetics			
Course Code: 21UMIC41	**Hrs/Week- 4**	**Hrs/Sem: 60**	**Credit: 4**

Unit –I: Basics of Genetics

Genetics- Historical Introduction- experiments of Griffith, Avery, Hershey and Chase - DNA structure - RNA – types, structure. RNA as the genetic material - Genetic code. Replication of DNA and enzymology of DNA replication.

Unit –II: Bacterial plasmids

Bacterial plasmids (F-plasmid, R plasmid, col plasmid, degradative plasmid, virulence plasmid, Ti Plasmid) - Structure, types and properties of plasmids- Plasmid replication- Transposons and IS elements- Structure, types and properties.

Unit- III: Central Dogma and Bacteriophages

Transcription – Reverse transcription, Reverse transcriptase -Translation – Bacteriophages - Classification based on structure and genetic material - Lytic cycle and lysogenic cycle (T4 and Lambda phage only).

Unit- IV: Mutations

Mutations- Spontaneous (Substitution, Spontaneous Deamination of 5-Methyl cytosine, Frameshift Mutation) induced (Chemical mutagens-Base Analogues, Chemicals changing the specificity of hydrogen bonding, Alkylating agents, intercalating agents) Rations as mutagens (UV and X-rays) Genotypic and phenotypic mutants- Reversion and suppression- Ames test.

Unit –V: Gene transfer mechanisms

Gene transfer mechanisms- Conjugation (Cell transmissible plasmids, F factor and Hfr strains- Transformation (Natural transformation, competence, DNA uptake, role of natural transformation, artificially induced competence and electroporation) - Generalized and specialized transduction.

Text Books:

1) Dubey R.C., and Maheshwari, S. *A Text Book of Microbiology,* NewDelhi: S.Chand & Co, 2003.
2) Jayanthi G.P. *Molecular biology,* Chennai: MJP publishers, 2008.
3) Freifelder D., *Molecular Biology*, New Delhi: Narosa publishing house, 1991.

Books for Reference:

1. Watson, J.D., Hopkins N.H., Roberts JW.,Steitz J.A and Weiner A.A.M. *Molecular Biology of the gene.* The Benjamin cummings publishing company. 1987.
2. Lewin B. *Genes IX*. UK: Oxford University press, 2007.
3. Talaro, K.P., Andtalaro. A. *Foundations in Microbiology.* New York: WCP McGraw- Hill,1999.
4. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. *Microbiology*. New York: McGraw-Hill Inc,1993.
5. Prescott L.M., Harley J.P., and Klein D.A., *Microbiology.* New York: McGraw-Hill Inc, 7th edition. 2008.

SEMESTER I			
Skill Enhancement Course – I Professional English for Microbiology - I			
Course Code -21UMIPE1	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Objectives:

- To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year students.
- To develop the language skills of students by offering adequate practice in professional contexts.
- To focus on developing students' knowledge of domain specific registers and the required language skills.
- To develop strategic competence that will help in efficient communication
- To sharpen students' critical thinking skills and make students culturally aware of the target situation.

Course outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	Recognise their own ability to improve their own competence in using the language	1	An
CO-2	Use language for speaking with confidence in an intelligible and acceptable manner	2	Ap
CO-3	Understand the importance of reading for life	1	Un
CO-4	Read independently unfamiliar texts with comprehension	1,2,3	Re
CO-5	Understand the importance of writing in academic life	7	Un
CO-6	Write simple sentences without committing error of spelling or grammar	1	Re
CO-7	Know presentation skills	1	An
CO-8	Get critical thinking skills	1	Un

SEMESTER I			
Skill Enhancement Course – I Professional English for Microbiology – I			
Course Code : 21UMIPE1	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Unit 1: Communication

Listening: Listening to audio text on history of Microbiology and answering questions

- Listening to Scope of Microbiology

Speaking: Pair work and small group work on difference between prokaryotes and eukaryotes.

Reading: Comprehension passages on bacterial cell wall – Differentiate between facts and opinion

Writing: Developing a story with pictures on structure of bacterial cell**.**

Vocabulary: Register specific - Incorporated into the LSRW tasks

Unit 2: Description

Listening: Listening to process description of Gram's staining - Drawing a flow chart.

Speaking: Role play about the contributors of Microbiology

Reading: Skimming/Scanning- Reading passages on Smear preparation

Writing: Process Description – Sterilization

Paragraph-Sentence Definition and Extended definition on methods of sterilization.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT 3: Negotiation strategies

Listening: Listening to interviews of specialists / Inventors in fields of Microbiology

Speaking: Brainstorming on Microscopy (Mind mapping).

Small group discussions (Development of Microbiology)

Reading: Longer Reading text on culture media preparation.

Writing: Essay Writing (250 words) types of media.

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 4: Presentation skills

Listening: Listening to lectures on Electron Microscope.

Speaking: Short talks on importance of Microscope.

Reading: Reading Comprehension passages on Whittaker's five kingdom classification.

Writing: Writing an essay on Algae. Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT 5: Critical thinking skills

Listening: Listening comprehension- Audio on Virus - Listening for information.

Speaking: Making PPT on structure of virus.

Reading : Comprehension passages on Life cycle of

Virus –Note making. Comprehension:

Research article on current trends about

virus

Writing: Problem and Solution essay– Creative writing –

Summary writing on vaccine production

Vocabulary: Register specific - Incorporated into the LSRW tasks

Text Books:

1. Tamil Nadu State Council for Higher Education (TANSCHE*),*

Professional Englishfor Life Science- I

2. Rajan S., Selvi Christy R*., Essentials of Microbiology*. CBS Publishers and Distributers. 2015

Books for Reference:

1. Prescott L.M., Harley J.P., and Klein D.A., *Microbiology* New York: McGraw- Hill Inc, 7th edition, 2008.
2. Dubey R.C., and Maheswari, S. *A Text Book of Microbiology*, New Delhi: S.Chand & Co, 2003.
3. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. *Microbiology,* New York: McGraw- Hill Inc, 1993.
4. Pelczar, *Microbiology*, Tata McGraw-Hill Education. 1998.

SEMESTER II			
Skill Enhancement Course – II Professional English for Microbiology – II			
Course Code -21UMIPE2	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

- **Objectives:**

• Develop their competence in the use of English with particularreference to the workplace situation.

• Enhance the creativity of the students, which will enable them tothink of innovative ways to solve issues in the workplace.

• Develop their competence and competitiveness and therebyimprove their employability skills.

• Help students with a research bent of mind develop their skills inwriting reports and research proposals.

Course outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	Attend interviews with boldness and confidence.	6	Ev
CO – 2	Adapt easily into the workplace context, having become communicatively competent.	8	Cr
CO – 3	Apply to the Research & Development organisations/ sections in companies and offices with winning proposals.	8	Ap
CO – 4	Know digital competence	6, 1	Kn
CO – 5	Get an idea about academic writing	1, 6	Un
CO - 6	Get communicative competence	6, 8	Un
CO - 7	Get work place communication	8	Un
CO - 8	Develop creativity and imagination	2	Un

SEMESTER II			
Skill Enhancement Course – II Professional English for Microbiology – II			
Course Code -21UMIPE2	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Unit 1- Communicative Competence

Listening – Listening to two talks/lectures by specialists on Microbial growth- (TED Talks) and answering comprehension exercises (inferential questions)

Speaking: Small group discussions on microbial metabolism- open ended questions

Reading: Two subject-based reading texts followed by comprehension activities/exercises on Buffer and it's preparation

Writing: Summary writing based on the reading passages on Buffer and it's preparation

Unit 2 - Persuasive Communication

Listening: listening to sample preparation for TEM and SEM

Speaking: debate on pros and cons of Micro organisms.

Reading: reading texts on advertisements and answering inferential questions on Butter

Writing: dialogue writing- writing an argumentative /persuasive essay on ice cream making.

Unit 3- Digital Competence

Listening: Listening to interviews of renowned alumnae.

Speaking: Interviews with subject specialists (using video conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging to nurture interests – subject related)

Reading: Selected sample of Web Page of a life science virtual lab.

Writing: Creating Web Pages

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

Unit 4 - Creativity and Imagination

Listening: Listening to short (2 to 5 minutes) academic videos (prepared byEMRC/ other MOOC videos on Indian academic sites – E.g.https://www.youtube.com/watch?v=tpvicScuDy0)

Speaking: Making oral presentations through short films on impact of COVID 19.

Reading: Essay on Creativity and Imagination about impact of COVID 19

Writing – Basic Script Writing for short films Awareness about COVID 19

- Creating blogs, flyers and brochures on safety precaution for COVID 19
- Poster making – writing slogans/captions Symptoms of COVID 19

Unit 5- Work place Communication & Basics of Academic Writing

Speaking: Short academic presentation using PowerPoint opportunities in microbiology

Reading &Writing: Product Profiles, Circulars, Minutes of Meeting.

Writing an introduction, paraphrasing
Punctuation (period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis)
Capitalization (use of upper case)

Text Books:

1. Tamil Nadu State Council for Higher Education (TANSCHE), Professional English for LifeScience- I
2. Rajan S., Selvi Christy R., *Essentials of Microbiology*. CBS Publishers and Distributers. 2015

Books for References:

1. Prescott L.M., Harley J.P., and Klein D.A., *Microbiology* (7th edition) New York: McGraw- Hill Inc,. 2008.
2. Dubey R.C., and Maheswari, S. *A Text Book of Microbiology*, New Delhi: S.Chand& Co, 2003.
3. Pelczar Jr., M.J. Chan E.C.S., and Kreig N.R. *Microbiology*- New York: McGraw- Hill Inc,. 1993.
4. Pelczar, *Microbiology*, Tata McGraw-Hill Education. 1998

SEMESTER –III			
Skill Based Elective – Bioinstrumentation			
Course code-21UMIS31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credits:2**

Objectives

1. To know the fundamental principles and applications of basic instruments in biology
2. To learn the types of electrophoresis and spectroscopy
3. To understand, design and evaluate systems and devices that can measure, test and/or acquire biological information
4. To apply advanced control theory to practical research problems.

Course Outcome:

CO No	Upon completion of this course, Students will be able to	PSO Addressed	CL
CO-1	Understand the concept about the basic instrumentation.	2	Un
CO-2	Know about pH measurements and important Of buffer.	2,3	Un
CO-3	Develop basic principles and application of centrifuge.	2,3	Co
CO-4	Develop basic principles and application of spectrophotometer.	2	Un
CO-5	Demonstrate an understanding of Electrophoresis.	2	Sy
CO-6	Develop basic principles and application of colorimetry	2,4	Co
CO-7	Grasp the principles and applications of Various instruments	2	Un
CO-8	Grasp the knowledge about advanced instrumentation.	2	Un

SEMESTER –III			
Skill Based Elective – Bioinstrumentation			
Course code-21UMIS31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credits:2**

Unit-I: Basics of instrumentation

Balance, pH meter, Reagent preparations. Buffers – Preparation of buffers-Standard buffers -Basic principle of centrifugation, and its types - Ultra Centrifugation (Preparative and analytical), Density gradient Centrifugation, Rate zonal centrifugation, Differential centrifugation.

Unit–II: Photometry

Colorimetry: Instruments of Colorimetry, components and their functions – Beer Lambert's Law. Spectrophotometer, UV-Visible Spectrophotometer, Types of Spectrophotometer instrumentation and application. Flame Photometry.

Unit–III: Chromatographic techniques

Chromatography - Principle, instrumentation and application of Paper Chromatography, Adsorption chromatography, Ion exchange Chromatography, Thin layer Chromatography, Affinity chromatography, HPLC and GC.

Unit-IV: Electrophoresis

Electrophoretic techniques –principle, Agarose Gel Electrophoresis, SDS-PAGE, Native Gel, 2D gel and gradient Gel Electrophoresis, Pulsed field Gel Electrophoresis (PFGE).

Unit–V: Advanced instrumentation

Spectroscopy – Raman effect, UV-Visible, Mass spectroscopy, Atomic Absorption spectroscopy, NMR –Experimental techniques and instrumentation.

Textbooks

1. Upadhyay, Upadhyay and Nath, *Biophysical chemistry – principles and techniques*, Himalaya publishing home, 3 rd edition , 2002
2. J.Jayaram *Laboratory manual in biochemistry*, Wiley publisher. 1981
3. L.Veerakumari *Bioinstrumentation*, MJP publishers, 1st edition. 2011**.**

BooksforReference:

1. Jayaraman.J. *Laboratory Manual in Bio chemistry*. NewDelhi Wiley Eastern Ltd. 1985.
2. Plummer.D.T. *An Introduction to Practical Biochemistry,* NewDelhi TataMcGrawHill. 1998.
3. P.Palanivelu *Analytical biochemistry and separation techniques-A laboratory manual*, tulsi books centre2nd edition 2001.

4. Keith Wilson and John walker *Principles and techniques of practical biochemistry*, Cambridge University press., 5th edition 2000.
5. Gurumani.N. *Research Methodology for Biological sciences*, Chennai. MJP publishers.2006.
6. D. Holme and H. Peck *Analytical biochemistry*, longman, 3rd edition 1998.
7. Freifelder, *Physical biochemistry- application to biochemistry and molecular biology*, San Fransisco. W.H. Freeman and company, 2nd edition, 1982.

Semester - III			
Part III Allied	**Statistics I**		
Course Code :21UMMA31	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Objectives:

- To help the students to understand the uses of statistics in various competitive fields.
- To apply the statistical tools in their day to day problems.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	understand the difference between the central moments and general moments	1	Un
CO-2	compute the central moments and general moments	3	Ev
CO-3	apply concepts and theorems in solving problems	8	Cr, Ap
CO-4	find correlation between two variables	3	Ap
CO-5	evaluate particular regression lines	3 and 7	Ap
CO-6	understand the difference between the discrete random variables and the continuous random variables and solve the problems	8	Un, Ap
CO-7	fit Binomial, Poisson and Normal distribution.	8	Ap
CO-8	compare moment generating function and cumulant generating function	2 and 7	Ev

Semester - III			
Part III Allied	**Statistics I**		
Course Code : 21UMMA31	**Hrs/week :6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I

Moments - Skewness and kurtosis - Curve fitting - Method of least squares - fitting lines - parabolic, exponential & logarithmic curves **(Text book 1 Chapter 4,5)**

Unit II

Correlation &regression - scatter diagram - Karl Pearson's coefficient of correlation - properties - lines of regression coefficient & properties - rank correlation

(Text book 1 Chapter 6 §sections 6.1,6.2 6.3)

Unit III

Random variables, distribution function, two dimensional random variables, moment generating function, cumulants and characteristic function

(Text book 2 chapter5&7 §sections 5.2 to 5.5 and 7.1 to 7.3)

Unit IV

Discrete probability distribution - Geometric, Binomial & Poisson distribution & their moment generating functions, characteristic function, properties & simple application. **(Text book 2§Chapter8§Section8.4,8.5,8.7 (Omitting Negative Binomials)**

Unit V

Continuous probability distributions - Gamma distributions, Normal distributions - their properties - simple problems - importance of normal distribution

(Text book 2§ Chapter 9 §sec 9.2, 9.5,9.6 and 9.7)

Text Books

1. S.Arumugam and A.Issac, *Statistics*, New Gamma publishing House. Palayamkottai

2. Gupta S.C., Kapoor V.K., *Fundamentals of mathematical Statistics* Eleventh edition, Sultan Chand & Sons, Educational Publishers, New Delhi.

Reference books

1 H.C.Saxena, *Elementary Statistics*, S.Chand& Company Ltd., New Delhi

2. J.N.Kapurand Saxena, *Mathematical Statistics*,S.Chand& Company Ltd., New Delhi.

SEMESTER III			
NME I	**Applied Physics I**		
Course Code: 21UPHN31	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Objectives:

1. To enrich students in the field of applied physics
2. To train students in domestic wiring
3. To understand basic principle behind air conditioning
4. To understand the theory of laser and applications of laser

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	recall the tools used in the home	10	Re
CO –2	discuss the systems of domestic wiring	10	Ev
CO –3	explain the principle of air conditioning	10	Un
CO –4	sketch the refrigerating cycle	10	Ap
CO –5	describe the function of a compressor	10	Un
CO –6	understand the theory behind laser	10	Un
CO –7	discuss the types of emission of laser	10	Ev
CO –8	list out the applications of lasers	10	Re

SEMESTER III			
NME I	**Applied Physics I**		
Course Code: 21UPHN31	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Unit I: Domestic Wiring

Introduction – Tools – Precautions in handling tools – Wires – Cables – Systems of domestic wiring (CTS wiring, conduit wiring) – Fuses.

Unit II: Electrical Appliances

Electric bell – Electric iron – Electric kettle – Hot plate – Fan (Electrical, Axial, Centrifugal).

Unit III: Air Conditioning

Principle – Refrigerating cycle – Refrigerants – Evaporators – Function of a compressor – Freezers – Ice plant – Water coolers.

Unit IV: Laser

Introduction– Stimulated Absorption – Principle of spontaneous emission and stimulated emission – Concept of laser - Population inversion – Pumping action – Characteristics of laser – Basic components of laser.

Unit V: Applications of Laser

Laser drilling – Laser cutting– Laser welding – Spot welding – Air pollution monitoring – Water pollution monitoring – Laser remote sensing.

Text Books:

1. Jose Robin G and Ubald Raj A. *Applied Physics*. Marthandam: Indira Publications. 3rd edition 1998.
2. Dr. Mani. P *A text book of Engineering Physics-I.* Dhanam Publications. 10thedition 2013.
3. Jose Robin G and Ubald Raj A. *Laser and its Applications*. Marthandam: Indira Publications. First Edition 2003**.**

Book for Reference:

1. Jose Robin G and Ubald Raj A. *Maintenance of Electrical Appliances*. Marthandam: Indira Publications. First Edition July 2017.
2. Kakani S L and Shubhra Kakani. *Photonics – Optoelectronics*. CBS Publishers &Distributors Pvt Ltd. First Edition 2017.

SEMESTER IV			
NME II	**Applied Physics II**		
Course Code : 21UPHN41	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Objectives:

1. To enlighten students to be aware of solar energy sources
2. To make students understand the working of windmills, OTEC and Geothermal process used for power generation and biomass energy conversion
3. To enrich the knowledge of our students on communication physics
4. To make students knowledgeable on nano physics

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	construct solar ponds for water desalination and solar cookers	7	Cr
CO –2	understand the working of solar dryers and solar water heater.	7	Un
CO –3	explain the bio mass energy conversion	`7	Un
CO –4	understand the working of windmills, otec and geothermal process used for power generation	7	Un
CO –5	explain the advantages of fibre optics communication.	2	Un
CO –6	define nanomaterials	10	Re
CO –7	list out special features of nanophase materials	10	Re
CO –8	describe pulsed laser deposition	10	Un

SEMESTER IV			
NME II	**Applied Physics II**		
Course Code : 21**UPHN41**	**Hrs./Week : 2**	**Hrs./Sem : 30**	**Credits : 2**

Unit I: Energy Physics – I

Conventional and non conventional energy sources (Introduction) – Solar energy – Solar cooker(box type) – Solar ponds – Solar Crop Dryers – Solar Water Heater - Water Desalination.

Unit II: Energy Physics – II

Bio mass energy – Biomass conversion process digestion - Ocean Thermal energy - Geothermal Energy – Wind Energy.

Unit III: Medical Physics

Nuclear medicine - Radiation Therapy - Magnetic Resonance Imaging (MRI) – Endoscopy– Electroencephalogram (EEG) – Electrocardiogram (ECG) – Cardiac Pacemaker – Blood Pressure Apparatus (Sphygmomanometer).

Unit IV: Fibre Optics

Introduction – Optical fibre and cable – Total internal reflection - Principles and propagation of optical fibre – Acceptance angle – Numerical aperture – Types of optical fibres (Material and Number of modes) – Fibre optic communication system – Advantages and disadvantages.

Unit V: Nanomaterials

Introduction– Definition – Special features of nanophase materials – Different forms of nanomaterials – Synthesis of nanomaterials (basics) – Preparation of nanomaterials: Pulsed laser deposition – Properties of nanophase materials - Applications of nanophase materials.

Text Books:

1. Jose Robin G and Ubald Raj A, *Energy Physics*. Marthandam: Indira Publications. First edition 2014.
2. Dr. Sr. GerardinJayam. *Physics Every day*. First Edition 2008.
3. Dr. Mani P. *A text book of Engineering Physics –I*. Dhanam Publication. Tenth Edition 2013.
4. Dr. Mani P. *A text book of Engineering Physics –II*. Dhanam Publication. Tenth Edition 2016.

Book for Reference:

1. Rai G.D. *Nonconventional Energy Sources*. Khanna Publishers. Reprint, 2014.

2. Ubald Raj A and Jose Robin G. *Solid State Physics*. Marthandam: Indira Publications. second edition 2018.
3. Murugeshan R and Kiruthiga Sivaprasath. *Optics and Spectroscopy*. S. Chand and Company Ltd. Ninth edition 2019.
4. Arumugam M. *Biomedical Instrumentation*. Anuradha Agencies. Reprint, 2002.

SEMESTER III			
Core Skill Based Elective Instrumentation Physics			
Course Code: 21UPHS31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credits:2**

Objectives:

1. To enrich students with the knowledge of instrumentation physics
2. To facilitate students in understanding the basic principles of instrumentation physics
3. To aid the students in measurement techniques

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO–1	identify the errors of instruments	4	Un
CO–2	find out the arithmetic mean, deviation from the mean, average deviation, standard deviation	8	Cr
CO–3	list out the characteristics of resting potential	3	Re
CO–4	compare active and passive transducers	3	Ev
CO–5	understand the working of bio medical equipments such as electron microscope.	3	Un
CO–6	read and interpret the output of bio potential recorders such as CT scan	3	Ev
CO–7	recall the functional elements of measuring instruments	3	Re
CO–8	describe the applications of physics in the field of medicine	3	Un

SEMESTER III			
Core Skill Based Elective	**Instrumentation Physics**		
Course Code: 21UPHS31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credits:2**

Unit I: Measurement and Error

Definition – Accuracy and precision – Significant figures - Types of error (Gross error, Systematic error, Random error) – Statistical analysis (Arithmetic mean, Deviation from the mean, Average deviation, Standard deviation)

Unit II: Electrodes

Electrode potential– Purpose of the electrode paste - Electrode material – Types of electrodes – Depth and needle electrodes (2.4.6) – Surface electrodes – Chemical electrodes (Hydrogen electrode, pH electrode, pCO_2 electrode).

Unit III: Microscope

Optical microscope - Electron microscope – Comparison between optical and electron microscope – Resolving and Magnification power – Depth of focus – Types of electron microscope – TEM – SEM – Comparison between TEM and SEM.

Unit IV: Specialized and Advances in Medical Instruments

Angiography – Endoscopes – Computed Tomography (CT scan) – X-ray machine – Comparison of Fluoroscopy and Radiography – Computers in medicine – Lasers in medicine – Cryogenic surgery.

Unit V: Displays and Oscilloscope

Classification of displays – Display devices – Liquid crystal diode – Incandescentdisplay

–Oscilloscope – Basic principle – CRT features – Block diagram of oscilloscope.

Text Books:

1. Albert D. Helfrick and William D. Cooper. *Modern Electronic Instrumentation and Measurement Techniques.* Prentice-Hall of India Pvt Limited. Reprint, 8th edition 2002.
2. Arumugam M. *Biomedical Instrumentation*. Anuradha Agencies. Reprint, 2002.
3. Kalsi H. S. *Electronic Instrumentation*. Tata Mc Graw Hill Education Pvt. Limited. Reprint 2012.

Books for Reference:

1. Mani P. *A textbook of Engineering Physics-I.* Dhanam Publications. Reprint, 2013.

Jose Robin G and Ubald Raj A. *Applied Physics*. Marthandam: Indira Publications. 3rd edition 1998.

SEMESTER IV			
Skill Based Elective	**Physics for Competitive Examinations**		
Course Code : 21UPHS41	**Hrs./Week :2**	**Hrs./Sem : 30**	**Credits :2**

Objectives:

1. To prepare the students for competitive exams and make them competent in facing the challenges with confidence
2. To motivate students to face and pursue higher education through competitive Examinations
3. To equip students with the basic principles of physics and apply the same in solving problems

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO –1	solve problems in gravitation and escape velocity	8, 9	An
CO –2	answer problems in surface tension and viscosity	8, 9	An
CO –4	explain problems in laws of thermodynamics	8, 9	An
CO –5	solve problems in diffraction and interference	8, 9	An
CO –6	explain problems related to kirchhoff's laws & steady current	8, 9	An
CO –7	explain problems in electromagnetic induction	8, 9	An
CO –8	solve problems in zener diode & transistor	8, 9	An

SEMESTER IV			
Skill Based Elective	**Physics for Competitive Examinations**		
Course Code : 21UPHS41	**Hrs./Week :2**	**Hrs./Sem : 30**	**Credits :2**

Unit I: Properties of matter

Gravitation, Escape velocity and artificial satellite – Surface Tension and Viscosity – Elasticity.

Unit II: Heat

Laws of thermodynamics - Conduction and radiation.

Unit III: Optics

Interference – Diffraction, Resolving power (Prism & Grating) and Polarisation.

Unit IV: Electricity and Electromagnetism

Kirchhoff's laws and Steady current – Electromagnetic Induction - Alternating Current.

Unit V: Semiconductors

PN junction diode – Zener diode – Transistor: Transistor as an amplifier, Transistor as an oscillator.

Text Books:

1. Dr. Kakani S.L. *Objective Physics*. Sultan Chand and sons Ltd. 10th revised edition 2001.

Book for Reference:

1. Satya Prakash and Er. Vibhav Saluja. *Objective Physics*. Meerut: Prakashan publications. 27th revised edition 2010.

SEMESTER III			
Allied III	**Psychological Statistics - I**		
Course Code:21UPSA31	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credit: 4**

Objectives:

To introduce the students to the world of research in psychology

To develop an understanding about the various statistical measures used in psychological research.

Course outcome:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	learn the basic concepts and principles of statistics in psychology	7	Re
CO-2	compare and contrast the various measurements of statistics	7	Un
CO-3	apply knowledge about variability and correlation in statistics in psychology	7	Ap
CO-4	analyze the need of knowledge of inferential and descriptive statistics	7	An
CO-5	evaluate the means of developing an understanding about sampling and probability	7	Ev
CO-6	create new theories and concepts of statistics in psychology	7	Cr
CO-7	develop a good knowledge about the research field by understanding statistics.	7	Cr
CO-8	develop a good research aptitude among students.	7	Cr

SEMESTER III			
Allied III	**Psychological Statistics - I**		
Course Code: 21UPSA31	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credit: 4**

Unit I Introduction

Meaning and definition of statistics – origin, growth– applications in psychology and limitations. Primary and Secondary Data: Differences and data collection methods

Unit II Data Classification & Frequency Distribution

Data: Meaning – Methods of organizing data: Statistical Tables – Rank order – Frequency distribution – how to construct a frequency distribution table – grouping error – cumulative frequency and cumulative percentage frequency distributions. **Graphical representation of Data:** Meaning - Advantages – Modes: Graphical representation of ungrouped data and grouped data.

Unit III Measures of Central Tendency

Mean: Computation of mean for ungrouped data - Computation of mean for grouped data including deviation method –Properties and drawbacks of mean – When not to use mean. **Median**: Computation of median for ungrouped data and grouped data – Properties and Drawbacks of median. **Mode**: Computation of mode for ungrouped and grouped data – Properties and drawbacks of mode - When to use mean, median and mode.

Unit IV: Measure of Variability

Range: Computing Range – Properties and Drawbacks of Range. **Quartile Deviation**: Computation of quartile deviation for ungrouped data and grouped data – Properties and Drawbacks. Coefficient of **Quartile Deviation** - computation for ungrouped and grouped data.- properties and Drawbacks. **Mean Deviation:** Computation of mean deviation for ungrouped and grouped data – properties and Drawbacks. **Standard Deviation:** Computing Standard Deviation for grouped and ungrouped data –Properties. Data types suitable for different measures of variability – **Variance**.

Unit V: Correlation and regression

Correlation: Introduction Correlation Coefficient - Product moment correlation - computation - Applications and limitation. Rank order correlation - Limits - characteristics - limitations computation. **Regression**: Regression analysis- applications of regression analysis.

- **Computation needs to be done for onl the mentioned statistical analysis.**

Textbooks

1. Verma, J. P., &Ghufran, M. *Statistics for Psychology: A comprehensive text*. New Delhi:Tata McGraw Hill Education,,2012.
2. Mangal, S. K. *Statistics in psychology and education*. PHI Learning Pvt. Ltd,2002.

Books for Reference

1.Kothari, C. R. *Research methodology: Methods and Techniques*. New Age International,2004.
2.Gupta, S.P. *Statistical Methods*, New Delhi: Sultan Chand and Sons,2006.
5. Minium, E.W., King B.M. and Bear. G. *Statistical Reasoning in Psychology and Education* New York: john wiley& sons, 2001.

SEMESTER IV			
Allied IV	**Psychological Statistics – II**		
Course Code: 21UPSA41	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credit: 4**

Objectives:

To strengthen the knowledge of statistics and relate it with psychological research methods.

To develop an understanding about the various statistical measures used in psychological research.

Course outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	learn the basic concepts and principles of statistics in psychology	7	Re
CO-2	compare and contrast the various measurements of statistics	7	Un
CO-3	apply knowledge about variability and correlation in statistics in psychology	7	Ap
CO-4	analyze the need of knowledge of inferential and descriptive statistics	7	An
CO-5	evaluate the means of developing an understanding about sampling and probability	7	Ev
CO-6	create new theories and concepts of statistics in psychology	7	Cr
CO-7	develop a scientific society	7	Cr
CO-8	develop a knowledge that makes them true researchers and solve society's problems	7, 8	Cr

SEMESTER IV			
Allied IV	**Psychological Statistics – II**		
Course Code: 21UPSA41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credit: 4**

Unit I Normal Distribution and Sampling

Normal Distribution: Introduction – Properties - Standard Score – Testing normality of data - Central Limit theorem – Application of normal distribution. Sampling: Introduction – Principles of sample survey – Sample survey and its advantages- Characteristics of good sample – important terminologies in sampling – methods of data collection – types of sampling techniques. Determine the sample size.

Unit II Testing of Hypothesis

Testing of hypothesis – Important terminologies in hypothesis testing: types of hypothesis – null hypothesis – alternative hypothesis -Type 1 & 2 errors - level of significance - one tailed and two tailed tests - Degrees of freedom - Procedures for testing hypotheses: Criteria for test selection.

Unit III 't' test and f test

Small sample tests – t test for one sample -computation – two independent samples. - computation. **Analysis of variance (ANOVA):** Introduction - one-way ANOVA: Important terminologies - one-way ANOVA model. Assumptions in one-way ANOVA.

Unit IV Non-Parametric Tests

Non-Parametric Test: Meaning. Advantages and disadvantages– Non-parametric tests that are equivalent to parametric tests. **Chi-square:** Introduction - Assumptions - Applications: Testing equal occurrence hypothesis - Testing the significance of association between two attributes - testing goodness of fit. **Sign test:** Sign test for one sample. **Kruskal Wallis test.** Difference between parametric and non-parametric tests.

Unit V Variables and Scaling Techniques

Introduction – Nature of Psychological Data – Types of Data: Metric (Interval and ratio) and non-metric (nominal and ordinal) data– Construct and Concepts – Definition of variable – Construction of test: Steps - Implications - Scales of measurement – Reliability: Meaning – Methods of estimating reliability – Validity – Psychological Assessment

- **Computation needs to be done for only the mentioned statistical analysis.**

T**extbooks**

1. Verma, J. P., &Ghufran, M. .*Statistics for Psychology: A comprehensive text.* Tata McGraw Hill Education, New Delhi,2012.

2. Mangal, S. K. *Statistics in psychology and education.* PHI Learning Pvt. Ltd,2002.

Books for Reference

1.Kothari, C. R. *Research methodology: Methods and Techniques.* New Age International,2004.

2.Gupta, S.P. *Statistical Methods*. New Delhi: Sultan Chand and Sons,2006.

3.Howell, D.C.*Statistical Methods of Psychology*. 5th edition. Australia: Duxbury Publishers,2002.

SEMESTER – I			
Skill Enhancement course	**Professional English for Psychology I**		
Course Code: 21UPSPE1	**Hrs / Week: 2**	**Hrs / Semester: 30**	**Credit: 2**

Objectives:

To impart basic English knowledge on the subject of psychology.

To make the students confident and fluent in the usage of English language.

Course Outcome:

CO No	Upon completion of this course, the person will be able to	PSO Addressed	CL
CO 1	recognise their own ability to improve their own competence in using the language	9	Un
CO 2	use language for speaking with confidence in an intelligible and acceptable manner	9	An
CO 3	understand the importance of reading for life	9	Un
CO 4	read independently unfamiliar texts with comprehension	9	Un
CO 5	understand the importance of writing in academic life	9	An
CO 6	write simple sentences without committing error of spelling or grammar	9	Cr

SEMESTER – I			
Skill Enhancement course	**Professional English for Psychology I**		
Course Code: 21UPSPE1	**Hrs / Week: 2**	**Hrs / Semester: 30**	**Credit: 2**

Unit 1: Communication

Listening: Listening to audio text on observation skills

- Listening to various observation techniques

Speaking: Pair work and small group work on how observation is done in counselling

Reading: Comprehending passages on contemporary observation skills

Writing: Developing a script on observation report

Vocabulary: Register specific - Incorporated into the LSRW tasks

Unit 2: Description

Listening: Listening to process description of attention and making notes on types of attention

Speaking: Role play on listening skills

Reading: Skimming/Scanning- Reading passages on listening skills

Writing: Process Description – The importance of listening skills in counselling

Paragraph-Sentence Definition and Extended definition on methods of focus

Free Writing on the methods of improving attention

Vocabulary: Register specific -Incorporated into the LSRW tasks.

Unit 3: Negotiation Strategies

Listening: Listening to interviews of specialists / Inventors in the field of Psychology

Speaking: Brainstorming on the concept of feedback

Small group discussions on external expression of feedback

Reading: Longer Reading text on the topic: response and feedback

Writing: Essay Writing (250 words) Topic: Subjective well being

Vocabulary: Register specific - Incorporated into the LSRW tasks

Unit 4: Presentation skills

Listening: Listening to lectures on motivation and questioning

Speaking: Short talks on the importance of activation and persistence of behaviour

Reading: Reading Comprehension passages on types of questions

Writing: Writing an essay on types of questions

Forming sentences to interpret the statements of responses for questions

Vocabulary: Register specific -Incorporated into the LSRW tasks

Unit 5: Critical thinking skills

Listening: Listening to audios that stimulate confrontation

Speaking: Making presentations with PPTs on the types of confrontations and challenges

Reading: Comprehending passages on types of confrontations

Writing: Essay writing on: My strongest challenge

Vocabulary: Register specific - Incorporated into the LSRW tasks

Books for Reference:

Geldard et al_ *Useful counselling micro skills* .2011.

English for life sciences, Tamil Nadu State Council for Higher education (TANSCHE).

SEMESTER – II			
Skill Enhancement course	**Professional English for Psychology II**		
Course Code: 21UPSPE2	**Hrs / Week: 2**	**Hrs / Semester: 30**	**Credit: 2**

Objectives:

To impart basic English knowledge on the subject of psychology.

To make the students confident and fluent in the usage of English language.

Course Outcome:

CO No	Upon completion of this course, the person will be able to	PSO Addressed	CL
CO 1	recognize their own ability to improve their own competence in using the language	9	Un
CO 2	use language for speaking with confidence in an intelligible and acceptable manner	9	An
CO 3	understand the importance of reading for life	9	Un
CO 4	read independently unfamiliar texts with comprehension	9	Un
CO 5	understand the importance of writing in academic life	9	An
CO 6	write simple sentences without committing error of spelling or grammar	9	Cr

SEMESTER – II			
Skill Enhancement course	**Professional English for Psychology II**		
Course Code: 21UPSPE2	**Hrs / Week: 2**	**Hrs / Semester: 30**	**Credit: 2**

Unit 1: Communication

Listening: Listening to audio text on instruction patterns.
- Listening to various instruction dialogues

Speaking: Pair work and small group work on how instructions are given in counselling

Reading: Comprehending passages on contemporary instructive skills

Writing: Developing a script on instruction for a particular issue

Vocabulary: Register specific - Incorporated into the LSRW tasks

Unit 2: Description

Listening: Listening to audio recordings where humour is used as a counselling technique

Speaking: Role play on humorous counselling session models

Reading: Skimming/Scanning- Reading passages on humour skills

Writing: Process Description – The importance of humour in counselling
Paragraph-Sentence Definition and Extended definition on methods of focus
Free Writing on the methods of improving attention and humour

Vocabulary: Register specific -Incorporated into the LSRW tasks.

Unit 3: Negotiation Strategies

Listening: Listening to interviews of specialists / Inventors in the field of Counselling Psychology

Speaking: Brainstorming on the concept of counselling relationship
Small group discussions on counselling skills

Reading: Longer Reading text on the topic: communication strategies

Writing: Essay Writing (250 words) Topic: Rapport building

Vocabulary: Register specific - Incorporated into the LSRW tasks

Unit 4: Presentation skills

Listening: Listening to lectures on counselling stages

Speaking: Short talks on efficient counsellor behaviour

Reading: Reading Comprehension passages on types of counselling

Writing: Writing an essay on efficient counselling relationship
Forming sentences to interpret the statements of counselling conversations

Vocabulary: Register specific -Incorporated into the LSRW tasks

Unit 5: Critical thinking skills
Listening: Listening to audios that stimulate counselling skills
Speaking: Making presentations with PPTs on the types of issues that require counselling
Reading: Comprehending passages on types of counselling conversations
Writing: Essay writing on most efficient counselling strategy
Vocabulary: Register specific - Incorporated into the LSRW tasks

Books for Reference:
Geldardetal.*Useful counselling micro skills* .2011.
English for life sciences, Tamil Nadu State Council for Higher education (TANSCHE).

SEMESTER III			
NME I	**Basic Biotechnology**		
Course Code: 21UZON31	**Hrs/ Week : 2**	**Hrs/ Sem: 30**	**Credit: 2**

Objectives

- To impart basic knowledge on biotechnology
- To develop skills in biology using various biotechniques
- To motivate the students to take up career in biotechnology related fields in their future

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the basic principles of Biotechnology	1	Un
CO-2	distinguish between prokaryotic and eukaryotic cells from their structural studies	2	An
CO-3	understand the restriction enzymes and cloning vectors and assess their use in genetic engineering.	4	Un, Ev
CO-4	analyse the structure of DNA, and use various techniques to visualize, manipulate and separate the DNA molecules	4, 5	Un, An
CO-5	apply the various gene manipulation techniques to generate genetically modified organisms	6	An
CO-6	evaluate techniques of gene delivery and cloning to adapt in manipulation of genes	5	Ev
CO-7	discuss the preparation and characterization of appropriate nano materials in the field of nanotechnology	7	Cr
CO-8	to perform biotechnology experiments to isolate separate and amplify DNA molecules	8	Cr

Unit I **Introduction to Basic Biotechnology**

Definition, history of Biotechnology - scope of Biotechnology; structure of cell - eukaryotic and prokaryotic cells.

Unit II **Basics of Gene Manipulation**

Structure of DNA - gene concept - central dogma of life - concept of genetic engineering - Type II Restriction enzymes and DNA ligases in genetic engineering - cloning vectors – definition - general characters - plasmid cloning vector – pBR322 - construction of recombinant DNA - basic steps in cloning.

Unit III **Techniques in Biotechnology**

Agarose gel electrophoresis, SDS PAGE, PCR - Gene delivery methods – transformation, transfection, methods, biolistic method (gene gun).

Unit IV **Genetic Modification of Organisms**

Transgenic animals and plants - methods of production of transgenic organisms - outline of microinjection mediated gene transfer to animals - outline of Agrobacterium mediated gene transfer to plants – GMOs – Super mouse, Gold fish, Golden rice, Bt Cotton.

Unit V **Demonstrations/ Model/ Chart**

DNA isolation, restriction digestion, agarose gel electrophoresis, SDS PAGE, PCR, Structure - DNA, tRNA (Model/ Chart).

Text Book:

Kumaresan, V. *Biotechnology*. Nagercoil: Saras Publication, 6th edition, 2012.

Books for Reference:

1. Dubey, R.C. *A Textbook of Biotechnology*. New Delhi: S. Chand and Company Ltd., 2009.
2. Rastogi, S.C. *Biotechnology Principles and Applications*. Chennai: Reprint, Narosa. Publishing House, 2020.
3. Singh, B.D. *Biotechnology*. New Delhi: Kalyani Publishers. 2015.
4. Sathyanarayana, V. *Biotechnology*. Kolkatta:. Books and Allied (P) Ltd. 15th Edition. 2020.
5. Harisha S. *Biotechnology Procedures and Experiments Hand Book*. New Delhi: Lakshmi Publications. First Edition. 2008.
6. Asish Verma, Surajit Das, Anchal Singh. *Laboratory Manual for Biotechnology*. New Delhi: S. Chand and Company, Ltd., 2008.

SEMESTER IV			
NME II	**Applied Biotechnology**		
Course Coe: 21UZON41	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credit: 2**

Objectives

- To impart comprehensive knowledge on various aspects of modern biotechnology.
- To understand the applications of biotechnological innovations for environmental protection and human welfare.

Course Outcomes

CO. No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	understand the production of different bio-products	4	Un
CO-2	examine the nature and feature of SCP and aerobic and anaerobic digestion	4,5	An
CO-3	apply the techniques to clean up the environment through various treatment methods	3,7	Ap
CO-4	create awareness to cure cancer	4	Cr
CO-5	understand the importance of biosafety and IPR	8	Un
CO-6	evaluate the synthesis and applications of bio-products	7	Ev
CO-7	adopt appropriate tools and techniques in biotechnological manipulation	7	Cr
CO-8	apply the experimental procedures to the spectrum of fields making use of Biotechnology	8	Ap

Unit I **Food and Beverage Biotechnology**

Fermented food – yoghurt, bread – microbial biomass – nutritive value of Single Cell Protein and mushroom cultivation (White button mushroom) - wine and beer. (Demo – Mushroom cultivation & Microbial production of wine).

Unit II **Fuel Biotechnology**

Biogas – substrates- process of production – applications; biodiesel – manufacture - advantages.

Unit III **Environmental Biotechnology**

Sewage treatment – primary, secondary and tertiary treatments. Bioremediation – types, bio remediation of ground water - In-situ and Ex-situ bioremediation.

Unit IV **Health Care Biotechnology**

Gene therapy methods – germ line and somatic cell line – gene therapy for cancer.

Unit V **Regulations in Biotechnology**

Biosafety – guidelines, Intellectual Property Right – copy right and trade mark – patent.

Text Book

1. Kumaresan, V. *Biotechnology.* Kottar, Nagercoil: Saras Publication: - 6th edition. 2012.

Books for Reference

1. Dubey, R.C. *A textbook of Biotechnology*. New Delhi: S. Chand and Company Ltd. 2009
2. Rastogi, S.C. *Biotechnology, Principles and Applications*. Chennai: Narosa Publishing House. 2012.
3. Singh, B.D. *Biotechnology*. New Delhi: Revised edition. Kalyani Publishers. 2015
4. Sathyanarayana, V. *Biotechnology*. Kolkatta: Books and Allied(P) Ltd.15th edition 2020
5. Harisha S. *Biotechnology Procedures and Experiments Hand Book*. New Delhi, India: Infinity Science Press, LIC, Hinghum, Massachusett. 2007.
6. Asish Verma, Surajit Das, Anchal Singh. *Laboratory Manual for Biotechnology*. New Delhi: S. Chand and Company. 2008.

SEMESTER I			
PROFESSIONAL ENGLISH FOR ZOOLOGY – I			
Course Code:21UZOPE1	**Hrs/ Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

Objectives:

- To develop language and communication skills of the students by offering adequate practice in professional contexts.
- To enhance competence in reading, writing, listening and speaking.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognize their own ability to improve their own competence in using the language	1,5	Un, Ap
CO-2	use language for speaking with confidence in an intelligible and acceptable manner	5	Ap
CO-3	understand the importance of reading for life	4,6	Un
CO-4	read independently unfamiliar texts with comprehension	4,6	Un
CO-5	understand the importance of writing and apply in academic life	2, 8	Un, Ap
CO-6	write simple sentences without committing error of spelling or grammar	8	An, Ap
CO-7	listen to lectures and interpret critically	3,8	Un, Ap
CO- 8	become proficient in communication and become confident to present themselves.	5,7	Un, Ap

UNIT 1: COMMUNICATION

Listening: Listening to instructions and following– Instructions to use microscope.

Speaking: Pair walk- dialogue between a patient and nutritionist (formal conversation)

Reading: Comprehension passage - Professor Har Gobind Khorana.

Writing: Developing stories from pictures - Life Cycle / Metamorphosis of a Butterfly

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 2: DESCRIPTION

Listening: Listening to descriptive video clip and gist writing - How to grow Hibiscus cutting in water.

Speaking: Role play - Conversation between a Zoology teacher and a student

Reading: Skimming/Scanning - Ultra sound scanning machine

Writing: Compare and contrast expressions – plant and animal cell

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 3: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialist - Mario Molina (Ozone scientist) - https://www.youtube.com/watch?v=iGf4TGHO_Jc

Speaking: Brain storming - Mind Mapping(Microorganisms)

Reading: Passage reading - The basic macronutrients and micronutrients

Writing: Essay Writing - Essay on Conservation of Nature

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 4: PRESENTATION SKILLS

Listening: Listening to lecture and syllabification - Iron deficiency (https://www.youtube.com/watch?v=Q3b-Vsh5NEo)

Speaking: Preparation for a short speech - Chocolate is a psycho addictive food

Reading: Reading comprehension passage - Louis Pasteur-Synonyms

Writing: Recommendations (Using laptop or PC)

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 5: CRITICAL THINKING SKILLS

Listening: Listening and comprehending – Introduction to enzymes

Speaking: Making a power point presentation - Do's and Dont's.

Reading : Note making - Water cycle

Writing: Problem and Solution essay - Non-biodegradable waste

Vocabulary: Unit specific - Incorporated into the LSRW tasks

Books for Reference

English for Life Sciences, Tamil Nadu State Council for Higher Education (TANSCHE)

SEMESTER II			
PROFESSIONAL ENGLISH FOR ZOOLOGY – II			
Course Code: 21UZOPE2	**Hrs/ Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

Objectives:

- To prepare the students of life sciences for exuberant science communication.
- To develop language and communication skills of the students by offering adequate practice in professional contexts.

Course Outcomes:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognise their own ability to improve their own competence in using the language	1,5	Un, Ap
CO-2	use language for speaking with confidence in an intelligible and acceptable manner	5	Ap
CO-3	understand the importance of reading for life	4,6	Un
CO-4	read independently unfamiliar texts with comprehension	4,6	Un
CO-5	understand the importance of writing and apply in academic life	2, 8	Un, Ap
CO-6	write simple sentences without committing error of spelling or grammar	8	An, Ap
CO-7	listen to lectures and interpret critically	3,8	Un, Ap
CO-8	become proficient in communication and become confident to present themselves.	5,7	Un, Ap

UNIT 1: COMMUNICATION

Listening: Listening to an audio text - Importance of water for the lives on earth.

Speaking: Group conversations - Informal discussion in a small group making plans for a get-together.

Reading: Passage reading - Vertebrates and invertebrates

Writing: Narration of story from pictures – Story of an elephant

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 2: DESCRIPTION

Listening: Illustration of a descriptive process - Induced fertilization in fish

Speaking: Role play - Interview with a famous scientist

Reading: Descriptive reading - What Happened to the Reptiles? (Zai Whitaker)

Writing : Single sentence and extended definitions

Vocabulary: Unit specific - Incorporated into the LSRW tasks

UNIT 3: NEGOTIATION STRATEGIES

Listening : Listening to a passage - The Crescograph ("J.C.Bose" by Aldous Huxley)

Speaking: Small group discussion - Genetically modified crops.

Reading: Passage reading- Fashion Trends.

Writing: Developing essay from the passage -Healthy diet.

Vocabulary: Unit specific-Incorporated into the LSRW tasks.

UNIT 4: PRESENTATION SKILLS

Listening : Listening to lectures and notes taking-
(https://www.youtube.com/watch?v=Dh9ptiJj7TE)

Speaking: Organized speech – Frustrations of colour-blind people. (informative)

Reading: Comprehensive passage - Digestive System and answering questions.

Writing: Descriptive writing – Interpretation - Animals for ever (Gerald Durrell's)

Vocabulary: Unit specific - Incorporated into the LSRW tasks.

UNIT 5: CRITICAL THINKING SKILLS

Listening: Listening for information - Introduction to enzymes

Speaking: Preparation of Power Point presentation – Small group discussion on errors in power point presentation (History of Zoology)

Reading : Note making – Professional Competence and Professional Ethics

Writing: Summary writing - Human immune system.

Vocabulary: Unit specific-Incorporated into the LSRW tasks.

Books for Reference:

English for Life Sciences, Tamil Nadu State Council for Higher Education (TANSCHE)

SEMESTER IV			
Skill Based Elective	**A. Clinical Laboratory Technology**		
Course Code: 21UZOS41	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Objectives

- To become skilled persons for employment.
- To learn the utility and the applications of the instruments.
- To study the etiology of various diseases affecting human beings.

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the laboratory practices and know how to maintain the laboratory instruments	1	Un
CO-2	analyze and distinguish various types of blood cells	2	An
CO-3	understand the pathological diseases and explain the test for hepatitis, AIDS and intestinal parasite	3	An
CO-4	evaluate critical thinking of biochemical test	5	Un
CO-5	demonstrate the proficiency in basic methods of instrumentation and quantitative analytical skills used to conduct biological research	6	Un
CO-6	develop skills in various lab techniques	7	Cr
CO-7	acquire knowledge to handle clinical equipments	4	Un
CO-8	design, carryout and interpret scientific experiments	8	Ap

Unit I **Best Laboratory Practices and Instrumentation**

Best laboratory practices - norms to be followed in a clinical lab - sterilization - dry heat (hot air oven), moist heat (autoclave) and UV radiation (laminar flow chamber) – X- Ray - CT scan and MRI scan.

Unit II **Haematology**

Collection and storage of blood, preparation and use of blood components - blood groupings (A,B,O & Rh factor). Estimation of haemoglobin.

Unit III **Clinical Pathology**

Dialysis - hepatitis test – hemolytic jaundice - analysis of sputum - AIDS (ELISA Western blot test) Diagnosis of dengue and COVID-19.

Unit IV **Clinical Biochemistry**

Estimation of cholesterol, urea, uric acid, creatinine of blood - assay of enzyme alkaline phosphatase.

Unit V **Demonstration/ Charts/ Models/ Hands-on Training/ Hospital Visit**

Stethoscope, sphygmomanometer, electrocardiogram, EEG and echo cardiogram - analysis of urine - routine physical examination.

Text Book:

1. Ramnik Sood. *Medical Laboratory Technology*, Methods and Interpretations New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.2005.
2. Jyoti Saxena, Mamta Banuthiyal and Indu Ravi Laboratory. *Manual of Microbiology, Biochemistry, and Molecular Biology*. New Delhi: Scientific Publishers (India). 2015.

Books for Reference:

1. Biswajit Mohanty and Sharbari Basu. *Fundamentals of Practical Clinical Biochemistry.* New Delhi: B.I Publications Pvt. Ltd. 2006.
2. Estridge, B.H., Reynolds, A.P. and N.J. Walters. *Basic Medical Laboratory Techniques.* Banglore: Thomson Delmar Learing Fastern press (Bangalore) Pvt. Ltd. 4th edition 2000.
3. Kannai, L. Mukherjee. *Medical Laboratory Technology.* Chennai: Tata Mc Graw Hill Publishing Company Limited, Vol-I, Vol-II and Vol-III. 1997.