COURSE STRUCTURE & SYLLABUS
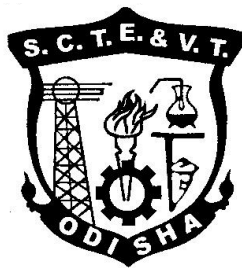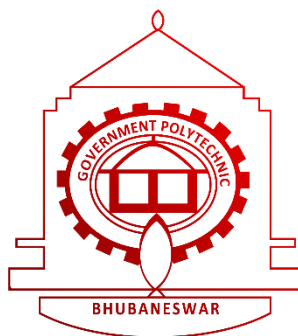
FOR

DIPLOMA IN

INFORMATION TECHNOLOGY

(w.e.f. 2018-19 ACADEMIC SESSION)

State Council for Technical Education & Vocational Training (SCTE&VT), Odisha, Bhubaneswar

Government Polytechnic, Bhubaneswar, Odisha

Government Polytechnic, Bhubaneswar

VISION

The Vision of the Government Polytechnic, Bhubaneswar is to be a premier Diploma Institution in the Eastern India by transforming the learners into competent technocrats by imparting technical education in multiple disciplines.

MISSION

The mission of the Government Polytechnic, Bhubaneswar is to:

- Focus on quality teaching and learning by providing better academic environment for both faculties and students.
- Develop professionally and technically skilled students who work for betterment of the society
- Nurture positive attitude and social values amongst the students and staff.

VISION

The Vision of the Department of Information Technology is to develop knowledge and skill of students by quality education to make responsible and competent technocrats who will work for the needs of industries and betterment of the society.

MISSION

The Mission of the Department of Information Technology is to:

M-1. Provide an excellent learning environment for the students to be technically efficient in solving problems.

M-2. Prepare the students with strong fundamental concepts, analytical capability and programming skills.

M-3. Create a nurturing environment for lifelong learning.

M-4. Generate social awareness and responsibility within the students to serve the mankind and protect the environment.

Program Outcomes for an Engineering diploma graduate:

i) **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems

ii) **Problem analysis:** Identify and analyze well-defined engineering problems using codified standard methods.

iii) **Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

iv) **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

v) **Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.

vi) **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

vii) **Life-long learning:** Ability to analyze individual needs and engage in updating in the context of technological changes.

Program Specific Outcome of Diploma in Information Technology:

PSO-1: Ability to design and develop methodologies in computer programming and apply those skills in the field of Information Technology.

PSO-2: Develop potentiality to apply the skills learnt for betterment of the society by updating it on the basis of the advanced technological changes and effectively communicate about well-defined engineering activities.

Program Educational Objective of Diploma in Information Technology:

The Program Educational Objectives (PEOs) of the Department of Information Technology are:

PEO-1: **Strong Fundamentals & Technically skilled:** To equip the students with sound knowledge in mathematics, science and basic engineering fundamentals and develop skill to solve engineering problems.

PEO-2: **Higher study and Professional responsibilities:** To enable students to pursue higher studies for professional growth and/or work as an entrepreneur for successful professional career.

PEO-3: **Teamwork and lifelong learning:** To inculcate soft skill, professional and ethical attitude, teamwork, leadership skills and multidisciplinary approach within the students which will enable them to correlate societal issue with engineering solution and pursue lifelong learning

Mapping of Mission statements with program educational objectives

Mission of the Department	PEO-1 (Strong Fundamentals & Technically skilled)	PEO-2 (Higher study and Professional responsibilities)	PEO-3 (Teamwork and lifelong learning)
Provide an excellent learning environment for the students to be technically efficient in solving problems.	3	3	1
Prepare the students with strong fundamental concepts, analytical capability and programming skills.	3	3	1
Create a nurturing environment for lifelong learning.	2	2	2
Generate social awareness and responsibility within the students to serve the mankind and protect the environment.	2	2	3

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR FIRST SEMESTER (COMMON TO ALL ENGINEERING COURSES) (wef 2018-19)

| SL. NO. | SUBJECT CODE | SUBJECT | PERIODS | | | EVALUATION SCHEME | | | |
			L	T	P	MID SEM/ INTERNAL ASSESSMENT/ SESSIONAL	END SEM EXAM	EXAMS (HOURS)	TOTAL
		THEORY							
1	Th.1a OR Th.1b	COMMUNICATIVE ENGLISH OR COMPUTER APPLICATION	4	-	-	20	80	3	100
2	Th.2a OR Th.2b	ENGINEERING PHYSICS OR ENGINEERING CHEMISTRY	4	-	-	20	80	3	100
3	Th.3	ENGINEERING MATHEMATICS-I	5	1	-	20	80	3	100
4	Th.4 OR Th.4a&b	ENGG. MECHANICS OR BASIC ELECTRICAL & ELECTRONICS ENGG.	4	-	-	20	80	3	100
		TOTAL	17	1	-	80	320	-	400
		PRACTICAL / TERM WORK							
5	Pr.1a OR Pr.1b	COMM. ENGLISH LAB OR COMPUTER APPLICATION LAB	-	-	4	50	-	-	50
6	Pr.2a OR Pr.2b	ENGG. PHYSICS LAB OR ENGG. CHEMISTRY LAB	-	-	4	50	50	3	100
7	Pr.3a OR Pr.3b	ENGINEERING DRAWING OR WORKSHOP PRACTICE	-	-	6	50	100	3 4	150
8	Pr.4	SEMINAR	-	-	4	50	-	-	50
		STUDENT CENTRED ACTIVITIES (SCA)	-	-	3	-	-	-	-
		TOTAL	-	-	21	200	150	-	350
		GRAND TOTAL	17	1	21	280	470	-	750

Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies etc. Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

In Th.4a&b Basic Electrical & Electronics Engg. paper there shall be examination in separate Answer books for Th.4a Basic Electrical Engg. and Th.4b Basic Elecronics Engg. in the same sitting

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR SECOND SEMESTER (COMMON TO ALL ENGINEERING COURSES) (wef 2018-19)

SL. NO.	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME			
			L	T	P	MID SEM/ INTERNAL ASSESSMENT/ SESSIONAL	END SEM EXAM	EXAMS (HOURS)	TOTAL
THEORY									
1	Th.1a OR Th.1b	COMMUNICATIVE ENGLISH OR COMPUTER APPLICATION	4	-	-	20	80	3	100
2	Th.2a OR Th.2b	ENGINEERING PHYSICS OR ENGINEERING CHEMISTRY	4	-	-	20	80	3	100
3	Th.3	ENGINEERING MATHEMATICS-II	5	1	-	20	80	3	100
4	Th.4 OR Th.4a&b	ENGG. MECHANICS OR BASIC ELECTRICAL & ELECTRONICS ENGG.	4	-	-	20	80	3	100
		TOTAL	17	1	-	80	320	-	400
PRACTICAL / TERM WORK									
5	Pr.1a OR Pr.1b	COMM. ENGLISH LAB OR COMPUTER APPLICATION LAB	-	-	4	50	-	-	50
6	Pr.2a OR Pr.2b	ENGG. PHYSICS LAB OR ENGG. CHEMISTRY LAB	-	-	4	50	50	3	100
7	Pr.3a OR Pr.3b	ENGINEERING DRAWING OR WORKSHOP PRACTICE	-	-	6	50	100	3 4	150
8	Pr.4	SEMINAR	-	-	4	50	-	-	50
		STUDENT CENTRED ACTIVITIES (SCA)	-	-	3	-	-	-	-
		TOTAL	-	-	21	200	150	-	350
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In Th.4a&b Basic Electrical & Electronics Engg. paper there shall be examination in separate Answer books for Th.4a Basic Electrical Engg. and Th.4b Basic Elecronics Engg. in the same sitting

Th.1a. COMMUNICATIVE ENGLISH

(1st & 2nd sem Common)

Theory: 4 Periods per Week   IA : 20 Marks

Total Periods: 60 Periods   Term End Exam : 80 Marks

Examination: 3 Hours   TOTAL MARKS : 100 Marks

Topic wise distribution of periods

Sl. No.	Topic	Periods
I	Literature Appreciation	20
II	Vocabulary	05
III	Application of Grammar	08
IV	Formal writing skills	15
V	Elements of communication • Introduction to communication • Professional communication • Nonverbal communication	12
	TOTAL	60

OBJECTIVE:

To comprehend the given passage

To answer correctly the questions on seen and unseen passages

To increase the vocabulary

To apply rules of grammar for flawless writing

To understand and use the basic concepts of communication in an organized set up and social context

To give positive feedback in various situation, to use appropriate body language and to avoid barrier for effective communication

To improve writing skill

Unit-I

LITERATURE APPRECIATION

1. Reading comprehension

Sub-skills of reading comprehension are to be worked out and tested through an unseen passage in about 200-500 words.

A student should get acquainted with sub-skills of reading for the purpose of:

- Skimming the gist
- Scanning for necessary information
- Close reading for inference and evaluation
- Main idea and supporting points
- Guessing the meaning of un-familiar words
- Note- making
- Summarizing
- Supplying a suitable title

2. Text

The following chapter from "Invitation to English", Book-1 for +2 students of CHSE, Odisha.2016 reprint to be covered in class room:

- **Standing Up For Yourself** By Yevgeny Yevtushenko
- The **Magic Of Teamwork** By Sam Pitroda
- **Inchcape Rock** By Robert Southey
- **To My True Friend** By Elizabeth Pinard

The student is to answer comprehension questions from these chapters in the end examination.

UNIT- II

VOCABULARY

Use of synonyms, antonyms

- Same word used in different situations in different meaning
- Single word substitute

Unit-III

APPLICATION OF ENGLISH GRAMMAR

- Countable an Uncountable Noun
- Articles and Determiners
- Modal Verbs
- Tenses
- Voice-change
- Subject-verb Agreement

UNIT-IV

FORMAL WRITING SKILLS

1. Paragraph writing

- Meaning
- Features of Paragraph Writing (Topic Statement, Supporting Points and Plot Compatibility)
- Developing Ideas into Paragraphs (Describing Place/ Person/ Object /Situation and any general topic of interest)

2. Notice

3. Agenda

4. Report writing (Format of a Report, Reporting an event / news)

5. Writing personal letter

6. Letter to the Principal, Librarian, Head of the Deptt, and Hostel Superintendent

7. Writing Business letters

- Layout of a Business Letter
- Letter of Enquiry, Placing an Order, Execution of an Order, Complaint, Cancellation of an order(Features, Format and example)

8. Job application and C.V.(Features, Format and example)

UNIT-V

ELEMENTS OF COMMUNICATION

A. Introduction to Communication

1. Meaning, Definition and concept of communication

2. Good Communication and Bad Communication

3. Communication model

- One-way Communication Model and Two-way Communication Model with examples

4. Process of communication and factors responsible for it

- Sender, Message, Channel, Receiver / Audience, Feedback, Noise, Context

B. Professional Communication

1. Meaning of professional communication

2. Types of professional communication

2.1. Formal or Systematic Communication

- Upward communication (How it takes place, symbol, merits and demerits)
- Down-ward communication (How it takes place, symbol, merits and demerits)
- Parallel communication (How it takes place, symbol, merits and demerits)

2.2. Informal communication

- Grape vine communication (How it takes place, symbol, merits and demerits)

C. Non- Verbal Communication

1. Meaning of nonverbal Communication

2. Different areas of Non-verbal Communication

- Kinesics or Body Language (Postures and Gestures, Facial Expression and Eye Contact)
- Proxemics or Spatial Language (Private Space, Personal Space, Social Space, Public Space)
- Language of Signs and Symbols(Audio Sign and Visual Sign in everyday life with merits and demerits)

Syllabus Coverage up to I.A

1. Reading Comprehension
2. Standing Up by Yourself
3. Use of Synonyms and Antonyms
4. Notice
5. Agenda

Books Recommended:

1. Invitation to English, Book-1, (for +2 students), CSHE (2016 reprint), Odisha
2. Invitation to English, Book-2, (for +2 students), CSHE (2016 reprint), Odisha
3. Invitation to English, Book-3, (for +2 students), CSHE (2016 reprint), Odisha
4. Invitation to English, Book-4, (for +2 students), CSHE (2016 reprint), Odisha
5. Wren and Martin High School English Grammar, Dr. NDV Prasad Rao, S. Chand Publication Communication Skills, Sanjay Kumar and Puspalata, Oxford University Press

COURSE OUTCOMES:

After completion of this course the student will be able to

1. create a communication model and understand the use of basic concept of communication in an organized set-up and social context.
2. apply rules of grammar and analyze levels of word meaning for error writing.
3. remember and comprehend facts to develop flawless presentation skill
4. evaluate feedback and appraise effective communication.

COs, POs and PSOs Mapping

Cos, POs and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	3	3	-	2
CO2	1	-	-	-	-	3	3	-	3
CO3	2	-	-	-	-	3	3	-	2
CO4	2	-	-	-	-	3	3	-	2
Total	7	-	-	-	-	12	12	-	9
Average	1.75	-	-	-	-	3	3	-	2.25

Th.1b. COMPUTER APPLICATION

(1st / 2nd sem Common)

Theory: 4 Periods per Week   IA : 20 Marks

Total Periods: 60 Periods   Term End Exam : 80 Marks

Examination: 3 Hours   TOTAL MARKS : 100 Marks

Objective:

The students will get to know about the fundamentals of computer. They will get acquainted with various components of computer hardware, software etc. Idea on Role of operating system and its usability will also be known. Knowledge on word processing, electronic spreadsheet, presentation software and Internet will also be acquired. The students will be given brief knowledge about Programming methodology and C programming.

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Computer Organisation	05
2	Computer Software	07
3	Computer Network and Internet	08
4	File Management and Data Processing	05
5	Problem Solving Methodology	05
6	Overview of C Programming language	15
7	Advanced features of C	15
	TOTAL	60

1. COMPUTER ORGANISATION

Introduction to Computer Evolution of Computers Generation of Computers Classification of Computers Basic Organisation of Computer (Functional Block diagram) Input Devices, CPU & Output Devices. Computer Memory and Classification of Memory

2. COMPUTER SOFTWARE

Software concept, System software, Application software
Overview of Operating System Objectives and Functions of O.S ,
Types of Operating System: Batch Processing, Multiprogramming, Time Sharing OS
Features of DOS, Windows and UNIX
Programming Languages Compiler, interpreter Computer Virus
Different Types of computer virus
Detection and prevention of Virus
Application of computers in different Domain

3. COMPUTER NETWORK AND INTERNET

Networking concept, Protocol, Connecting Media, Date Transmission mode
Network Topologies, Types of Network
Networking Devices like Hub, Repeater, Switch, Bridge, Router, Gateway & NIC
Internet Services like E-Mail, WWW, FTP, Chatting, Internet Conferencing, Electronic Newspaper & Online Shopping
Different types of Internet connectivity and ISP

4. FILE MANAGEMENT AND DATA PROCESSING

Concept of File and Folder
File Access and Storage methods. Sequential, Direct, ISAM
Data Capture, Data storage

Data Processing and Retrieval

5. PROBLEM SOLVING METHODOLOGY

Algorithm, Pseudo code and Flowchart Generation of Programming Languages
Structured Programming Language
Examples of Problem solving through Flowchart

6. OVERVIEW OF C PROGRAMMING LANGUAGE

Constants, Variables and Data types in C Managing Input and Output operations.
Operators, Expressions, Type conversion & Typecasting
Decision Control and Looping Statements (If, If-else, If-else-if, Switch, While, Dowhile, For, Break, Continue & Goto)
Programming Assignments using the above features.

7. ADVANCED FEATURES OF C

Functions and Passing Parameters to the Function (Call by Value and Call by Reference) Scope of Variables and Storage Classes
Recursion Function and Types of Recursion
One Dimensional Array and Multidimensional Array
String Operations and Pointers
Pointer Expression and Pointer Arithmetic Programming Assignments using the above features.
Structure and Union (Only concepts, No Programming)

Syllabus coverage upto I.A

Chapter- 1,2 3,4

Books Recommended

1. Computer Fundamentals and Programming in C by Reema Thareja, Oxford Unversity Press
2. Programming in ANSI C by A.N Kamthane, Pearson Education
3. Computer Application by Kalyani Publisher
4. Let us C by Y. Kanetkar, BPB
5. Computer Fundamentals, by E. Balaguruswamy, TMH

COURSE OUTCOMES:

After completion of this course the student will be able to
1. understand the fundamental concept of computer and identify its various components and its uses.
2. identify and analyse computer software and file management system.
3. understand the fundamental concept of networking and internet.
4. acquire knowledge of programming methodology and able to develop logics to create program in C language.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	-	-	-	-	3	2	2
CO2	3	2	-	2	-	2	3	2	2
CO3	3	2	-	2	-	2	3	2	2
CO4	3	3	2	2	2	-	3	3	2
Total	12	8	2	6	2	4	12	9	8
Average	3	2	2	2	2	2	3	2.25	2

Th.2a. ENGINEERING PHYSICS
(1st / 2nd sem Common)

Theory: 4 Periods per Week   IA : 20 Marks

Total Periods: 60 Periods   Term End Exam : 80 Marks

Examination: 3 Hours   TOTAL MARKS : 100 Marks

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	UNITS & DIMENSIONS	03
2	SCALARS & VECTORS	03
3	KINEMATICS	06
4	WORK & FRICTION	05
5	GRAVITATION	05
6	OSCILLATIONS & WAVES	06
7	HEAT & THERMODYNAMICS	07
8	OPTICS	04
9	ELECTROSTATICS & MAGNETOSTATICS	07
10	CURRENT ELECTRICITY	06
11	ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION	05
12	MODERN PHYSICS	03
	TOTAL	60

UNIT 1 - UNITS AND DIMENSIONS

2.1. Physical quantities - (Definition).
2.2. Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units).
2.3. Definition of dimension and Dimensional formulae of physical quantities.
2.4. Dimensional equations and Principle of homogeneity.
2.5. Checking the dimensional correctness of Physical relations.

UNIT 2 - SCALARS AND VECTORS

2.1. Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors.
2.2. Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical.
2.3. Resolution of Vectors – Simple Numericals on Horizontal and Vertical components.
2.4. Vector multiplication (scalar product and vector product of vectors).

UNIT 3 - KINEMATICS

3.1. Concept of Rest and Motion.
3.2. Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).
3.3. Equations of Motion under Gravity (upward and downward motion) - no derivation.
3.4. Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units).
3.5. Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration).
3.6. Define Projectile, Examples of Projectile.
3.7. Expression for Equation of Trajectory, Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angle, Condition for maximum Horizontal Range.

UNIT 4 – WORK AND FRICTION

4.1. Work – Definition, Formula & SI units.
4.2. Friction – Definition & Concept.

4.3. Types of friction (static, dynamic), Limiting Friction (Definition with Concept).
4.4. Laws of Limiting Friction (Only statement, No Experimental Verification).
4.5. Coefficient of Friction – Definition & Formula, Simple Numericals.
4.6. Methods to reduce friction.

UNIT 5 - GRAVITATION

5.1. Newton's Laws of Gravitation – Statement and Explanation.
5.2. Universal Gravitational Constant (G)- Definition, Unit and Dimension.
5.3. Acceleration due to gravity (g)- Definition and Concept.
5.4. Definition of mass and weight.
5.5. Relation between g and G.
5.6. Variation of g with altitude and depth (No derivation – Only Explanation).
5.7. Kepler's Laws of Planetary Motion (Statement only).

UNIT 6 - OSCILLATIONS AND WAVES

6.1. Simple Harmonic Motion (SHM) - Definition & Examples.
6.2. Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.
6.3. Wave motion – Definition & Concept.
6.4. Transverse and Longitudinal wave motion – Definition, Examples & Comparison.
6.5. Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period.
6.6. Derivation of Relation between Velocity, Frequency and Wavelength of a wave
6.7. Ultrasonics – Definition, Properties & Applications.

UNIT 7 - HEAT AND THERMODYNAMICS

7.1. Heat and Temperature – Definition & Difference
7.2. Units of Heat (FPS, CGS, MKS & SI).
7.3. Specific Heat (concept, definition, unit, dimension and simple numerical)
7.4. Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical)
7.5. Thermal Expansion – Definition & Concept
7.6. Expansion of Solids (Concept)
7.7. Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units.
7.8. Relation between α, β & γ
7.9. Work and Heat - Concept & Relation.
7.10. Joule's Mechanical Equivalent of Heat (Definition, Unit)
7.11. First Law of Thermodynamics (Statement and concept only)

UNIT 8 – OPTICS

8.1. Reflection & Refraction – Definition.
8.2. Laws of reflection and refraction (Statement only)
8.3. Refractive index – Definition, Formula &Simple numerical.
8.4. Critical Angle and Total internal reflection – Concept, Definition & Explanation
8.5. Refraction through Prism (Ray Diagram & Formula only – NO derivation)..
8.6. Fiber Optics – Definition, Properties & Applications.

UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS

9.1. Electrostatics – Definition & Concept.
9.2. Statement & Explanation of Coulombs laws, Definition of Unit charge.
9.3. Absolute & Relative Permittivity (ε) – Definition, Relation & Unit.
9.4. Electric potential and Electric Potential difference (Definition, Formula & SI Units).
9.5. Electric field, Electric field intensity (E) – Definition, Formula & Unit.
9.6. Capacitance - Definition, Formula & Unit.
9.7. Series and Parallel combination of Capacitors (No derivation, Formula for effective/ Combined/ total capacitance & Simple numericals).
9.8. Magnet, Properties of a magnet.

9.9. Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition).

9.10. Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit).

9.11. Magnetic lines of force (Definition and Properties)

9.12. Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit.

UNIT 10 – CURRENT ELECTRICITY

10.1. Electric Current – Definition, Formula & SI Units.

10.2. Ohm's law and its applications.

10.3. Series and Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).

10.4. Kirchhoff's laws (Statement & Explanation with diagram).

10.5. Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).

UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION

11.1. Electromagnetism – Definition & Concept.

11.2. Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's Left Hand Rule

11.3. Faraday's Laws of Electromagnetic Induction (Statement only)

11.4. Lenz's Law (Statement)

11.5. Fleming's Right Hand Rule

11.6. Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.

UNIT 12 - MODERN PHYSICS

12.1. LASER & laser beam (Concept and Definition)

12.2. Principle of LASER (Population Inversion & Optical Pumping)

12.3. Properties & Applications of LASER

12.4. Wireless Transmission – Ground Waves, Sky Waves, Space Waves (Concept & Definition)

RECOMMENDED BOOKS:

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
3. Text Book of Engineering Physics by Barik, Das, Sharma, Kalyani Publisher
4. Concepts in Physics by H. C. Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

Syllabus coverage upto I.A

Units 1,2,3,4,5,6

COURSE OUTCOMES:

After completion of this course the student will be able to
1. apply the basic knowledge of physics relevant to engineering which is critical for converting ideas into technology.
2. analyze laws of physics and their application in various processes
3. evaluate to solve engineering problems
4. apply the properties of physical quantities, sound, light, heat and its application in modern physics

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	-	1	-	-	1	-	1
CO2	2	-	-	1	-	-	1	-	1
CO3	3	2	-	1	-	-	1	-	1
CO4	1	-	-	1	-	-	1	-	1
Total	9	3	-	4	-	-	4	-	4
Average	2.25	1.5	-	1	-	-	1	-	1

Th.2b. ENGINEERING CHEMISTRY
(1st / 2nd sem Common)

Theory: 4 Periods per Week	IA : 20 Marks
Total Periods: 60 Periods	Term End Exam : 80 Marks
Examination: 3 Hours	TOTAL MARKS : 100 Marks

Objective:

Engineering Chemistry is concerned with the changes of matters with its environment and an ever growing subject. So, the aim of teaching Engineering Chemistry in Diploma Courses is to acquaint the students with the basic Chemistry of different materials used in industry and to equip the students with the basic principles of chemical changes taking place in different aspects connected to engineering fields. They also develop the right attitude to cope up with the continuous flow of new technology.

Topic wise distribution of periods

Sl. No.	Topic	Periods
A	Physical Chemistry	22
B	Inorganic Chemistry	08
C	Organic Chemistry	10
D	Industrial Chemistry	20
	TOTAL	60

A. PHYSICAL CHEMISTRY

Chapter 1: Atomic structure: Fundamental particles (electron, proton & neutron Definition, mass and charge). Rutherford's Atomic model (postulates and failure), Atomic mass and mass number, Definition, examples and properties of Isotopes, isobars and isotones. Bohr's Atomic model (Postulates only), Bohr-Bury scheme, Aufbau's principle, Hund's rule, Electronic configuration (up to atomic no 30).

Chapter 2: Chemical Bonding: Definition, types (Electrovalent, Covalent and Coordinate bond with examples (formation of $NaCl$, $MgCl_2$, H_2, Cl_2, O_2, N_2, H_2O, CH_4, NH_3, NH_4^+, SO_2).

Chapter 3: Acid base theory: Concept of Arrhenius, Lowry Bronsted and Lewis theory for acid and base with examples (Postulates and limitations only). Neutralization of acid & base. Definition of Salt, Types of salts (Normal, acidic, basic, double, complex and mixed salts, definitions with 2 examples from each).

Chapter 4: Solutions: Definitions of atomic weight, molecular weight, Equivalent weight. Determination of equivalent weight of Acid, Base and Salt.

Modes of expression of the concentrations (Molarity , Normality & Molality) with Simple Problems. pH of solution (definition with simple numericals)

Importance of pH in industry (sugar, textile, paper industries only)

Chapter 5: Electrochemistry: Definition and types (Strong & weak) of Electrolytes with example. Electrolysis (Principle & process) with example of NaCl (fused and aqueous solution).

Faraday's 1st and 2nd law of Electrolysis (Statement, mathematical expression and Simple numerical) Industrial application of Electrolysis- Electroplating (Zinc only).

Chapter 6: Corrosion: Definition of Corrosion, Types of Corrosion- Atmospheric Corrosion, Waterline corrosion. Mechanism of rusting of Iron only. Protection from Corrosion by (i) Alloying and (ii) Galvanization.

B. INORGANIC CHEMISTRY

Chapter 7 : Metallurgy: Definition of Mineral, ores , gangue with example. Distinction between Ores And Minerals. General methods of extraction of metals,

    i) Ore Dressing

    ii) Concentration (Gravity separation, magnetic separation, Froth floatation & leaching)

    iii) Oxidation (Calcinations, Roasting)

    iv) Reduction (Smelting, Definition & examples of flux, slag)

    v) Refining of the metal (Electro refining, & Distillation only)

Chapter 8 : Alloys: Definition of alloy. Types of alloys (Ferro, Non Ferro & Amalgam) with example. Composition and uses of Brass, Bronze, Alnico, Duralumin

C. ORGANIC CHEMISTRY

Chapter 9 : Hydrocarbons : Saturated and Unsaturated Hydrocarbons (Definition with example) Aliphatic and Aromatic Hydrocarbons (Huckle's rule only). Difference between Aliphatic and aromatic hydrocarbons

IUPAC system of nomenclature of Alkane, Alkene, Alkyne, alkyl halide and alcohol (up to 6 carbons) with bond line notation.

Uses of some common aromatic compounds (Benzene, Toluene, BHC, Phenol, Naphthalene, Anthracene and Benzoic acid) in daily life.

D. INDUSTRIAL CHEMISTRY

Chapter 10 : Water Treatment : Sources of water, Soft water, Hard water, hardness, types of Hardness (temporary or carbonate and permanent or non-carbonate), Removal of hardness by lime soda method (hot lime & cold lime—Principle, process & advantages) , Advantages of Hot lime over cold lime process.

Organic Ion exchange method (principle, process, and regeneration of exhausted resins)

Chapter 11 : Lubricants: Definition of lubricant, Types (solid, liquid and semisolid with examples only) and specific uses of lubricants (Graphite, Oils, Grease), Purpose of lubrication

Chapter 12 : Fuel: Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel.

Liquid: Diesel, Petrol, and Kerosene --- Composition and uses.

Gaseous: Producer gas and Water gas (Composition and uses). Elementary idea about LPG, CNG and coal gas (Composition and uses only).

Chapter 13 : Polymer: Definition of Monomer, Polymer, Homo-polymer, Co-polymer and Degree of polymerization. Difference between Thermosetting and Thermoplastic, Composition and uses of Polythene, & Poly-Vinyl Chloride and Bakelite.

Definition of Elastomer (Rubber). Natural Rubber (it's draw backs). Vulcanisation of Rubber. Advantages of Vulcanised rubber over raw rubber.

Chapter 14: Chemicals in Agriculture: Pesticides: Insecticides, herbicides, fungicides- Examples and uses.

Bio Fertilizers: Definition, examples and uses.

Syllabus Coverage upto I.A

Chapter 1,2,3,4,5,6

Books Recommended:

1. Text Book of Intermediate Chemistry Part-1 and Part-2 by Nanda, Das, Sharma, Kalyani Publishers
2. Engg. Chemistry by B.K. Sharma, Krishna Prakashan Media Pvt. Ltd
3. Engineering Chemistry by Y.R. Sharma and P. Mitra, Kalyani Publishers
4. Engineering Chemistry for Diploma – Dr. R K Mohapatra, PHI Publication, New Delhi.
5. Engineering Chemistry- Jain & Jain, Dhanpat Roy and Sons.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. summerize the fundamental principle of chemical bonding and atomic structure.
2. examine various acids, bases, salts and prepare solutions of various strength which will be suited for different industries and chemical reactions
3. evaluate engineering problems related to corrosion, electrochemistry, and protection of metals,non-metals, alloys and polymeric materials for futuristic engineering.
4. identify the quality parameters of various fuels and water.
5. distinguish between the various organic compounds, their properties and uses.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-
CO3	3	3	-	2	2	-	-	-	-
CO4	3	3	-	2	1	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-
Total	15	12	-	6	3	-	-	-	-
Average	3	3	-	2	1.5	-	-	-	-

Th.3. ENGINEERING MATHEMATICS-I

(1ST Sem Common)

Theory: 5 Periods per Week   IA : 20 Marks

Total Periods: 75 Periods   Term End Exam : 80 Marks

Examination: 3 Hours   TOTAL MARKS : 100 Marks

Objective:

1. This subject helps the students to develop logical thinking which is useful in comprehending the principles of all to the subjects.
2. Analytical and systematic approach towards any problem is developed through learning of this subject.
3. Mathematics being a versatile subject can be used at every stage of human life.

Topic wise distribution of periods

Sl. No.	Subject	Unit	Topic	Periods
A	Algebra	1	Matrices and Determinant	18
B	Trigonometry	2	Trigonometry	15
C	Two Dimensional Geometry	3 4	Co-ordinate Geometry in Two Dimensions (Straight Line) Circle	13 07
D	Three Dimensional Geometry	5 6	Co-ordinate Geometry in Three Dimensions Sphere	15 7
TOTAL				75

1) **MATRICES AND DETERMINANTS**
   a) Types of matrices
   b) Algebra of matrices
   c) Determinant
   d) Properties of determinant
   e) Inverse of a matrix (second and third order) (Question should be on second order matrix)
   f) Cramer's Rule (Question should be on two variables)
   g) Solution of simultaneous equations by matrix inverse method (Question should be on two variables)

2) **TRIGONOMETRY**
   a) Trigonometrical ratios
   b) Compound angles, multiple and sub-multiple angles (only formulae)
   c) Define inverse circular functions and its properties (no derivation)

3) **CO-ORDINATE GEOMETRY IN TWO DIMENSIONS (Straight line)**
   a) Introduction of geometry in two dimension
   b) Distance formulae, division formulae, area of a triangle (only formulae no derivation)
   c) Define slope of a line, angle between two lines (only F), condition of perpendicularity and parallelism.
   d) Different forms of straight lines (only formulae)
      i) One point form (ii) two point form (iii) slope form (iv) intercept form (v) Perpendicular form
   e) Equation of a line passing through a point and (i) parallel to a line (ii) Perpendicular to a line
   f) Equation of a line passing through the intersection of two lines
   g) Distance of a point from a line

4) **CIRCLE**
   a) Equation of a circle

      i.   center radius form

      ii.   general equation of a circle

      iii.   end point of diameter form

5) CO-ORDINATE GEOMETRY IN THREE DIMENSIONS

a) Distance formulae, section formulae, direction ratio, direction cosine, angle between two lines (condition of parallelism and perpendicularity)

b) Equation of a plane

i) General form, angle between two planes, perpendicular distance of a point from a plane, equation of a plane passing through a point and ii) parallel to a plane, iii) perpendicular to a plane

6) SPHERE

a) Equation of a sphere

      i.   center radius form

      ii.   general form

      iii.   two end points of a diameter form (only formulae and problems)

Books Recommended:

1. Elements of Mathematics _ Vol. _ 1 & 2 (Odisha State Bureau of Text Book preparation & Production)

Reference Books:

1. Mathematics Part- I & Part- II- Textbook for Class XII, NCERT Publication

<u>Syllabus to be covered up to IA</u>

Ch.1, Ch,2, and Ch,3,(a,b,c)

COURSE OUTCOMES:

After completion of this course the student will be able to

1. analyse the solution set of a system of linear equations in forms of Determinants and Matrices.
2. apply the reciprocal relationship between the trigonometric functions and use of inverse trigonometric functions.
3. calculating the equation of two-dimensional objects like line and circle and understand their properties.
4. determine the equation of perpendicular, parallel and skew lines and sphere in three dimensions.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	-	-	-	-	1	1	1
CO2	1	1	-	-	-	-	1	1	1
CO3	1	1	-	-	-	-	1	1	1
CO4	1	1	-	-	-	-	1	1	1
Total	4	4	-	-	-	-	4	4	4
Average	1	1	-	-	-	-	1	1	1

Th. 4. ENGINEERING MECHANICS

(1st / 2nd sem Common)

Theory: 4 Periods per Week   IA : 20 Marks

Total Periods: 60 Periods   Term End Exam : 80 Marks

Examination: 3 Hours   TOTAL MARKS : 100 Marks

Objective:

On completion of the subject, the student will be able to do:

1. Compute the force, moment & their application through solving of simple problems on coplanar forces.
2. Understand the concept of equilibrium of rigid bodies.
3. Know the existence of friction & its applications through solution of problems on above.
4. Locate the C.G. & find M.I. of different geometrical figures.
5. Know the application of simple lifting machines.
6. Understand the principles of dynamics.

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Fundamentals of Engineering Mechanics	14
2	Equilibrium	08
3	Friction	10
4	Centroid & moment of Inertia	14
5	Simple Machines	08
6	Dynamics	06
	TOTAL	60

1. **FUNDAMENTALS OF ENGINEERING MECHANICS**
    1.1. Fundamentals.
        Definitions of Mechanics, Statics, Dynamics, Rigid Bodies
    1.2. Force
        Force System.
        Definition, Classification of force system according to plane & line of action.
        Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.
    1.3. Resolution of a Force.
        Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.
    1.4. Composition of Forces.
        Definition, Resultant Force, Method of composition of forces, such as
        1.4.1. Analytical Method such as Law of Parallelogram of forces & method of resolution.
        1.4.2. Graphical Method.
            Introduction, Space diagram, Vector diagram, Polygon law of forces.
        1.4.3. Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method.
    1.5. Moment of Force.
        Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units. Classification of moments according to direction of rotation, sign convention, Law of moments, Varignon's Theorem, Couple – Definition, S.I. units, measurement of couple, properties of couple.
2. **EQUILIBRIUM**

2.1. Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.

2.2. Lamia's Theorem – Statement, Application for solving various engineering problems.

3. **FRICTION**

3.1. Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction. Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction.

3.2. Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up & down).

3.3. Ladder, Wedge Friction.

4. **CENTROID & MOMENT OF INERTIA**

4.1. Centroid – Definition, Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.

4.2. Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems. M.I. of plane lamina & different engineering sections.

5. **SIMPLE MACHINES**

5.1. Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine, define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine.

5.2. Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack.

5.3. Types of hoisting machine like derricks etc, Their use and working principle. No problems.

6. **DYNAMICS**

6.1. Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, Motion of Particle acted upon by a constant force, Equations of motion, De-Alembert's Principle.

6.2. Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.

6.3. Momentum & impulse, conservation of energy & linear momentum, collision of elastic bodies, and Coefficient of Restitution

<div align="center">

Syllabus coverage upto I.A

Chapter 1, 2 and 3.1

</div>

Books Recommended

1. Engineering Mechanics – by A.R. Basu (TMH Publication Delhi)
2. Engineering Machines – Basudev Bhattacharya (Oxford University Press).
3. **Text Book of Engineering Mechanics – R.S Khurmi (S. Chand).**
4. Applied Mechanics & Strength of Material – By I.B. Prasad.
5. Engineering Mechanics – By Timosheenko, Young & Rao.
6. Engineering Mechanics – Beer & Johnson (TMH Publication).

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the concept of movement and their application

2. understand the concept of equilibrium of rigid body

3. locate C.G and find M.I of different geometrical figures

4. identify the existence of friction and its application in practical life.

5. recognize the use of simple lifting machines in industry, Understand the principles of Dynamics.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	1	1	-	1	-	2
CO2	3	2	1	1	1	-	1	-	2
CO3	3	2	1	1	-	-	-	-	-
CO4	3	2	1	1	-	-	1	-	2
CO5	2	2	3	1	1	-	2	-	2
Total	14	10	8	5	3	-	5	-	8
Average	2.8	2	1.6	1	1	-	1.25	-	2

Th.4(a). BASIC ELECTRICAL ENGINEERING

(1ˢᵗ / 2ⁿᵈ sem Common)

Theory: 2 Periods per Week   IA : 10 Marks

Total Periods: 30 Periods   Term End Exam : 40 Marks

Examination: 1.5 Hours   TOTAL MARKS : 50 Marks

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Fundamentals	05
2	A.C. Theory	08
3	Generation Elect. Power	03
4	Conversion of Electrical Energy	07
5	Wiring and Power Billing	04
6	Measuring Instrument	03
	TOTAL	30

Objective:

1. To be familiar with A.C. fundamental and circuits.
2. To be familiar with basic principle and application of energy conversion devices
3. To be familiar with the generation of electrical power.
4. To be acquainted with wiring and protective devices.
5. To be familiar with circulation and commercial billing of electrical power & energy.
6. To have basic knowledge of various electrical measuring instruments & conservation of electrical energy

1. **FUNDAMENTALS**
   1.1. Concept of current flow.
   1.2. Concept of source and load.
   1.3. State Ohm's law and concept of resistance.
   1.4. Relation of V, I & R in series circuit.
   1.5. Relation of V, I & R in parallel circuit.
   1.6. Division of current in parallel circuit.
   1.7. Effect of power in series & parallel circuit.
   1.8. Kirchhoff's Law.
   1.9. Simple problems on Kirchhoff's law.
2. **A.C. THEORY**
   2.1. Generation of alternating emf.
   2.2. Difference between D.C. & A.C.
   2.3. Define Amplitude, instantaneous value, cycle, Time period, frequency, phase angle, phase difference.
   2.4. State and explain RMS value, Average value, Amplitude factor & Form factor with Simple problems.
   2.5. Represent AC values in phasor diagrams.
   2.6. Explain AC through pure resistance inductance & capacitance
   2.7. Explain AC though RL, RC, RLC series circuits.
   2.8. Simple problems on RL, RC & RLC series circuits.
   2.9. Concept of Power and Power factor
   2.10. Impedance triangle and power triangle.

3. **GENERATION OF ELECTRICAL POWER**
   3.1. Give elementary idea on generation of electricity from thermal , hydro & nuclear power station with block diagram
4. **CONVERSION OF ELECTRICAL ENERGY**
   (No operation, Derivation, numerical problems)
   4.1. Introduction of DC machines.
   4.2. Main parts of DC machines.
   4.3. Classification of DC generators.
   4.4. Classification of DC motor.
   4.5. Uses of different types of DC generators & motors.
   4.6. Types and uses of single phase induction motors.
   4.7. Concept of Lumen
   4.8. Different types of Lamps (Filament, Fluorescent, LED bulb) its Construction and Principle.
   4.9. Star rating of home appliances (Terminology, Energy efficiency, Star rating Concept)Introduction to poly phase circuit, advantages & comparison with single phase.
5. **WIRING AND POWER BILLING**
   5.1. Types of wiring for domestic installations
   5.2. Layout of household electrical wiring (single line diagram showing all the important component in the system).
   5.3. List out the basic protective devices used in house hold wiring.
   5.4. Calculate energy consumed in a small electrical installation.
6. **MEASURING INSTRUMENTS**
   6.1. Introduction to measuring instruments.
   6.2. Torques in instruments.
   6.3. Different uses of PMMC type of instruments (Ammeter & Voltmeter).
   6.4. Different uses of MI type of instruments (Ammeter & Voltmeter).
   6.5. Draw the connection diagram of A.C/ D.C Ammeter, voltmeter, energy meter and wattmeter. (Single phase only).

Books Recommended

1. ABC of Electrical Enginnering by Jain & Jain (Dhanpat Rai Publication)
2. Fundamentals of Electrical Engg and Electronics by B.L Thereja
3. Concept of Basic Electrical Enginnering ,P.K Das and A.K. Mallick by B.M Publications
4. Fundamentals of Electrical Engg by Asfaq Hussain
5. Fundamentals of Electrical Engg by JB Gupta
6. Basic Electrical Engg. By Chakraborti (Mcgraw Hill)

Syllabus Coverage upto I.A

Chapter 1,2,3

Th.4(b). BASIC ELECTRONICS ENGINEERING

(1ˢᵗ / 2ⁿᵈ sem Common)

Theory: 2 Periods per Week   IA : 10 Marks

Total Periods: 30 Periods   Term End Exam : 40 Marks

Examination: 1.5 Hours   TOTAL MARKS : 50 Marks

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Electronic Devices	08
2	Electronic circuits	09
3	Communication Systems	03
4	Transducers & Measuring Instruments	10
	TOTAL	30

Objective:

1. To be familiar with Electronic devices
2. To be familiar with Electronic circuits
3. To be familiar with communication system
4. To be familiar with Electronic measuring instruments

1. **ELECTRONIC DEVICES**
   1.1. Basic Concept of Electronics and its application.
   1.2. Basic Concept of Electron Emission & its types.
   1.3. Classification of material according to electrical conductivity (Conductor, Semiconductor & Insulator) with respect to energy band diagram only.
   1.4. Difference between Intrinsic & Extrinsic Semiconductor.
   1.5. Difference between vacuum tube & semiconductor.
   1.6. Principle of working and use of PN junction diode, Zener diode and Light Emitting Diode (LED)
   1.7. Integrated circuits (I.C) & its advantages.
2. **ELECTRONIC CIRCUITS**
   2.1. Rectifier & its uses.
   2.2. Principles of working of different types of Rectifiers with their merits and demerits
   2.3. Functions of filters and classification of simple Filter circuit (Capacitor, choke input and π)
   2.4. Working of D.C power supply system (unregulated) with help of block diagrams only
   2.5. Transistor, Different types of Transistor Configuration and state output and input current gain relationship in CE,CB and CC configuration(No mathematical derivation)
   2.6. Need of biasing and explain different types of biasing with circuit diagram.(only CE configuration)
   2.7. Amplifiers(concept) , working principles of single phase CE amplifier
   2.8. Electronic Oscillator and its classification
   2.9. Working of Basic Oscillator with different elements through simple Block Diagram
3. **COMMUNICATION SYSTEM**
   3.1. Basic communication system (concept & explanation with help of Block diagram)
   3.2. Concept of Modulation and Demodulation, Difference between them
   3.3. Different types of Modulation (AM, FM & PM) based on signal, carrier wave and modulated wave (only concept, No mathematical Derivation)

4. TRANSDUCERS AND MEASURING INSTRUMENTS

4.1. Concept of Transducer and sensor with their differences.

4.2. Different type of Transducers & concept of active and passive transducer.

4.3. Working principle of photo emissive, photoconductive, photovoltaic transducer and its application

4.4. Multimeter and its applications

4.5. Analog and Digital Multimeter and their differences

4.6. Working principle of Multimeter with Basic Block diagram

4.7. CRO, working principle of CRO with simple Block diagram

Syllabus Coverage upto I.A

Chapter 1,2(upto 2.6)

Books Recommended

1. Principles of Electronics by V.K Mehta and Rohit Mehta,S Chand Publication
2. Principles of Electronics by S.K. SAHADEV (Dhanpatrai Publication)

COURSE OUTCOMES:

After completion of this course the student will be able to
1. analyse electrical circuit in both AC and DC supply and solve numerical problems.
2. understand the principle of generation of Electrical power, various types of Electrical machines and electrical measuring instrument.
3. classify domestic wiring and solve numerical problem on consumption of energy.
4. understand the fundamental of semiconductor devices and their applications in electronic circuit.
5. acquire basic knowledge on communication system and Electronic measuring Instruments.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	3	-	-	-	2	-	1
CO2	3	2	1	3	-	-	1	-	2
CO3	2	3	3	-	2	-	2	-	3
CO4	3	1	1	-	-	-	1	-	2
CO5	2	1	1	2	-	-	2	-	2
Total	13	10	9	5	2	-	8	-	10
Average	2.6	2	1.8	2.5	2	-	1.6	-	2

BST201 ENGINEERING MATHEMATICS - II

Theory: 5 Periods per Week	IA : 20 Marks
Total Periods: 75 Periods	Term End Exam : 80 Marks
Examination: 3 Hours	TOTAL MARKS : 100 Marks

Objective:

Principles and application in Engineering are firmly ground on abstract mathematical structures. Students passing from secondary level need familiarization with such structure with a view to develop their knowledge, skill and perceptions about the applied science. Calculus is the most important mathematical tool in forming engineering application into mathematical models. Wide application of calculus makes it imperative to develop methods of solving differential equations. The knowledge of limit, derivative and derivative needs to be exhaustively practiced. To help a systematic growth of skill in solving equation by calculus method will be the endeavor of this course content. Understanding the concept of co-ordinate system in 3D in case of lines, planes and sphere and it's use to solve Engineering problems. After completion of the course the student will be equipped with basic knowledge to form equations and solve them competently.

Topic wise distribution of periods

Sl. No.	Topic	Periods	Marks
1	Vector Algebra	15	12
2	Limits and Continuity	12	12
3	Derivatives	21	20
4	Integration	15	24
5	Differential Equation	12	12
	TOTAL	75	80

1. **VECTOR ALGEBRA**
   a) Introduction
   b) Types of vectors (null vector, parallel vector , collinear vectors) (in component form)
   c) Representation of vector
   d) Magnitude and direction of vectors
   e) Addition and subtraction of vectors
   f) Position vector
   g) Scalar product of two vectors
   h) Geometrical meaning of dot product
   i) Angle between two vectors
   j) Scalar and vector projection of two vectors
   k) Vector product and geometrical meaning (Area of triangle and parallelogram)
2. **LIMITS AND CONTINUITY**
   a) Definition of function, based on set theory
   b) Types of functions
      i) Constant function
      ii) Identity function
      iii) Absolute value function
      iv) The Greatest integer function
      v) Trigonometric function
      vi) Exponential function
      vii) Logarithmic function
   c) Introduction of limit
   d) Existence of limit

e) Methods of evaluation of limit

    i) $\lim\limits_{x \to 0} \dfrac{x^n - a^n}{x - a} = n a^{n-1}$

    ii) $\lim\limits_{x \to 0} \dfrac{a^x - 1}{x} = \log_e a$

    iii) $\lim\limits_{x \to 0} \dfrac{e^x - 1}{x} = 1$

    iv) $\lim\limits_{x \to 0} (1 + x)^{1/n} = e$

    v) $\lim\limits_{x \to \infty} \left(1 + \dfrac{1}{x}\right)^x = e$

    vi) $\lim\limits_{x \to 0} \dfrac{\log(1+x)}{x} = 1$

    vii) $\lim\limits_{x \to 0} \dfrac{\sin x}{x} = 1$

    viii) $\lim\limits_{x \to 0} \dfrac{\tan x}{x} = 1$

f) Definition of continuity of a function at a point and problems based on it

3. **DERIVATIVES**
   a) Derivative of a function at a point
   b) Algebra of derivative
   c) Derivative of standard functions

   $$x^n, a^x, \log_a x, e^x, \sin x, \cos x, \tan x, \cot x, \sec x, \csc x, \sin^{-1} x, \cos^{-1} x, \tan^{-1} x, \cot^{-1} x,$$

   $$\sec^{-1} x, \csc^{-1} x$$

   d) Derivative of composite function (Chain Rule)
   e) Methods of differentiation of
       i)   Parametric function
       ii)   Implicit function
       iii)   Logarithmic function
       iv)   a function with respect to another function
   f) Applications of Derivative
       i)   Successive Differentiation (up to second order)
       ii)   Partial Differentiation (function of two variables up to second order)
   g) Problems based on above

4. **INTEGRATION**
   a) Definition of integration as inverse of differentiation
   b) Integrals of standard functions
   c) Methods of integration
       i)   Integration by substitution
       ii)   Integration by parts
   d) Integration of the following forms

   i) $\int \dfrac{dx}{x^2 + a^2}$ ii) $\int \dfrac{dx}{x^2 - a^2}$ iii) $\int \dfrac{dx}{a^2 - x^2}$ iv) $\int \dfrac{dx}{\sqrt{x^2 + a^2}}$ v) $\int \dfrac{dx}{\sqrt{x^2 - a^2}}$ vi) $\int \dfrac{dx}{\sqrt{a^2 - x^2}}$

   vii) $\int \dfrac{dx}{x\sqrt{x^2 - a^2}}$ viii) $\int \sqrt{a^2 - x^2}\, dx$ ix) $\int \sqrt{a^2 + x^2}\, dx$ x) $\int \sqrt{x^2 - a^2}\, dx$

   e) Definite integral, properties of definite integrals

   i) $\int_0^a f(x)\, dx = \int_0^a f(a - x)\, dx$

   ii) $\int_a^b f(x)\, dx = -\int_b^a f(x)\, dx$

   ii) $\int_a^c f(x)\, dx = \int_a^b f(x)\, dx + \int_b^c f(x)\, dx$, $a < b < c$

   v) $\int_{-a}^a f(x)\, dx = 0, if\ f(x)$ = odd

   $$= 2\int_0^a f(x)\, dx, if\ f(x) = even$$

   f) Application of integration
       i)   Area enclosed by a curve and X – axis
       ii)   Area of a circle with centre at origin

5. **DIFFERENTIAL EQUATION**
   a) Order and degree of a differential equation
   b) Solution of differential equation
       i)   1st order and 1st degree equation by the method of separation of variables

ii)   Linear equation $\frac{dy}{dx} + Py = Q$, where P, Q are functions of x

Books Recommended

1.   Elements of Mathematics – Vol -1 & II (Odisha State Bureau of Text Book Preparation & Production)

Reference Books

1.   Mathematics Part- I & Part- II- Textbook for Class XII, NCERT Publication

Syllabus to be covered up to IA

Ch. 2 and Ch. 3

COURSE OUTCOMES:

After completion of this course the student will be able to
1.   apply geometric and algebraic properties of vector and can compute vector additions and multiplications.
2.   evaluate the ideas of continuity and differentiability.
3.   recognize the relationship between the derivative of a function as a function and the notion of the derivatives as the slope of the tangent line to a function at a point.
4.   evaluate integrals by different methods of integrations.
5.   distinguish between linear, nonlinear, partial and ordinary differential equations and to solve by using different methods.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	-	-	-	-	1	1	1
CO2	3	-	-	-	-	-	1	1	1
CO3	3	-	-	-	-	-	1	1	1
CO4	3	1	-	-	-	-	1	1	1
CO5	3	2	-	-	-	-	1	1	1
Total	15	6	-	-	-	-	5	5	5
Average	1	1	1	-	1	-	1	-	1

Pr.1a. Communicative English Lab
(1st & 2nd sem Common)

Practical: 4 Periods per Week   Sessional : 50 Marks

Total Periods: 60 Periods   TOTAL MARKS : 50 Marks

Sl. No.	Topic	Periods
1	Listening Skill	10
2	Speaking Skill	20
3	Personality Development	10
4	Interpersonal Skills	10
5	Presenting in G D , Seminar and Conferences	10
	TOTAL	60

1. **LISTENING SKILL**
   - The student should be able to listen to a text read aloud in normal speed with focus on intonation
   - After listening the student can fill-in-blanks, choose a suitable title, make a summary, supply required information and be able to answer comprehension questions from the passage read aloud.

2. **SPEAKING SKILL**
   - Reading aloud of dialogues, texts, poems, speeches focusing on intonation.
   - Self-introduction
   - Role-plays on any two- situations
   - Telephonic conversation

3. **PERSONALITY DEVELOPMENT**
   - Initiation
   - Physical appearance
   - Audience purpose

4. **INTERPERSONAL SKILLS**
   Appropriate use of non-verbal skills in face-to-face communication
   [I.e. viva- voice, group-interviews, GDs and seminars]

5. **PRESENTING IN GD, SEMINARS AND CONFERENCES**
   - Leadership quality
   - Time management
   - Achieving the target

COURSE OUTCOMES:

After completion of this course the student will be able to
   1. create a communication model and understand the use of basic concepts of communication in an organized set-up and social context.
   2. apply rules of grammar and analyze levels of word meaning for errorless writing.
   3. remember and comprehend facts to develop flawless presentation skill.
   4. evaluate a feedback and appraise effective communication.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	1	1	1	3	3	1	1
CO2	1	1	1	1	1	3	3	1	1
CO3	1	1	1	1	1	3	3	1	1
CO4	1	2	1	1	1	3	3	1	1
Total	4	5	4	4	4	12	12	4	4
Average	1	1.25	1	1	1	3	3	1	1

Pr.1b. COMPUTER APPLICATION LAB
(1st & 2nd sem Common)

Practical: 4 Periods per Week   Sessional : 50 Marks

Total Periods: 60 Periods   TOTAL MARKS : 50 Marks

1. BASIC COMPUTER OPERATION [04]

Identification of different components of Computer Switch on and Booting Process Shut down, Restart of computer

2. PERSONAL COMPUTER SYSTEM [12]

Study of device and power supply form factor of Personal Computer System
Identification of various Mother Board components
Identification of different ports, type of connectors, and their purpose, Cooling System of Processor and Case
Identification and Study of ROM, RAM, Adapter Cards, Expansion Slots, SATA connectors
Study of Adapters and Converters

3. COMPUTER LAB SAFETY AND STUDY OF LAB TOOLS [06]

Study of various types of LAB Safety measures (General Safety, Electrical Safety, Fire safety), Analysis of various Power Fluctuation Types (Blackout, Brownout, Noise, Spike, Power surge), Power Protection Devices (Surge suppressor, UPS, Standby power supply) Procedures for proper disposal or recycling of hazardous computer components (Batteries, Monitors, Toner Kits, Cartridges, Chemical Solvents and Aerosol Cans)
Study of General Lab Tools (ESD tools, Hand tools, cable tools, Cleaning tools, Diagnostic tools), Disk Management Tools

4. OPERATINGSYSTEM [08]

Basic DOS commands (CLS, DIR, DATE, TIME, VERSION, MD, CD, RD, DEL, COPY, REN, USE OF WILD CARDS, PATH), Basic Windows OS operations, MOUSE OPERATIONS, Utilities and Accessories, Installation and configuration of OS

5. WORKING WITH MS-OFFICE [12]

Basic operations of Word Processing Package. (MS-Word), Basic operations of Electronic Spread Sheet Package. (MS-Excel), Basic operations of Presentation Package (MS- Power point) (Create, Edit, Format, Save, Print/View in the above three packages)

6. WORKING WITH INTERNET [06]

Getting acquainted with Internet connection, Browser, website
URL, webpage, http, WWW, net browsing
Creating E-Mail Id, sending and receiving E-mail Chatting

7. C PROGRAMMING [12]
1. Write a Program in C to find the greatest number among three numbers.
2. Write a Program in C to find the average of n numbers by using for loop.
3. Write a program in C to determine whether a number is prime or not?
4. Write a program in C to check whether a given number is palindrome or not?
5. Write a program in C to compute the sine series.
6. Write a program in C to accept row wise and column wise element in a two dimensional array and print them.

7. Write a program in C to find the vowels in a given string.
8. Write a program in C to find the factorial of a number, by using recursion.
9. Write a program in C to find the sum of Fibonacci series, by using function.
10. Write a program in C to accept a number from keyboard and print it in reverse order of entry, by using function.

COURSE OUTCOMES:

After completion of this course the student will be able to
1. identify I/O devices and demonstrate various file handling operations.
2. acquire the knowledge of lab safety and study of lab tools.
3. use operating system and internet to communicate with other users
4. apply the features of three most common office programs-WORD, EXCEL and POWER POINT.
5. solve problems by using 'C' language.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	1	2	1	-	2	2	2
CO2	2	2	-	2	1	-	2	1	2
CO3	2	1	1	2	1	-	2	1	2
CO4	2	2	-	1	1	2	2	1	1
CO5	2	2	-	2	1	2	2	1	2
Total	10	9	2	9	5	4	10	6	9
Average	2	1.8	1	1.8	1	2	2	1.2	1.8

Pr.2a. Engineering Physics Lab
(1st / 2nd sem Common)

Practical: 4 Periods per Week   Sessional : 50 Marks

Total Periods: 60 Periods   End Sem Exams: 50 Marks

Examination: 3 Hours   TOTAL MARKS : 50 Marks

(Any 10 Experiments)

1. To find the cross sectional area of a wire using a screw gauge.
2. To find the thickness and volume of a glass piece using a screw gauge.
3. To find volume of a solid cylinder using a Vernier Calipers.
4. To find volume of a hollow cylinder using a Vernier Calipers.
5. To determine the radius of curvature of convex surface using a Spherometer.
6. To determine the radius of curvature of concave surface using a Spherometer.
7. To find the time period of a simple pendulum and determine acceleration due to gravity.
8. To determine the angle of Prism.
9. To determine the angle of Minimum Deviation by I ~ D curve method.
10. To trace lines of force due to a bar magnet with North pole pointing North and locate the neutral points.
11. To trace lines of force due to a bar magnet with North pole pointing South and locate the neutral points.
12. To verify Ohm's Law by Ammeter – Voltmeter method.

COURSE OUTCOMES:

After completion of this course the student will be able to
1. understand the relationship between the working principles and practical measurements in Optics, mechanics, Electrical engineering, magneto static and simple harmonic motion.
2. apply the working principles of the given experiments and perform the experiments using required apparatus in Optics, mechanics, Electrical engineering, magneto static and simple harmonic motion.
3. analyze the experimental results through interpretation of graphical/ theoretical values demonstrate and document the same
4. analyze the laboratory activities to solve problems related to key concepts taught in the classroom

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	1	-	1	1	1
CO2	2	1	1	1	1	-	1	1	1
CO3	2	1	1	1	1	-	1	1	1
CO4	2	1	1	1	1	-	1	1	1
Total	8	4	4	4	4	-	4	4	4
Average	2	1	1	1	1	-	1	1	1

Pr.2b. Engineering Chemistry Lab
(1st / 2nd sem Common)

Practical: 4 Periods per Week   Sessional : 50 Marks

Total Periods: 60 Periods   End Sem Exams: 50 Marks

Examination: 3 Hours   TOTAL MARKS : 50 Marks

1. Preparation and study of physical and chemical properties CO2 gas.
2. Preparation and study of physical and chemical properties NH3 gas.
3. Crystallization of Copper sulphate from copper carbonate.
4. Simple acid-base titrations
    i)   Acidimetry
    ii)   Alkalimetry
5. Tests for acid radicals (Known):
    i)   Carbonate,
    ii)   Sulphide,
    iii) Chloride,
    iv)   Nitrate and
    v)   Sulphate.
6. Test for Basic radicals (Known):
    i)   Ammonium,
    ii)   Zinc,
    iii) Magnesium,
    iv)   Aluminium,
    v)   Calcium,
    vi)   Sodium and
    vii) potassium.
7. Test for unknown Acid radicals
8. Test for unknown basic radicals
9. Test for unknown salt (composed of one basic radical and one acid radical)

Recommended Books:

1. Practical Intermediate Chemistry By Dr. Bichitrananda Nanda
2. Elemental Experimental chemistry by Dr. Y R Sharma, A K Das, Kalyani Publisher

COURSE OUTCOMES:

After completion of this course the student will be able to
1. understand the fundamental principle of preparation of different gases, their properties, reactions and safe use in engineering fields.
2. express to prepare pure substances, crystals from other compounds.
3. develop the solutions for different acidic and basic solutions and determine their strengths through titration.
4. identify the different radicals present in a salt and also in a mixture and the properties of different radicals.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	2	2	-	2	1	1
CO2	3	-	-	2	2	-	2	1	1
CO3	3	-	-	2	1	-	2	1	1
CO4	3	-	-	2	1	-	2	1	1
Total	12	-	-	8	6	-	8	4	4
Average	3	-	-	2	1.5	-	2	1	1

Pr.3a. Engineering Drawing
(1st / 2nd sem Common)

Practical: 6 Periods per Week   Sessional : 50 Marks
Total Periods: 90 Periods   End Sem Exams: 100 Marks
Examination: 3 Hours   TOTAL MARKS : 150 Marks

Objective

After completion of the study of Engg. Drawing the student should be able to
1. Understand the importance of Engineering Drawing.
2. Demonstrate the use of different drawing instrument.
3. Make free hand lettering and numbering.
4. Practice of dimensioning of drawing.
5. Undertake different geometric constructions, projections of straight line, planes and solids.
6. Take up different orthographic projections.
7. Draw sectional views, development of surface of different solids.
8. Develop the concept of building drawing.
9. Prepare 2D engineering drawing using Auto CAD software.

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Introduction and Demonstration	03
2	Types of Lines, Lettering & Dimensioning	03
3	Scales	03
4	Curves	06
5	Orthographic Projections	21
6	Section and Developments	21
7	Isometric Projections	06
8	Building Drawing	12
9	Practices on Auto CAD	15
	TOTAL	90

(All drawings are to be made in First Angle Projection)

1. **INTRODUCTION & DEMONSTRATION**
   1.1. Identify various sizes of drawing boards, drawing sheets as pr BIS.
   1.2. List the types of pencils, instruments, and scales (RF).
   1.3. Demonstrate lying of drawing sheet, margin, standard layout and title block as per BIS, folding principle of drawings (blue prints, print outs etc).
2. **TYPES OF LINES, LETTERING & DIMENSIONING**
   2.1. Demonstrate and explain the use of various types of lines.
   2.2. Demonstrate the principle of single stroke, gothic lettering & numerals as per BIS.
3. **SCALES**
   3.1. Significance of scales in drawing; different scales.
   3.2. Define and draw plain sale and diagonal sale.
4. **CURVES**
   4.1. Explain Conic sections with illustration, Explain terms like focus, vertex, directrix and eccentricity.
   4.2. Draw conics sections by eccentricity method – Ellipse, Parabola and Hyperbola.
   4.3. Draw Ellipse by concentric circle method sand arc of cicle method.
   4.4. Draw parabola by Rectangle Method and Tangent Method.
5. **OTHOGRAPHIC PROJECTIONS**
   5.1. Demonstrate the principles of 1st angle and 3rd angle projections with the help of models and draw symbols.
   5.2. Draw projection of points.

5.3. Draw projection of straight line (parallel to both planes, parallel to one and perpendicular to other, parallel to one and inclined to other and inclined to both reference planes).

5.4. Draw plane figure such as squares, rectangles, triangles, circle, Pentagon and hexagon (perpendicular to one plane and inclined to other).

5.5. Draw projections of solids such as prism, cylinder, cone, tetrahedron and pyramid in simple position (with axis parallel to one reference plane and perpendicular to other reference plane).

6. SECTION & DEVELOPMENTS

6.1. Draw the sectional projection & development of prism, cylinder, cone and pyramid in simple position by a cutting plane perpendicular to one reference plane and inclined to other reference plane.

6.2. Draw true shape of the cutting sections.

7. ISOMETRIC PROJECTIONS

Draw isometric view & Isometric projection of prism, pyramid, cone & cylinder with axis horizontal and vertical with construction of isometric scales.

8. BUILDING DRAWING

8.1. Explain terms related to building drawing.

8.2. Draw plan, elevation of single room building with verandah (Flat roof according to given line plan and specification).

9. PRACTICES ON AUTO CAD

9.1. Introduction-Settings, Limits etc.

9.2. Auto CAD commands-
Draw commands (Line, circle, are polygon, ellipse, rectangle).
Edit command, Dimension commands and Modify Commands for two dimensional drafting only.

9.3. Exercise for practice using Auto CAD.
9.3.1. Orthographic projections of lines, planes sand solids as per chapter 5.0.
9.3.2. Isometric projection as per Chapter 7.0.

Books Recommended

1. Machine Drawing by Basudeb Bhattacharya, Oxford University Press.
2. A Text Book of Engineering Drawing by Dr. R.K. Dhawan.
3. A Text Book of Engineering Graphics & Auto CAD by K Venugopal.
4. A Text book of Engineering Drawing by N.D. Bhatt.
5. Engineering Drawing by P.S. Gill.
6. A Introduction to Auto CAD – 2012 by George Omura, Willey India Publishers.

COURSE OUTCOMES:

After completion of this course the student will be able to
1. adequate knowledge about engineering drawing and drawing instruments.
2. able to know different geometric construction, projection, sectional views and development of surfaces of different solid with proper dimensions
3. develop the concept of building drawing and 2D engineering drawing using the software AUTOCAD.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	1	-	-	-	-	-	2
CO2	1	1	1	-	-	-	-	-	1
CO3	1	1	1	-	-	-	-	-	1
CO4	1	1	1	-	-	-	-	-	2
Total	4	4	4	-	-	-	-	-	6
Average	1	1	1	-	-	-	-	-	1.5

Pr.3b. Workshop Practice

(1st / 2nd sem Common)

Practical: 6 Periods per Week   Sessional : 50 Marks
Total Periods: 90 Periods   End Sem Exams: 100 Marks
Examination: 3 Hours   TOTAL MARKS : 150 Marks

Objective:

1. To demonstrate safely practice in various shops of the workshop.
2. To select suitable tools & equipment in the following shops.
   (a) Fitting.
   (b) Sheet Metal.
   (c) Welding (Gas & Electrical).
   (d) Turning.
3. To select suitable materials for different process in the above shops.
4. To demonstrate the different processes adopted in the above shops.
5. To finish the jobs within stipulated time and with accuracy as per specifications.

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Fitting Shop	24
2	Sheet Metal	18
3	Welding Shop	24
4	Turning Shop	21
5	Exposure to CNC Milling / Lathe Machine	03
	TOTAL	90

1. FITTING SHOP

1.1. Demonstrate safety practices in the fitting shop.
1.2. Select suitable holding & clamping devices for fitting jobs.
1.3. Select suitable tools like- files, vice, chisels, punch, scriber, hammers, surface plate, V-block, try square, caliper etc.
1.4. Demonstrate the following operations:
   Sawing, Chipping, Fitting, Craping, Grinding, Marking, Reaming, Tapping, Drilling & Angular cutting.
1.5. Introduction of chipping, demonstration on chipping and its applications.
1.6. Description, demonstration and practice of simple operation of hack saw straight and angular cutting.
1.7. Introduction and use of measuring tools used in fitting shop like steel rule, measuring tape, outside micrometer, vernier caliper and vernier height gauge.
1.8. Description and Demonstration and practice of thread cutting using taps and dies.
   Job: Cutting & fitting practice on a square of 50mm X 50mm X 8mm MS Flat.
   Job: Angular cutting practice of 45 degree (on the above job).
   Job: Preparation of stud (to cut external threads) with the help of dies (mm or BSW).
   Job: H-fitting in the mild steel (ms) square.
   Job: Prepare one job on male female fitting.

2. SHEET METAL

2.1. Demonstrate safety practices in sheet metal shop.
2.2. Prepare surface development for the jobs according to the drawing.
2.3. Cut M.S and G.P. sheets according to the surface development / drawing using standard sheet metal cutting tools.
2.4. Select hand tools for sheet metal work.

2.5. Demonstrate the process of metal clamp joining and reveted joining of sheet metals.

Job: Making of sheet metal joints.

Job: Prepare a sheet metal tray or a funnel.

Job: Prepare a sheet metal job involving rolling, shearing, creasing, bending & cornering.

Job: Prepare a lap riveting joint.

3. **WELDING SHOP**

3.1. Introduction.

3.2. Safety precautions in welding, safety equipments & its application in welding shop.

3.3. Introduction to welding, type of welding, common materials that can be welded, introduction to gas welding equipment, types of flame, adjustment of flame, applications of gas welding, Welding tools & safety precautions.

3.4. Introduction to electric arc welding (AC & DC), practice in setting current & voltage for striking proper arc, precautions while using electric arc welding. Applications of arc welding. Introduction to polarity & their use.

3.5. Demonstrate & use of the different tools used in the welding shop with sketches, Hand shield, helmet, clipping hammer, gloves, welding lead, connectors, aprons, goggles, etc.

3.6. Demonstrate of welding defects & various types of joints & end preparation.

Job: Preparation of lap joint by arc welding rod.

Job: Preparation of Tee joint by arc welding.

Job: Preparation of single V or double V butt joint by electric arc welding.

Job: Brazing practice. Use of Spelt or (on MS sheet pieces).

Job: Gas welding practice on worn-out & broken parts.

4. **TURNING SHOP**

4.1. Introduction.

4.2. Safety precaution & safety equipments.

4.3. Various marking, measuring, cutting & holding tools.

4.4. Demonstration of different parts of a lathe, demonstration on centering & turning operation in a group of 06 students.

Job: plain turning, taper turning & grooving practices on round bar.

5. **EXPOSURE TO C.N.C MILLING / LATHE MACHINE**

Reference Books

1. Workshop Technology by S.K.Hajara Choudhray, Media Promoters Publishers, New Delhi.
2. Workshop Technology by B.S. Raghubanshi, Dhanpat Rai and Sons, New Delhi.
3. Workshop Technology by H.S. Bawa – TMH.
4. Workshop Familiarization by E Wilkinson.
5. Sheet metal shop practice by Bruce & Meyer.
6. Workshop Technology by R.S. Khurmi & J.K. Gupta, S.Chand.

Notes

1. Work, Progress book should be maintained continuously.
2. The roll numbers of the students must be punched on each job.
3. The turning shop job should be done by students' maximum 06 students in a group.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. demonstrate the safety practices in various shops of the workshop
2. identify suitable tools and equipment's in the following shops of Fitting, Sheet metal, Welding, Turing.
3. able to identify suitable raw materials used for different process in the shop.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	3	2	-	-	-	2
CO2	1	1	-	2	1	-	-	-	1
CO3	1	1	-	2	2	-	-	-	1
Total	3	2	-	7	5	-	-	-	4
Average	1	1	-	2.3	1.7	-	-	-	1.33

Pr.4 Seminar

(1st / 2nd sem Common)

Practical: 4 Periods per Week   Sessional : 50 Marks
Total Periods: 60 Periods   TOTAL MARKS : 50 Marks

The students shall present seminar on different topics on latest science and Technology in the entire class. There shall not be any grouping of students. The students shall present the seminar topic to the whole class/section. All other students should be allowed and encouraged to put questions to the presenter student, who shall answer the questions. A student has to present seminar on at least 2 topics in a semester. He/she has to submit seminar report for each topic separately, to the teacher concerned, which shall be preserved for verification by the authorities. The students should be encouraged to refer to the magazines, journals ,e-materials etc. for preparing for seminar topic. Attendance of all students other than the presenters should be ensured, so that seminar shall be more participative and knowledge of students shall improve by listening to many topics presented.

COURSE OUTCOMES:

After completion of this course the student will be able to
1. develop presentation skill in an organizes set of and appraise feedback on the contents of presentation in a constructive manner
2. gather information and knowledge on technological advances and present the aquired knowledge on technological advances present the acquired knowledge
3. explore knowledge and skill of sharing knowledge and meet professional and social relevance effectively

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	1	-	3	-	2
CO2	2	-	1	-	-	-	2	1	2
CO3	2	-	-	-	1	-	3	3	3
Total	6	-	1	-	2	-	8	4	7
Average	2	-	1	-	1	-	2.67	2	2.33

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR THIRD SEMESTER INFORMATION TECHNOLOGY (w.e.f. 2019-20)

DISCIPLINE: INFORMATION TECHNOLOGY — **SEMESTER: 3RD**

SL. NO.	SUBJECT CODE	SUBJECT	L	T	P	INTERNAL ASSESSMENT/ SESSIONAL	END SEM EXAM	EXAM (HOURS)	TOTAL
THEORY									
1	Th. 1	COMPUTER SYSTEM ARCHITECTURE	4	-	-	20	80	03	100
2	Th. 2	DATA STRUCTURE	4	-	-	20	80	03	100
3	Th. 3	DIGITAL ELECTRONICS	4	-	-	20	80	03	100
4	Th. 4	OBJECT ORIENTED METHODOLOGY	4	-	-	20	80	03	100
5	Th. 5	ENVIRONMENTAL STUDIES	4	-	-	20	80	03	100
		TOTAL	**20**	**-**	**-**	**100**	**400**	**-**	**500**
PRACTICAL / TERM WORK									
6	Pr. 1	DATA STRUCTURE LAB USING C	-	-	4	25	50	-	75
7	Pr. 2	DIGITAL ELECTRONICS LAB	-	-	4	25	50	-	75
8	Pr. 3	OBJECT ORIENTED PROGRAMMING USING JAVA	-	-	4	25	25	-	50
9	Pr. 4	OFFICE AUTOMATION LAB	-	-	4	25	25	-	50
10		STUDENT CENTERED ACTIVITIES(SCA)	-	-	3	-	-	-	
		TOTAL	**-**	**-**	**19**	**100**	**150**	**-**	**250**
		GRAND TOTAL	**20**	**-**	**19**	**200**	**550**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies etc. Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

Th-1 COMPUTER SYSTEM ARCHITECTURE

(COMMON TO CSE / IT)

Theory periods:	4P / week	**Internal Assessment:**	20
Total Period:	60	**End Semester Examination:**	80
Examination:	3 hrs	**Total marks:**	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	BASIC STRUCTURE OF COMPUTER HARDWARE	06
2	INSTRUCTIONS & INSTRUCTION SEQUENCING	07
3	PROCESSOR SYSTEM	10
4	MEMORY SYSTEM	10
5	INPUT – OUTPUT SYSTEM	10
6	I/O INTERFACE & BUS ARCHITECTURE	10
7	PARALLEL PROCESSING	07
	TOTAL	60

B. RATIONAL:

Now a days the usage of computer has become very essential in various areas like education, entertainment, business, sports etc. This subject will expose the learner to have an idea about the architecture of different components of a computer system and their operation procedure. Further the learner will have idea how the different components integrate to execute a task to get the result. It also gives an idea how to improve the processing capability.

1. Apply matrices in Engineering mechanics, electrical circuits and linear programming.

2. Transform Engineering problems to mathematical models with the help of differential equations andfamiliarize with the methods of solving by analytical methods, transform method, operator method and numerical methods.

3. Solve algebraic and transcendental equations by Iterative methods easily programmable in computers.

4. Analysis data and develop interpolating polynomials through method of differences.

C. OBJECTIVE:

After completion of this course the student will be able to:

- Understand the basic structure of a computer with instructions.
- Learn about machine instructions and program execution.
- Learn about the internal functional units of a processor and how they are interconnected.
- Understand how I/O transfer is performed.
- Learn about basic memory circuit, organization and secondary storage.
- Understand concept of parallel processing.

D. COURSE CONTENTS

1. Basic structure of computer hardware
1.1. Basic Structure of computer hardware
1.2. Functional Units
1.3. Computer components
1.4. Performance measures
1.5. Memory addressing & Operations

2. Instructions & instruction Sequencing

  2.1. Fundamentals to instructions

  2.2. Operands

  2.3. Op Codes

  2.4. Instruction formats

  2.5. Addressing Modes

3. Processor System

  3.1. Register Files

  3.2. Complete instruction execution

- Fetch
- Decode
- Execution

  3.3. Hardware control

  3.4. Micro program control

4. Memory System

  4.1. Memory characteristics

  4.2. Memory hierarchy

  4.3. RAM and ROM organization

  4.4. Interleaved Memory

  4.5. Cache memory

  4.6. Virtual memory

5. Input – Output System

  5.1. Input - Output Interface

  5.2. Modes of Data transfer

  5.3. Programmed I/O Transfer

  5.4. Interrupt driven I/O

  5.5. DMA

  5.6. I/O Processor

6. I/O Interface & Bus architecture

  6.1. Bus and System Bus

  6.2. Types of System Bus

- Data
- Address
- Control

  6.3. Bus Structure

  6.4. Basic Parameters of Bus design

  6.5. SCSI

  6.6. USB

7. Parallel Processing

  7.1. Parallel Processing

  7.2. Linear Pipeline

  7.3. Multiprocessor

  7.4. Flynn"s Classification

Book Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Moris Mano	Computer System Architecture	PHI
2	Er. Rajeev Chopra	Computer Architecture and Organisation	S.Chand
3	Parthasarthy, Senthil Kumar	Fundamentals of Computer Architecture	TMH

COURSE OUTCOMES:

After completion of this course the student will be able to
1. acquire the basic knowledge regarding structure of a computer and knowledge about machine instruction and program execution.
2. demonstrate the internal functional units of a processor and how they are interconnected.
3. analyze the functional units of a processor and how they are interconnected and how I/O transfer is performed.
4. illustrate the basic memory circuit, organization, secondary storage and concept of parallel processing.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	-	1	-	1	1	2
CO2	1	3	-	-	1	-	1	1	2
CO3	2	2	-	-	2	-	1	2	1
CO4	2	2	-	-	2	-	1	-	2
Total	8	8	1	-	6	-	4	4	7
Average	2	2	1	-	1.5	-	1	1.33	1.75

Th-2 DATA STRUCTURE

(COMMON TO CSE / IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION	04
2	STRING PROCESSING	03
3	ARRAYS	07
4	STACKS & QUEUES	08
5	LINKED LIST	08
6	TREE	08
7	GRAPHS	06
8	SORTING SEARCHING & MERGING	08
9	FILE ORGANIZATION	08
	TOTAL	60

B. RATIONAL:

The study of Data structure is an essential part of computer science. Data structure is a logical & mathematical model of storing & organizing data in a particular way in a computer. In system programming application programming the methods & techniques of data structures are widely used. The study of data structure helps the students in developing logic & structured programs.

C. OBJECTIVE:

After completion of this course the student will be able to:

- Understand the concepts of linear data structures, their operations and applications
- Understand the operation in abstract data type like Stack and Queue.
- Understand the concept of pointers and their operations in linked list.
- Know the concepts of non-linear data structures, their operations and applications in tree and graph.
- Understand the various sorting and searching techniques.
- Understand file storage and access techniques.

D. DETAIL CONTENT:

1. INTRODUCTION:
1.1. Explain Data, Information, data types
1.2. Define data structure & Explain different operations
1.3. Explain Abstract data types
1.4. Discuss Algorithm & its complexity
1.5. Explain Time, space tradeoff

2. STRING PROCESSING
2.1. Explain Basic Terminology, Storing Strings
2.2. State Character Data Type,
2.3. Discuss String Operations

3. **ARRAYS**
   3.1. Give Introduction about array,
   3.2. Discuss Linear arrays, representation of linear array In memory
   3.3. Explain traversing linear arrays, inserting & deleting elements
   3.4. Discuss multidimensional arrays, representation of two dimensional arrays in   memory   (row major order & column major order), and pointers
   3.5. Explain sparse matrices.

4. **STACKS & QUEUES**
   4.1. Give fundamental idea about Stacks and queues
   4.2. Explain array representation of Stack
   4.3. Explain arithmetic expression ,polish notation & Conversion
   4.4. Discuss application of stack, recursion
   4.5. Discuss queues, circular queue, priority queues.

5. **LINKED LIST**
   5.1. Give Introduction about linked list
   5.2. Explain representation of linked list in memory
   5.3. Discuss traversing a linked list, searching,
   5.4. Discuss garbage collection.
   5.5. Explain Insertion into a linked list, Deletion from a linked list, header linked list

6. **TREE**
   6.1. Explain Basic terminology of Tree
   6.2. Discuss Binary tree, its representation and traversal, binary search tree, searching,
   6.3. Explain insertion & deletion in a binary search trees

7. **GRAPHS**
   7.1. Explain graph terminology & its representation,
   7.2. Explain Adjacency Matrix, Path Matrix

8. **SORTING SEARCHING & MERGING**
   8.1. Discuss Algorithms for Bubble sort, Quick sort,
   8.2. Merging
   8.3. Linear searching, Binary searching.

9. **FILE ORGANIZATION**
   9.1. Discuss Different types of files organization and their access method,
   9.2. Introduction to Hashing, Hash function, collision resolution, open addressing.

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Book Recommended:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	S. Lipschutz	Data Structure	Schaum Series
2	A.N.Kamthane	Introduction to Data Structure in C	Pearson Education
3	Reema Thereja	Data Strcture using C	Oxford University Press

COURSE OUTCOMES:

After completion of this course the student will be able to
   1. analyse different data structure such as string, array, linked list, stack and queue.
   2. apply algorithms for solving problems like inserting, deleting, traversing, searching and sorting
   3. solve problems involving nonlinear data structure Tree, Graphs and Files.

4. compare different file organisation and select hashing function to resolve collision.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	1	-	-	-	-	3	-
CO2	3	2	3	2	-	-	-	3	1
CO3	3	2	3	1	2	-	2	3	1
CO4	3	3	3	3	1	-	1	3	1
Total	3	3	3	3	-	-	1	2	-
Average	15	13	13	9	3	-	4	14	3

Th.3 - DIGITAL ELECTRONICS
(Common to ETC, AE&I, CSE, IT, EIC, Mechatronics)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Chapter wise Distribution of periods with Total periods

Sl. No.	Topic	Periods
1	Basics of Digital Electronics	12
2	Combinational logic circuits	12
3	Sequential logic circuits	12
4	Registers, Memories & PLD	08
5	A/D and D/A Converters	07
6	Logic Families	09
	TOTAL	60

Rationale:

Today term digital has become a part of our everyday life. The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer products, such as automated industrial machinery, computers, microprocessors, pocket calculators, digital watches, microcontrollers, Digital life support machines, real time systems and clocks, TV games, etc. which are based on the principles of digital electronics. The areas of applications of digital electronics have been increasing every day. In fact, digital systems have invaded all walks of life. This subject will very much helpful for student to understand clearly about the developmental concept of digital devices.

Objective:

After completion of this course the student will be able to:

1. Explain Binary, Octal, Hexadecimal number systems and compare with decimal system.
2. Perform binary addition, subtraction, Multiplication and Division.
3. Write 1"s complement and 2"s complement numbers for a given binary number & Perform subtraction
4. Compare weighted and Un-weighted codes and its applications
5. State Boolean expressions for the given statement of the problem
6. State De-Morgan"s theorems &Apply De Morgan"s theorems and other postulates to simple Boolean expressions.
7. Use Karnaugh Map to simplify Boolean Expression (upto3 variables only).
8. Implement of Logic Gates, i.e. AND, OR, NOT operators with truth table.
9. Working of combinational logic circuits, function of the Half-adder, full-adder.
10. Explain 2"scomplimentparalleladder/subtractor circuit.
11. Working of Serial & parallel adder with block diagram/circuit diagram
12. Explain the Operation of 4x1 Multiplexer & 1x4 De-Multiplexer, Decoders, Encoder, comparator.
13. Understanding the working of Sequential Logic circuits
14. Construct SR, JK, D, T, Master Slave Flip Flop.
15. Counters and different types and operations
16. Explain the working of Registers and memories & PLD
17. Explain various types of memories, Differentiate between ROM and RAM
18. Working of A/D and D/A converters & Necessity of A/D and D/A converters.
19. Explain Various logic families and Characteristics of Digital ICs

1. **Unit-1: Basics of Digital Electronics**
   1.1.   Number System-Binary, Octal, Decimal, Hexadecimal - Conversion from one system to another

number system.

1.2. Arithmetic Operation-Addition, Subtraction, Multiplication, Division, 1's & 2's complement of Binary numbers& Subtraction using complements method

1.3. Digital Code & its application & distinguish between weighted & non-weight Code, Binary codes, excess-3 and Gray codes.

1.4. Logic gates: AND,OR,NOT,NAND,NOR, Exclusive-OR, Exclusive-NOR--Symbol, Function, expression, truth table & timing diagram

1.5. Universal Gates& its Realisation

1.6. Boolean algebra, Boolean expressions, Demorgan's Theorems.

1.7. Represent Logic Expression: SOP & POS forms

1.8. Karnaugh map (3 & 4 Variables)&Minimization of logical expressions ,don't care conditions

2. Unit-2: Combinational Logic Circuits

2.1. Half adder, Full adder, Half Subtractor, Full Subtractor, Serial and Parallel Binary 4 bit adder.

2.2. Multiplexer (4:1), De- multiplexer (1:4), Decoder, Encoder, Digital comparator (3 Bit)

2.3. Seven segment Decoder

(Definition, relevance, gate level of circuit Logic circuit, truth table, Applications of above)

3. Unit-3: Sequential logic Circuits

3.1. Principle of flip-flops operation, its Types,

3.2. SR Flip Flop using NAND,NOR Latch (un clocked)

3.3. Clocked SR,D,JK,T,JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications

3.4. Concept of Racing and how it can be avoided.

4. Unit-4: Registers, Memories & PLD

4.1. Shift Registers-Serial in Serial -out, Serial- in Parallel-out, Parallel in serial out and Parallel in parallel out

4.2. Universal shift registers-Applications.

4.3. Types of Counter & applications

4.4. Binary counter, Asynchronous ripple counter (UP & DOWN), Decade counter. Synchronous counter, Ring Counter.

4.5. Concept of memories-RAM, ROM, static RAM, dynamic RAM,PS RAM

4.6. Basic concept of PLD & applications

5. Unit-5: A/D and D/A Converters

5.1. Necessity of A/D and D/A converters.

5.2. D/A conversion using weighted resistors methods.

5.3. D/A conversion using R-2R ladder (Weighted resistors) network.

5.4. A/D conversion using counter method.

5.5. A/D conversion using Successive approximate method

6. Unit-6: LOGIC FAMILIES

6.1. Various logic families &categories according to the IC fabrication process

6.2. Characteristics of Digital ICs- Propagation Delay, fan-out, fan-in, Power Dissipation ,Noise Margin ,Power Supply requirement &Speed with Reference to logic families.

6.3. Features, circuit operation &various applications of TTL(NAND), CMOS (NAND & NOR)

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3

Learning Resources: [Text Books]

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	RP JAIN	Modern Digital Electronics	TMH
2	Ananda Kumar	Fundamental of Digital Electronics	PHI Publication
3	P.RAJA	Digital Electronics	SCITECH Publication
4	S.Salivahanan ,S.Arivazhagan	Digital Circuits Design	VIKAS Pub House
5	M. Morris Mano	Digital Logic and Computer Design	MGH
6	Dr. R. S. Sedha	Digital Electronics	S. chand

COURSE OUTCOMES:

After completion of this course the student will be able to
1. Identify various number system, binary code and minimization technique to simplify Boolean expression.
2. Distinguish between combinational and sequential circuit. Design of various combinational and sequential circuits
3. Design Register and Counter circuits by using sequential circuit.
4. Compare A/D and D/A and classify various converter circuit.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	1	-	-	1	-	1
CO2	-	2	2	2	-	-	1	-	1
CO3	2	-	3	1	-	-	1	1	1
CO4	-	2	-	2	-	-	1	1	1
Total	5	4	5	6	-	-	4	2	4
Average	2.5	2	2.5	1.5	-	-	1	1	1

Th-4 OBJECT ORIENTED METHODOLOGY

Common to (CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	PRINCIPLES OF OBJECT ORIENTED PROGRAMMING	05
2	INTRODUCTION TO JAVA	10
3	OBJECTS AND CLASSES	08
4	USING JAVA OBJECTS	06
5	INHERITANCE	08
6	POLYMORPHISM	08
7	JAVA FILES AND I/O	06
8	PACKAGES: PUTTING CLASSES TOGETHER	05
9	EXCEPTION HANDLING	04
	TOTAL	60

RATIONALE: Object-oriented programming is an approach to handle the increasing complexities of the programs, program organization and development by incorporating the structured programming features with several new concepts. It helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. Java is a simple, reliable, portable and powerful object-oriented programming language, which enables a programmer to write programs to produce the solution to live problems. By undergoing this course, the students will be able to understand the principles of object oriented programming, with programs in Java and use them to make implemented.

OBJECTIVE:

After completion of this course the student will be able to:

- Understand the concepts of OOPs, their advantages and applications
- Comprehend the features of Java
- Know to create classes, objects, methods
- Know the concepts and advantages of overloading methods and type conversions
- Appreciate the concepts of inheritance and the various types of inheritance.
- Understand the use of Interfaces and system packages
- Use the various operations of files to perform file operations
- Understand the concept of managing errors and exceptions

1. OBJECT ORIENTED PROGRAMMING (OOPS) CONCEPTS   05
   1.1.   Programming Languages
   1.2.   Object Oriented Programming
   1.3.   OOPS concepts and terminology
   1.4.   Benefit of OOPS
   1.5.   Application of OOPS

2. INTRODUCTION TO JAVA   10
   2.1.   What is Java ?

7.2. Java API Packages

7.3. Using System Packages

7.4. Naming Convention

7.5. Creating Packages

7.6. Accessing a Package

7.7. Using a Package

7.8. Adding a Class to Package

7.9. Hiding Classes

7.10. Static Import

8. JAVA FILES AND I/O   05
8.1. What is a stream ?

8.2. Reading and writing to files(only txt files

8.3. Input and Output Stream

8.4. Manipulating Input data

8.5. Opening and Closing Streams

8.6. Predefined streams

8.7. File handling Classes and Methods

9. EXCEPTION HANDLING   06
9.1. Exceptions Overview

9.2. Exception Keywords

9.3. Catching Exceptions

9.4. Using Finally Statement

9.5. Exception Methods

9.6. Declaring Exceptions

9.7. Defining and throwing exceptions

9.8. Errors and Runtime Exceptions

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Learning Resources: [Text Books]

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	E. Balagurusami	Programming With Java A Primer	The McGraw-Hill Companies
2	Patric Naughton	JavaTM 2: The Complete Reference	Tata McGraw-Hill Publishing Company Limited
3	Rashmi Kanta Das	Core Java For Beginners	Vikas Publishing
4	Herbert Schildt	Java: A Beginner's Guide	McGraw-Hill Education
5	Cay S. Horstmann	Core Java Volume I - Fundamentals	Prentice Hall

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the object oriented methodologies, differentiate between POP and OOP
2. apply the knowledge of programming in JAVA
3. organizing effectively to re-use the existing components of a software product and facilitate the sharing of its components by other systems.
4. apply an object-oriented approach to software development.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	-	1	-	1	2	2	1
CO2	3	2	3	2	-	-	2	2	1
CO3	3	2	1	-	-	1	2	2	-
CO4	3	2	3	1	-	1	2	2	1
Total	12	8	7	4	-	3	8	8	3
Average	3	2	2.33	1.33	-	1	2	2	1

Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. RATIONALE

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every student in order to take care of the environmental aspect in each and every activity in the best possible manner.

B. OBJECTIVE:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

C. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	The Multidisciplinary nature of environmental studies	04
2	Natural Resources	10
3	Systems	08
4	Biodiversity and it"s Conservation	08
5	Environmental Pollution	12
6	Social issues and the Environment	10
7	Human population and the environment	08
	TOTAL	60

D. COURSE CONTENT

1. The Multidisciplinary nature of environmental studies:
   1.1. Definition, scope and importance.
   1.2. Need for public awareness.

2. Natural Resources: Renewable and non-renewable resources:
   2.1. atural resources and associated problems.
   a) Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
   b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam"s benefits and problems.
   c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.

    d) Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .

    e) Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

    f) Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

2.2. Role of individual in conservation of natural resources.

2.3. Equitable use of resources for sustainable life styles.

3. Systems:

3.1. Concept of an eco-system.

3.2. Structure and function of an eco-system.

3.3. Producers, consumers, decomposers.

3.4. Energy flow in the eco systems.

3.5. Ecological succession.

3.6. Food chains, food webs and ecological pyramids.

3.7. Introduction, types, characteristic features, structure and function of the following eco system:

3.8. Forest ecosystem:

3.9. Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

4. Biodiversity and it's Conservation:

4.1. Introduction-Definition: genetics, species and ecosystem diversity.

4.2. Biogeographically classification of India.

4.3. Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.

4.4. Biodiversity at global, national and local level.

4.5. Threats to biodiversity:Habitats loss, poaching of wild life, man wildlife conflicts.

5. Environmental Pollution:

5.1. Definition Causes, effects and control measures of:

    a) Air pollution.

    b) Water pollution.

    c) Soil pollution

    d) Marine pollution

    e) Noise pollution.

    f) Thermal pollution

    g) Nuclear hazards.

5.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

5.3. Role of an individual in prevention of pollution.

5.4. Disaster management: Floods, earth quake, cyclone and landslides.

6. Social issues and the Environment:

6.1. Form unsustainable to sustainable development.

6.2. Urban problems related to energy.

6.3. Water conservation, rain water harvesting, water shed management.

6.4. Resettlement and rehabilitation of people; its problems and concern.

6.5. Environmental ethics: issue and possible solutions.

6.6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.

6.7. Air (prevention and control of pollution) Act.

6.8. Water (prevention and control of pollution) Act.

6.9. Public awareness.

7. Human population and the environment:

7.1. Population growth and variation among nations.

7.2. Population explosion- family welfare program.

7.3. Environment and human health.

7.4. Human rights.

7.5. Value education

7.6. Role of information technology in environment and human health.

Syllabus coverage up to Internal assessment

Chapters: 1, 2 and 3.

Learning Resources:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Erach Bharucha	Textbook of Environmental studies	#UGC
2	D.D. Mishra	Fundamental concepts in Environmental Studies	S.Chand & Co-Ltd
3	K.Raghavan Nambiar	Text book of Environmental Studies	SCITECH Publication Pvt. Ltd.
4	V.M.Domkundwar	Environmental Engineering	Dhanpat Rai & Co

COURSE OUTCOMES:

After completion of this course the student will be able to

1. gain knowledge of environmental issues and awareness towards the environment.
2. classify different types of natural resources and describe the structures, functions values of various ecosystems.
3. undersatnd the cause,and eeffects and control measures of various types of pollutions.
4. develop awareness & responsibilities among the students towards the waste management and preservation of environment .

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	-	-	2	-	3	-	1
CO2	3	2	-	-	2	-	3	-	1
CO3	3	3	1	1	3	-	3	-	2
CO4	3	2	1	2	3	-	3	-	2
Total	12	9	2	3	10	-	12	-	6
Average	3	2.25	1	1.5	2.5	-	3	-	1.5

PR-1 DATA STRUCTURE LAB USING C

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	End Semester Examination:	50 Marks

LIST OF PRACTICALS:-

1. Implementation of 1D & 2D Array
2. Implementation of Stack
3. Pointer and it's application.
4. Structure & Union
5. Implementation of insertion & deletion in Stack
6. Implementation of insertion & deletion in Queue
7. Implementation of insertion & deletion in Linked list
8. Implementation of Bubble sort
9. Implementation of Quick sort
10. Implementation of Binary tree traversal
11. Implementation of Linear search
12. Implementation of Binary search

Learning Resources:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	T. R. Jagadesh	Computer lab referral for diploma students	Unv. S. Press
2	Gilburg, Forouzen	Data Structure A pseudocode approach with C	Cengage Learning
3	Reema Thareja	Data Structure using C	Oxford
4	Susanta Ku.Rout	Tips and Triks on Data Structure	Vikas

COURSE OUTCOMES:

After completion of this course the student will be able to

1. knowledge of basic data structures and algorithms.
2. understand concepts of searching and sorting techniques
3. develop and understand concepts of stacks, queues, lists, trees.
4. able to write algorithms for solving problems with the help of fundamental data structure using 'C'

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	-	-	-	-	1	2	-
CO2	1	1	-	-	-	-	1	2	-
CO3	1	1	-	-	-	-	1	2	-
CO4	1	2	-	-	-	-	2	2	1
Total	4	5	-	-	-	-	5	8	1
Average	1	1.25	-	-	-	-	1.25	2	1

PR-2 DIGITAL ELECTRONICS LAB

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	End Semester Examination:	50 Marks

A. Rationale:

The Digital Electronics Laboratory can play a vital role in wide Varity applications in the field of microprocessor, microcontrollers & household appliances, among others. It is the inter connection among the digital components and modules. Various digital ICs are discussed. This lab includes combinational logic & sequential logic circuits and its implementations.

B. Objective:

After completion of this course the student will be able to:
1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs
2. Verify truth tables of Digital gates
3. Implement various gates by using universal properties
4. Implement Half adder, Full adder, Half subtractor and Full subtractor using logic gates.
5. Know about Flip Flop,Counters,Registers
6. Study Multiplexer and Demultiplexer.
7. Study 8-bit D/A and A/D conversion.
8. Study display devices, LED, LCD, 7-segment displays.

C. List of Practicals
1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs IE 7400, 7402, 7404,7408, 7432 & 7486.(draw their pin diagram and features)
2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates & simplifications of Boolean gates
3. Implement various gates by using universal properties of NAND & NOR gates verify and truth table tabulate data.
4. Construct & verify operation of Half adder and Full adder using logic gates.
5. Construct & verify operation of Half subtractor and Full subtractor using logic gates.
6. Design &Implement a 4-bit Binary to Gray code converter.
7. Design & Implement a Single bit/ two bit digital comparator circuit
8. Design Multiplexer (4:1) and De-multiplexer (1:4).
9. Study the operation of flip-flops (i)S-R flip flop (ii) J-K flip flop (iii) D flip flop (iv) T flip flop
10. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.
11. Study shift registers.
12. verify the operation 8-bit D /A and A/ D conversion & test its performance
13. Study display devices LED, LCD, 7-segment displays.
14. Mini Project : To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report throughout and submit at the end of the semester. To assemble and tests circuits using above digital ICs with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999/Solar cell & Opto coupler applications.
(All the above experiments are to be conducted by through study of ICs)

15. Digital Works 3.04/ higher version is a graphical design tool that enables you to construct digital logic circuits and to analyse their behaviour through real time simulation. Its intuitive, easy to use interface makes it the ideal choice for learning or teaching digital electronics

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand digital trainer kit and various digital ICs.
2. Realization of various gates.
3. Design various combinational circuits.
4. Learn the operation of sequential circuits.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	2	2	-	-	1	-	2
CO2	3	1	1	1	-	-	1	-	1
CO3	3	2	2	2	-	-	1	-	2
CO4	3	2	2	2	-	-	1	-	2
Total	12	6	7	7	-	-	4	-	7
Average	3	1.5	1.8	1.8	-	-	1.0	-	1.8

PR-3 OBJECT ORIENTED PROGRAMMING USING JAVA

Total Period:	60	**Maximum marks:**	50 Marks
Lab periods:	4P / week	**Term Work/ Sessional:**	25 Marks
Examination:	3 Hours	**End Semester Examination:**	25 Marks

List of Practicals:-

1. Write a Java program to print 'Hello' on screen and then print your name on a separate line.
2. Write a Java program to print the sum of two numbers.
3. Write a Java program that takes a number as input and prints its multiplication table upto 10.
4. Write a Java program to print the area and perimeter of a rectangle.
5. Write a Java program to swap two variables.
6. Write a Java program to convert a decimal number to binary number.
7. Write a Java program to compare two numbers.
8. Write a Java program and compute the sum of the digits of an integer.
9. Write a Java program to count the letters, spaces, numbers and other characters of an input string.
10. Write a Java program to reverse a string.
11. Write a Java program to accept a number and check the number is even or not. Prints 1 if the number is even or 0 if the number is odd.
12. Write a Java program that accepts two integer values from the user and return the larger values. However if the two values are the same, return 0 and return the smaller value if the two values have the same remainder when divided by 6.
13. Write a Java program to get the larger value between first and last element of an array (length 3) of integers .
14. Design a class to represent a bank account. Include the following members :
    Data members:
    *   Name of the depositor
    *   Account Number
    *   Type of account
    *   Balance amount in the account
    Methods:
    *   To assign initial values
    *   To deposit an amount
    *   To withdraw an amount
    *   To display the name and balance
15. Given are two one-dimensional arrays, A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item from arrays A and B, in ascending order.
16. Write a java program implementing multiple inheritance.
17. Write a java program implementing package.
18. Write a java program to read a file line by line and print the line on the output screen.
19. Write a java program to read content from one file and write it into another file.
20. Define an exception called "No Match Exception" that is thrown when a string is not equal to "India". Write a program that uses this exception.
21. Develop a java project for percentage calculator/temperature conversion tool.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	E. Balagurusami	Programming With Java: A Primer	The McGraw-Hill Companies
2	Patric Naughton, Herbert Schildt	JavaTM 2: The Complete Reference	Tata McGraw-Hill Publishing Company Limited
3	Rashmi Kanta Das	Core Java For Beginners	Vikas Publishing
4	Herbert Schildt	Java: A Beginner's Guide	McGraw-Hill Education
5	Cay S. Horstmann	Core Java Volume I - Fundamentals	Prentice Hall

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Express the basic concept of JAVA
2. Write to execute JAVA programs
3. Develop small projects using JAVA

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	1	-	2	2	2	2
CO2	3	2	2	1	-	2	2	2	2
CO3	3	2	2	1	-	2	2	2	2
Total	9	6	6	3	-	6	6	6	6
Average	3	2	2	1	-	2	2	2	2

Pr.4- OFFICE AUTOMATION LAB

Total Period:	60	Maximum marks:	50 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	End Semester Examination:	25 Marks

List of Assignments (MS Word)

1. Create a news-paper document with at least 200 words,
    a. Use margins as, top:1.5, bottom:2, left:2, right:1 inches.
    b. Use heading "Gandhi Jayanti", font size: 16, font color: red, font face: Arial Black.
    c. With first letter "dropped" (use drop cap option) of the first paragraph containing a picture at the right side
    d. Use three columns from the second paragraph onwards till the half of the page.
    e. Then use heading "Computer basics"
    f. Create paragraph using two columns till the end of the page.
2. Create a Mathematical question paper using, at least five equations
    a. With fractions, exponents, summation function
    b. With at least one „m*n" matrix
    c. Basic mathematical and geometric operators.
    d. Use proper text formatting, page color and page border.
3. Create a flowchart using,
    a. Proper shapes like ellipse, arrows, rectangle, and parallelogram.
    b. Use grouping to group all the parts of the flowchart into one single object.
4. Create a table using table menu with,
    a. At least 5 columns and 10 rows.
    b. Merge the first row into one cell.
    c. Merge the second row into one cell, then split the second row into three cells.
    d. Use proper table border and color.
    e. Insert proper content into the table with proper text formatting.
5. Create a table using two columns,
    a. The left column contains all the short-cut keys and right side column contains the function of the short-cut keys.
    b. Insert a left column using layout option. Name the heading as Serial No.
6. Create two letters with the following conditions in Ms Word and find the difference.
    a. Write a personal letter to your friend using at least 100 words and two paragraphs. The date must be in top-right corner. Use „justify" text-alignment and 1.5 line spacing for the body of the letter. Letter must contain proper salutation and closing.
    b. Use step by step mail-merge wizard to design a letter. (Mailing → step by step mail merge wizard→letters→start from a template→select template→ letters→select proper template→ create new document→OK)
7. Create a letter, which must be sent to multiple recipients.
    a. Use Mail-Merge to create the recipient list.q
    b. Use excel sheet to enter the recipient.
    c. Start the mail merge using letter and directory format. State the difference.

List of Assignments (MS Excel)

1. Create a table "Student result" with following conditions.
   a. The heading must contain, Sl. No., Name, Mark1, Mark2, Mark3, Total, average and result with manual entry.
   b. Use formulas for total and average.
   c. Find the name of the students who has secured the highest and lowest marks.
   d. Round the average to the nearest highest integer and lowest integer (use ceiling and floor function respectively).

2. Do as directed
   a. Create a notepad file as per the following fields
      Slno   name   th1   th2   th3   th4   th5   total   % grade
   b. Import this notepad file into excel sheet using „data⎕from text" option.
   c. Grade is calculated as,
      i. If %>=90, then grade A
      ii. If %>=80 and <90, then grade B
      iii. If %>=70 and <80, then grade C
      iv. If %>=60 and <70, then grade D
      v. If %<60, then grade F

3. Create a sales table using the following data,

Item	Year1	Year2	Year3	Year4
Item1	1000	1050	1100	1200
Item2	950	1050	1150	1200
Item3	1100	1200	1200	1300

   a. Draw the bar-graph to compare the sales of the three items for four years using insert option.
   b. Draw a line-graph to compare the sales of three items for four years using insert option.
   c. Draw different pie-charts for the given data using insert option.
   d. Use condition, to highlight all the cells having value >=1000 with red color (use conditional formatting).

List of Assignments (MS PowerPoint)

1. Create a power-point presentation with minimum 5 slides.
   a. The first slide must contain the topic of the presentation and name of the presentation.
   b. Must contain at least one table.
   c. Must contain at least 5 bullets, 5 numbers.
   d. The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue.
   e. The body must be, font size: 24, font-face: Comic Sans MS, font-color: green.
   f. Last slide must contain „thank you".

2. Create a power-point presentation with minimum 10 slides
   a. Use word art to write the heading for each slides.
   b. Insert at least one clip-art, one picture
   c. Insert at least one audio and one video
   d. Hide at least two slides

3. Create a power-point presentation with minimum 5 slides

a. Use custom animation option to animate the text; the text must move left to right one line at a time.
b. Use proper transition for the slides.

List of Assignments (MS Access)

1. Create a database "Student" with,
   a. At least one table named "mark sheet" with field name "student name, roll number, mark1, mark2, mark3, mark4, total"
   b. The data types are, student name: text, roll number: number, mark1 to mark4: number, total: number. Roll number must be the primary key.
   c. Enter data in the table. The total must be calculated using update query.
   d. Use query for sorting the table according to the descending/ascending order of the total marks.
2. With addition to the table above,
   a. Add an additional field "result" to the "mark sheet" table.
   b. Enter data for at least 10 students
   c. Calculate the result for all the students using update queries, if total>=200, then pass, else fail.
   d. Search the students, whose name starts with "sh".
   e. Show the names and total marks of the students who have passed the examination.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Vikas Gupta	Comdex 14-1in-1 Computer course Kit	Dream Tech
2	Bittu Kumar	Master in Ms-Office	

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the basic features of MS-Word and create documents
2. apply the various features and implementation in creating a spreadsheets
3. design the MS-PowerPoint presentation by using various types of features
4. lean MS-ACCESS using access database wizard apply to generate database

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	1	2	2	-	2	1	2
CO2	2	2	-	2	2	-	2	1	2
CO3	2	1	1	2	2	-	2	1	2
CO4	2	2	-	1	1	-	2	1	1
Total	8	7	2	7	7	-	8	4	7
Average	2	1.75	2	1.75	1.75	-	2	1	1.75

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR FOURTH SEMESTER INFORMATION TECHNOLOGY (w.e.f. 2019-20)

DISCIPLINE: INFORMATION TECHNOLOGY						SEMESTER: 4TH			
SL. NO.	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME			
			L	T	P	INTERNAL ASSESSMENT/ SESSIONAL	END SEM EXAM	EXAM (HOURS)	TOTAL
THEORY									
1	Th. 1	OPERATING SYSTEM	4	-	-	20	80	03	100
2	Th. 2	DATA COMMUNICATION AND COMPUTER NETWORK	4	-	-	20	80	03	100
3	Th. 3	MICROPROCESSOR & MICROCONTROLLER	5	-	-	20	80	03	100
4	Th. 4	DATABASE MANAGEMENT SYSTEM	4	-	-	20	80	03	100
		TOTAL	**17**	**-**	**-**	**80**	**320**	**-**	**400**
PRACTICAL / TERM WORK									
5	Pr. 1	OPERATING SYSTEM LAB	-	-	3	25	25	03	50
6	Pr. 2	NETWORKING LAB	-	-	6	50	50	03	100
7	Pr. 3	MICROPROCESSOR MICROCONTROLLER LAB	-	-	4	25	25	03	50
8	Pr. 4	DATABASE MANAGEMENT SYSTEM LAB	-	-	4	50	50	03	100
9	Pr. 5	TECHNICAL SEMINAR	-	-	2	50	-	-	50
10		STUDENT CENTERED ACTIVITIES(SCA)	-	-	3	-	-	-	
		TOTAL	**-**	**-**	**19**	**200**	**150**	**-**	**350**
		GRAND TOTAL	**20**	**-**	**19**	**280**	**470**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies etc. Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

Th.1-OPERATING SYSTEM

COMMON TO (CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION	03
2	PROCESS MANAGEMENT	10
3	MEMORY MANAGEMENT	10
4	DEVICE MANAGEMENT	10
5	DEAD LOCKS	10
6	FILE MANAGEMENT	10
7	SYSTEM PROGRAMMING	07
	TOTAL	60

B. Rationale

The course provides the students with an understanding of Human computer interface existing in computer system and the basic concepts of Operating System and its working. The students will gather knowledge about efficient utilization of the resources to obtain optimization processing.

C. Objective:

After completion of this course the student will be able to:

- Understand the concept and function of operating system.
- Understand notion of a process and all computation.
- To introduce the critical – section problem whose solutions can be used to ensure the consistency of the shared data.
- Understand the concept of deadlock, its avoidance prevention and recovery.
- To provide a detailed description of various memory management techniques.
- To describe the benefits of a virtual memory system.
- To explain the function of file system.
- To describe the details of implementing local file systems and directory structures.
- Understand the brief idea of Systems Programming.

D. DETAIL CONTENTS:

1. INTRODUCTION   03
   1.1. Objectives and Explain functions of operating system.
   1.2. Evolution of Operating system
   1.3. Structure of operating system.

2. PROCESS MANAGEMENT   08
   2.1. Process concept, process control, interacting processes, inter process messages.
   2.2. Implementation issues of Processes.
   2.3. Process scheduling, job scheduling.
   2.4. Process synchronization, semaphore.
   2.5. Principle of concurrency, types of scheduling .

3. MEMORY MANAGEMENT   08

3.1. 3.1 Memory allocation Techniques

- Contiguous memory allocation

- non contiguous memory allocation

3.2. Swapping

3.3. Paging, Segmentation, virtual memory using paging,

3.4. Demand paging, page fault handling.

4. DEVICE MANAGEMENT   05

4.1. Techniques for Device Management

- Dedicated,

- shared and

- virtual.

4.2. Device allocation considerations I/O traffic control & I/O Schedule, I/O Device handlers.

4.3. SPOOLING.

5. DEAD LOCKS   08

5.1. Concept of deadlock.

5.2. System Model

5.3. Dead Lock Detection

5.4. Resources allocation Graph

5.5. Methods of Deadlock handling

5.6. Recovery &Prevention, Explain Bankers Algorithm & Safety Algorithm

6. FILE MANAGEMENT   07

6.1. File organization, Directory & file structure, sharing of files

6.2. File access methods, file systems, reliability

6.3. Allocation of disk space

6.4. File protection, secondary storage management.

7. SYSTEM PROGRAMMING   21

7.1. Concept of system programming and show difference from Application program.

7.2. Complier: functions of compiler.

7.3. Compare compiler and interpreter.

7.4. Seven phases of compiler, brief description of each phase.

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Books recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Donavan	Operating System	TMH
2	Silverschz & Galvin	Operating Systems	PHI
3	Er.Rajiv Chopra	Operating Systems	S.CHAND

COURSE OUTCOMES:

After completion of this course the student will be able to

1. express the basic objectives/role and function of operating system.

2. compare different memory management and process management techniques.
3. apply device management and allocation techniques to handle deadlock and relate with study of safety algorithm for recovery and prevention
4. select file system, access methods and file reliability & protection in memory.
5. analyse basic concepts of system programming, Application programming and differentiate working principle of Assembler, Compiler and Loader.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	-	-	-	1	1	3	-
CO2	3	3	1	-	-	2	1	3	1
CO3	3	2	3	1	1	1	1	2	2
CO4	3	2	3	1	-	-	-	3	1
CO5	2	3	2	-	-	-	1	1	-
Total	14	12	9	2	1	4	4	12	4
Average	2.80	2.40	2.25	1.00	1.00	1.33	1.00	2.40	1.33

TH-2 DATA COMMUNICATION & COMPUTER NETWORK

(Common to CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	NETWORK& PROTOCOL	08
2	DATA TRANSMISSION & MEDIA	08
3	DATA ENCODING	08
4	DATA COMMUNICATION & DATA LINK CONTROL	08
5	SWITCHING & ROUTING	10
6	LAN TECHNOLOGY	10
7	TCP/IP	08
	TOTAL	60

B. Rationale

Now a days the growth of data communication technology has become very fast in development of various application areas. This subject will expose the learner to have an idea about the architecture computer network and different protocols to be followed to communicate. Further they will have an idea about different mode of communication.

C. OBJECTIVS:

On completion of the subject, the student will be able to:

- Know the concepts of Data Communication, networking, protocols, and networking models
- Know the various transmission Medias
- Understand the concepts of switching
- Understand various Error detection and correction methods
- Know about data flow and error control
- Know about data link control
- Understand multiple access
- Learn the concepts of wired LANs and Ethernet
- Compare various connecting devices
- Know the concepts of network layer, logical addressing, IP, Forwarding and routing
- Understand brief concept on TCP/IP

D. COURSE CONTENTS:

1. Network & Protocol
   1.1. Data Communication
   1.2. Networks
   1.3. Protocol & Architecture, Standards, OSI, TCP/IP
2. Data Transmission & Media
   2.1. Data transmission Concepts and Terminology
   2.2. Analog and Digital Data transmission
   2.3. Transmission impairments, Channel capacity
   2.4. Transmission media, Guided Transmission, Wireless Transmission
3. Data Encoding
   3.1. Data encoding,

    3.2. Digital data digital signals,

    3.3. Digital data analog signals

    3.4. Analog data digital signals

    3.5. Analog data analog signals

4. **Data Communication & Data link control**

    4.1. Asynchronous and Synchronous Transmission

    4.2. Error Detection

    4.3. Line configuration

    4.4. Flow Control,

    4.5. Error Control

    4.6. Multiplexing

    4.7. FDM synchronous TDM

    4.8. Statistical TDM

5. **Switching & Routing**

    5.1. Circuit Switching networks

    5.2. Packet Switching principles

    5.3. X.25

    5.4. Routing in Packet switching

    5.5. Congestion

    5.6. Effects of congestion, congestion control

    5.7. Traffic Management

    5.8. Congestion Control in Packet Switching Network.

6. **LAN Technology**

    6.1. Topology and Transmission Media

    6.2. LAN protocol architecture

    6.3. Medium Access control

    6.4. Bridges, Hub, Switch

    6.5. Ethernet (CSMA/CD), Fiber Channel

    6.6. Wireless LAN Technology.

7. **TCP/IP**

    7.1. TCP/IP Protocol Suite

    7.2. Basic Protocol functions

    7.3. Principles of Internetworking

    7.4. Internet Protocol operations

    7.5. Internet Protocol

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Books recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	W.Stallings	Data Communication &Computer Networks	PHI
2	M.Bhatia	Introduction to Comp. Network	Unv. S. Press
3	Forouzen	Data Communication & Network	TMH

COURSE OUTCOMES:

After completion of this course the student will be able to

1. describe the concept of data communication model and its protocols
2. illustrate various transmission medias and switching techniques
3. analyze error detection, correction methods, data flow, error control and multiple access
4. distinguish wired LANs and wireless LANs, Ethernet, connecting devices classify logical addressing, forwarding and routing.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	1	-	2	2	1
CO2	1	2	1	2	-	-	2	2	-
CO3	1	2	-	1	-	-	2	1	-
CO4	2	2	-	-	-	-	1	-	2
Total	7	6	1	3	1	-	7	5	3
Average	1.75	2	1	1.5	1	-	1.75	1.67	1.5

Th.3- MICROPROCESSOR & MICROCONTROLLER

(Common ETC, AE&I, CSE & IT)

Theory periods:	5P / week	Internal Assessment:	20
Total Period:	75	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Chapter wise Distribution of periods with Total period

Sl. No.	Topic	Periods
1	Microprocessor (Architecture and Programming-8 bit-8085)	15
2	Instruction Set and Assembly Language Programming (8 bit)	15
3	TIMING DIAGRAMS	07
4	Microprocessor Based System Development Aids	11
5	Microprocessor (Architecture and Programming-16 bit-8086)	12
6	Microcontroller (Architecture and Programming-8 bit)	15
	TOTAL	75

B. Rationale

The Microprocessor control has taken predominance over other types of control quite some time past. Starting from Electrical Power plant to consumer electronics this tiny chip finds extensive uses. As such Microprocessors have made pervading influence on our lives. This field is developing so rapid that it is difficult to keep track with the changes. Under this subjects Architecture and instruction sets of 8 bit and 16-bit processor have been discussed. Some applications have been included through the interfacing chips. Microcontroller (MC) may be called computer on the chip since it has basic features of a microprocessor with internal ROM, RAM, Parallel and serial ports within a single chip. Or we can say microprocessor with memory and ports is called as a microcontroller. Microcontroller is a programmable digital processor with necessary peripherals. Both microcontrollers and microprocessors are complex sequential digital circuits meant to carry out job according to the program / instructions. Sometimes analog input/output interface makes a part of microcontroller circuit of mixed mode(both analog and digital nature).

C. Objective:

After completion of this course the student will be able to:

1. The students will able to differential between 8085 microprocessor &types of Bus.
2. Describe the Architecture & pin diagram of 8085 microprocessor.
3. Comprehend different instructions of 8085 microprocessor &addressing modes.
4. Write instructions under different addressing modes.
5. Discuss assembler & basic assembler directives.
6. Describe types of assembly language programs and write programs.
7. Explain the timing diagrams of different instructions.
8. State the functions of the interfacing chips like 8255, etc.
9. Explain the delay subroutine &calculate the delay by using one, two or three registers.
10. Explain ADC & DAC? & use of ADC & DAC modules
11. Write a program for traffic light control &stepper motor control.
12. Know about 16-bit microprocessor.

D. Detailed Contents:

1. **Unit-1:Microprocessor (Architecture and Programming-8 bit-8085)**
   1.1. Introduction to Microprocessor and Microcomputer & distinguish between them.
   1.2. Concept of Address bus, data bus, control bus & System Bus
   1.3. General Bus structureBlockdiagram.
   1.4. Basic Architecture of 8085 (8 bit) Microprocessor
   1.5. Signal Description (Pin diagram) of 8085 Microprocessor
   1.6. Register Organizations,Distinguish between SPR & GPR, Timing & Control Module,
   1.7. Stack, Stack pointer & Stack top.
   1.8. Interrupts:-8085 Interrupts, Masking of Interrupt(SIM,RIM)

2. **Unit-2: Instruction Set and Assembly Language Programming**
   2.1. Addressing data & Differentiate between one-byte, two-byte &three-byte instructions with examples.
   2.2. Addressing modes in instructions with suitable examples.
   2.3. Instruction Set of 8085(Data Transfer, Arithmetic, Logical, Branching, Stack& I/O , Machine Control)
   2.4. Simple Assembly Language Programming of 8085
       2.4.1.Simple Addition & Subtraction
       2.4.2.Logic Operations (AND, OR, Complement 1's & 2's) & Masking of bits
       2.4.3.Counters & Time delay (Single Register, Register Pair, More than Two Register)
       2.4.4.Looping, Counting & Indexing (Call/JMP etc).
       2.4.5.Stack & Subroutinesprogrames.
       2.4.6.Code conversion, BCD Arithmetic & 16 Bit data Operation, Block Transfer.
       2.4.7.Compare between two numbers
       2.4.8.Array Handling (Largest number & smallest number in the array)
   2.5. Memory & I/O Addressing,

3. **TIMING DIAGRAMS.**
   3.1. Define opcode, operand, T-State, Fetch cycle, Machine Cycle, Instruction cycle & discuss the concept of timing diagram.
   3.2. Draw timing diagram for memory read, memory write, I/O read, I/O write machine cycle.
   3.3. Draw a neat sketch for the timing diagram for 8085 instruction (MOV,MVI,LDA instruction).

4. **Unit-4 Microprocessor Based System Development Aids**
   4.1. Concept of interfacing
   4.2. Define Mapping &Data transfer mechanisms - Memory mapping & I/O Mapping
   4.3. Concept of Memory Interfacing:- Interfacing EPROM & RAM Memories
   4.4. Concept of Address decoding for I/O devices
   4.5. Programmable Peripheral Interface: 8255
   4.6. ADC & DAC with Interfacing.
   4.7. Interfacing Seven Segment Displays
   4.8. Generate square waves on all lines of 8255
   4.9. Design Interface a traffic light control system using 8255.
   4.10. Design interface for stepper motor control using 8255.

5. **Unit-5 Microprocessor (Architecture and Programming-16 bit-8086)**
   5.1. Register Organisation of 8086
   5.2. Internal architecture of 8086
   5.3. Signal Description of 8086
   5.4. General Bus Operation& Physical Memory Organisation

5.5. Minimum Mode &Timings,

5.6. Maximum Mode &Timings,

5.7. Interrupts and Interrupt Service Routines, Interrupt Cycle, Non-Maskable Interrupt, Maskable Interrupt

5.8. 8086 Instruction Set & Programming: Addressing Modes, Instruction Set, Assembler Directives and Operators,

5.9. Simple Assembly language programming using 8086 instructions.

6. **Unit-6 Microcontroller (Architecture and Programming-8 bit):-**

6.1. Distinguish between Microprocessor & Microcontroller

6.2. 8 bit & 16 bit microcontroller

6.3. CISC & RISC processor

6.4. Architectureof8051Microcontroller

6.5. Signal Descriptionof8051Microcontrollers

6.6. Memory Organisation-RAM structure, SFR

6.7. Registers,timers,interruptsof8051Microcontrollers

6.8. Addressing Modes of 8051

6.9. Simple 8051 Assembly Language Programming Arithmetic& Logic Instructions , JUMP, LOOP, CALL Instructions, I/O Port Programming

6.10. Interrupts, Timer & Counters

6.11. Serial Communication

6.12. Microcontroller Interrupts and Interfacing to 8255

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Books Recommended

1. Microprocessor architecture, programming & application with 8085 by R.S. Gaonkar, PenramInternational Publishing. (India) Pvt. Ltd.
2. The 8051 Microcontroller & Embedded Systems by Mazidi & Mazidi, - Pearson publication
3. Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A.K. Roy & K.M. Bhurchandi, - TMH Publication
4. Microprocessor & Microcontroller by N.SenthliKumar,M.Sarvanan,S.Jeevananthan,S K Shah-OXFORD
5. Microprocessor & Microcontroller by R.S. Kaler, IKI Publishing
6. Microprocessor & its application by B.Ram,Dhanpat rai
7. **Microcontroller, Theory and application by Ajaya V. Deshmukh. TMH**

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand the architecture of microprocessorand microcontroller
2. write assembly language program for microprocessors and microcontrollers
3. Perform Hands-on with various interfaces and other peripherals using 8051

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	2	1	1	1	1	1
CO2	1	3	-	3	-	-	2	1	1
CO3	2	1	-	1	1	-	1	1	1
Total	6	4	-	6	2	1	4	3	3
Average	2	2	-	2	1	1	1.33	1	1

Th.4-DATABASE MANAGEMENT SYSTEM

COMMON TO (CSE/IT)

Theory periods:	4P / week	**Internal Assessment:**	20
Total Period:	60	**End Semester Examination:**	80
Examination:	3 hrs	**Total marks:**	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	BASIC CONCPETS OF DBMS	05
2	DATA MODELS	08
3	RELATIONAL DATABASE	06
4	NORMALIZATION IN RELATIONAL SYSTEM	08
5	STRUCTURED QUERY LANGUAGE	09
6	TRANSACTION PROCESSING CONCEPTS	08
7	CONCURRENCY CONTROL CONCEPTS	08
8	SECURITY AND INTEGRITY	08
	TOTAL	60

B. Rationale: Databases are wonderful learning tools because they embody so much of the learning process. It is the vital component of modern information system which needs to store and process large volume of data. It gives an idea about accessing of data and shared by different application programs. The architecture of the database is simple to understand.

C. OBJECTIVS:

On completion of the subject, the student will be able to:

- Understand the database concepts, their benefits and advantages
- Understand the Database architecture
- Understand the concepts of E-R diagrams & E-R modeling
- Understand relational algebra
- Comprehend the different aspects of SQL
- Understand the concepts of normalization
- Understand the concepts of transaction processing
- Understand the techniques of concurrency control
- Comprehend the concepts & techniques of backup & recovery of database.
- Understand how to maintain security and integrity in database.

D. COURSE CONTENTS:

1. BASIC CONCPETS OF DBMS
   1.1. Purpose of database Systems
   1.2. Explain Data abstraction
   1.3. Database users
   1.4. Data definition language
   1.5. Data Dictionary

2. DATA MODELS
   2.1. Data independence
   2.2. Entity relationship models
   2.3. Entity sets and Relationship sets 2.4 Explain Attributes
   2.4. Mapping constraints
   2.5. E-R Diagram
   2.6. Relational model

2.7. Hierarchical model

2.8. Network model

3. RELATIONAL DATABASE

3.1. Relational algebra

3.2. Different operators select, project, join , simple Examples

4. NORMALIZATION IN RELATIONAL SYSTEM

4.1. Functional Dependencies

4.2. Lossless join

4.3. Importance of normalization

4.4. Compare First second and third normal forms 4.5 Explain BCNF

5. STRUCTURED QUERY LANGUAGE

5.1. Elementary idea of Query language

5.2. Queries in SQL

5.3. Simple queries to create, update, insert in SQL

6. TRANSACTION PROCESSING CONCEPTS

6.1. Idea about transaction processing

6.2. Transaction & system concept

6.3. Desirable properties of transaction

6.4. Schedules and recoverability

7. CONCURRENCY CONTROL CONCEPTS

7.1. Basic concepts,

7.2. Locks, Live Lock, Dead Lock,

7.3. Serializability (only fundamentals)

8. SECURITY AND INTEGRITY

8.1. Authorization and views

8.2. Security constraints

8.3. Integrity Constraints 8.4 Discuss Encryption

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Rog,Cornel	Database System Concepts	Cengage Learning
2	Prateek Bhatia	Data Base System	Kalyani Publications
3	A. Silberschatz, H.F. Korth	Database System Concepts	TMH Publication
4	C.J. Date	An Introduction to Database Systems	Norosa Publication

COURSE OUTCOMES:

After completion of this course the student will be able to

1. express the fundamental concept of Database and Data Models.
2. comprehend and apply the Relational Algebra in different aspects of SQL.
3. analyse the concepts of normalization in relational system and transaction processing.
4. evaluate the techniques of concurrency control and process of backup & recovery of database and to maintain security and integrity in database.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	2	-	1	2	2	1
CO2	3	1	1	3	-	1	2	2	1
CO3	2	1	1	1	-	1	2	2	1
CO4	1	-	-	2	-	2	2	2	2
Total	9	2	3	8	-	5	8	8	5
Average	2.25	1	1	2	-	1.25	2	2	1.25

Pr.1-OPERATING SYSTEM LAB

Total Period:	60	Maximum marks:	50 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	End Semester Examination:	25 Marks

LIST OF PRACTICALS:-

1. Write a Shell script to print the command line arguments in reverse order.
2. Write a Shell script to check whether the given number is palindrome or not.
3. Write a Shell script to sort the given array elements in ascending order using bubble sort.
4. Write a Shell script to perform sequential search on a given array elements.
5. Write a Shell script to perform binary search on a given array elements.
6. Write a Shell script to accept any two file names and check their file permissions.
7. Write a Shell script to read a path name, create each element in that path e.g: a/b/c i.e., 'a' is directory in the current working directory, under 'a' create 'b', under 'b' create 'c'.
8. Write a Shell script to illustrate the case-statement.
9. Write a Shell script to accept the file name as arguments and create another shell script, which recreates these files with its original contents.
10. Write a Shell script to demonstrate Terminal locking.
11. Write a Shell script to accept the valid login name, if the login name is valid then print its home directory else an appropriate message.
12. Write a Shell script to read a file name and change the existing file permissions.
13. Write a Shell script to print current month calendar and to replace the current day number by '*' or '**' respectively.
14. Write a Shell Script to display a menu consisting of options to display disk space, the current users logged in, total memory usage, etc. (using functions.)
15. Write a C-program to fork a child process and execute the given Linux commands.
16. Write a C-program to fork a child process, print owner process ID and its parent process ID.
17. Write a C-program to prompt the user for the name of the environment variable, check its validity and print an appropriate message.
18. Write a C-program to READ details of N students such as student name, reg number, semester and age. Find the eldest of them and display his details.

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Sumitabha Das	4th Edition, "UNIX – Concepts and Applications"	Tata McGraw Hill, 2006.
2	Yashvant Kanetkar	Unix Sell Programming 1st edition	BPB Publication

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the fundamental concept of UNIX and LINUXand use basic UNIX/ LINUX commands
2. create the codes in Shell programming.
3. develop the codes using UNIX/LINUX system calls.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	1	1	-	2	1	1
CO2	2	-	-	1	-	-	2	1	1
CO3	2	-	-	1	1	-	1	1	1
Total	6	-	-	3	2	-	5	3	3
Average	2	-	-	1	1	-	1.67	1	1

Pr.2 NETWORKING LAB

Total Period:	90	Maximum marks:	100 Marks
Lab periods:	6P / week	Term Work/ Sessional:	50 Marks
Examination:	3 Hours	End Semester Examination:	50 Marks

LIST OF PRACTICALS:-

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST
3. Making of cross cable and straight cable
4. Install and configure a network interface card in a workstation.
5. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
6. Managing user accounts in windows and LINUX
7. Sharing of Hardware resources in the network.
8. Use of Netstat and its options.
9. Connectivity troubleshooting using PING, IPCONFIG
10. Installation of Network Operating System(NOS)
11. Create a network of at least 6 computers.
12. Study of Layers of Network and Configuring Network Operating System
13. Study of Routing and Switching, configuring of Switch and Routers, troubleshooting of networks
14. Study of Scaling of Networks, Design verities of LAN and forward of Traffic
15. Study WAN concepts and Configure and forward Traffic in WAN
16. Configure IPv4 and IPv6 and learn Quality, security and other services
17. Learn Network programming
18. Troubles shoot Networks.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. recognize the physical topology and cabling of a network
2. identify the IP address and configure the IP address on a workstation and Managing user accounts in windows and linux
3. use of netstat and its options, connectivity troubleshooting using ping, IPconfig and Installation of network operating system
4. configuring network operating system, routing, switching and configuring of switch and routers
5. Create a network of at least 6 computers and troubleshooting of networks

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	1	2	2	-	2	1	2
CO2	2	2	-	2	2	-	2	1	2
CO3	2	1	1	2	2	-	2	1	2
CO4	2	2	-	1	1	-	2	1	1
CO5	2	2	-	1	1	1	2	1	2
Total	10	9	2	8	8	1	10	5	9
Average	2	1.8	1	1.6	1.6	1	2	1	1.8

Pr.3 - MICROPROCESSOR & MICROCONTROLLER LAB

(Common to ETC,AE&I,CSE & IT)

Total Period:	60	Maximum marks:	50 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	End Semester Examination:	25 Marks

A. Rationale:

The Microprocessor control has taken predominance over other types of control quite some time past. Starting from Electrical Power plant to consumer electronics this tiny chip finds extensive uses. As such Microprocessors have made pervading influence on our lives. This field is developing so rapid that it is difficult to keep track with the changes. Under this subjects Architecture and instruction sets of 8 bit and 16-bit processor have been discussed. Some applications have been included through the interfacing chips.

B. Objective:

After completion of this course the student will be able to:

1. The concept of Microprocessor 8085 (8Bit)
2. Concept of 16 Bit Processor 8086
3. Programming & Interfacing Concept
4. Develop software for microcontroller systems using a high-level programming language
5. Demonstrate familiarity with common microcontroller subsystems, such as timer modules
6. Demonstrate an ability to use both polling and interrupt-driven approaches for interfacing a microcontroller with peripheral devices
7. Develop and analyze software to interface a microcontroller with common peripheral devices, such as switches, visual displays, digital-to-analog converters, analog-to-digital converters, and flash memory to produce a system to accomplish a specified task
8. Design interfaces to external devices connected to the microcontroller using a standard bus

C. List of Practicals

NOTE: Total 14 Experiments Have To Be Completed. (4 from Gr - A ,3 from Gr - B , 4 from Gr - C, 3 from Gr - D)

Gr A) 8085 (Compulsory)

1. Addition, Subtraction, Multiplication, Division of two 8 bit numbers resulting 8/16 bit numbers.
   Optional (Any three)
2. 1''s and 2's Complements
3. Binary to Gray Code / Hexadecimal to decimal conversion.
4. Logic Operations (AND, OR,) & Masking of bits
5. Time delay (Single Register, Register Pair, More than Two Register)
6. Compare between two numbers
7. Smallest /Largest number among n numbers in a given data array
8. Block Transfer of data

Gr B) 8086(Compulsory)

1. Addition, subtraction, Multiplication, Division of 16 bit nos + 2's complement of a 16 bit no.
   Optional (Any two)
2. Marking of specific bit of a number using look-up table.
3. Largest /Smallest number of a given data array.
4. To separate the Odd and Even numbers from a given data array.
5. Sorting an array of numbers in ascending/descending order
6. Finding a particular data element in a given data array.

Gr-C) INTERFACING (Compulsory-any one)

1. Operation of 8255 using 8085 & 8051 microcontroller
2. Generate square waves on all lines of 8255 with different frequencies (concept of delay program)
   OPTIONAL (Any Three) based on self-study
1. Study of stepper Motor and its operations (Clockwise, anticlockwise, angular movement, rotate in various speeds)
2. Study of Elevator Simulator
3. Generation of Square, triangular and saw tooth wave using Digital to Analog Converter
4. Study of 8253 and its operation (Mode 0, Mode 2, Mode 3)
5. Study of Mode 0, Mode 1, BSR Mode operation of 8255.
6. Study of 8279 (keyboard & Display interface)
7. Study of 8259 Programmable Interrupt controller.
8. Study of Traffic Light controller
9. Steeper Motor Controller.

Gr-D) 8051 MICROCONTROLLER (Compulsory) by self-study

1. Initialize data to registers and memory using immediate, register, direct and indirect addressing mode
   OPTIONAL (any two)
2. Write a Program for
   2.1. Bit Digital Output-LED Interface
   2.2. 8 Bit Digital Inputs (Switch Interface)
3. Write a Programs for(Any one)
   3.1. 4 x 4 Matrix Keypad Interface
   3.2. Buzzer Interface
   3.3. Relay Interface
4. Write a Program for character based LCD Interface.
5. Write a Program for Analog to Digital Conversion (On chip ADC& DAC)
6. Interfacing With Temperature Sensor.
7. Write a program Stepper Motor Interface
8. Write a program to Generate Delay Subroutine
9. 805 Timer & Counter programming –Generate Square wave

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Implement assembly language programme using 8085 Microprocessor.
2. Study of Interfacing peripheral Devices using 8085 Microprocessor.
3. Design application of 8085 microprocessor.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	1	-	-	1	1	1
CO2	3	3	1	1	-	-	2	1	1
CO3	3	3	1	1	-	-	2	1	2
Total	9	8	3	3	-	-	5	3	4
Average	3	2.67	1	1	-	-	1.67	1	1.33

Pr.4-DATABASE MANAGEMENT SYSTEM LAB

Total Period:	60	**Maximum marks:**	100 Marks
Lab periods:	4P / week	**Term Work/ Sessional:**	50 Marks
Examination:	3 Hours	**End Semester Examination:**	50 Marks

A. ASSINGMENT FOR DBMS LAB

1. Show the Structure of DEPT. Select all data from DEPT table. Create a query to display unique jobs from the EMP table.
2. Write a query to Name the column headings EMP#, Employee, Job and Hire date, respectively. Run the query.
3. Create a query to display the Name and salary of employees earning more than Rs.2850.Save the query and run it.
4. Create a query to display the employee name and department no. for employee no. 7566.
5. Display the employee name, job and start date of employees hire date between Feb.20.1981 and May 1, 1981. Order the query in ascending order of start date.
6. Display the name and title of all employees who don't have a Manager.
7. Display the name, salary and comm. For all employee who earn comm. Sort data in descending order of salary and comm.
8. Display the name job, salary for all employees whose job is Clerk or Analyst their salary is not equal to Rs.1000, Rs.3000, Rs.5000.
9. Write a query to display the date. Label the column DATE.
10. Create a unique listing of all jobs that are in department 30.
11. Write a query to display the name, department number and department name for all employees.
12. Write a query to display the employee name, department name, and location of all employee who earn a commission.
13. Write a query to display the name, job, department number and department name for all employees who works in DALLAS.
14. Write a query to display the number of people with the same job. Save the query @ run it.
15. Create a query to display the employee name and hire date for all employees in same department.
16. Display the employee name and salary of all employees who report to KING.
17. Display the mane, department name and salary of any employee whose salary and commission matches both the salary and commission of any employee located in DALLAS.
18. Create a student database table using create command using Regd. No as Primary Key , insert data of your class.
19. Delete the information of student having roll No -15 and City- Bhubaneswar. Rename the Student database table to STUDENT INFORMATION.
20. Practice of all Data Retrieval, DML, DDL, TCL and DCL commands used in Oracle by writing queries.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. acquire knowledge of databases and SQL
2. apply various query processing to managing databases.
3. understand how to create database using database languages.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	1	1	1	2	2	2
CO2	2	-	-	1	-	1	2	2	2
CO3	2	-	-	1	1	1	1	2	2
Total	6	-	-	3	2	3	5	6	6
Average	2	-	-	1	1	1	1.67	2	2

Pr.5 -TECHNICAL SEMINAR

Total Period:	02	Maximum marks:	50 Marks
Lab periods:	2P / week	Term Work/ Sessional:	50 Marks
Examination:		End Semester Examination:	-

A. Objective:

Each student has to select a recent topic of latest technology in the area of Computer Science and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic of minimum 10 slides are the total presentation will be approximately 10 minutes duration. There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation. A student has to present at least 2 nos.of seminar during a semester and to submit the report for evaluation.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. present latest technical subjects/topics in an organizes set of and appraise feedback on the contents of presentation in a constructive manner
2. demonstrate information and knowledge on technological advances and share the aquired knowledge on technological advances in professional situations
3. explore knowledge and skill of sharing knowledge and meet professional and social relevance effectively

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	1	-	3	-	2
CO2	2	-	1	-	-	-	2	1	2
CO3	2	-	-	-	1	-	3	3	3
Total	6	-	1	-	2	0	8	4	7
Average	2	-	1	-	1	0	2.67	2	2.33

		STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA							
		TEACHING AND EVALUATION SCHEME FOR FIFTH SEMESTER INFORMATION TECHNOLOGY (w.e.f. 2019-20)							
DISCIPLINE: INFORMATION TECHNOLOGY					SEMESTER: 5TH				
SL. NO.	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
			L	T	P	INTERNAL ASSESSMENT/ SESSIONAL	END SEM EXAM	EXAM (HOURS)	TOTAL
THEORY									
1	Th. 1	ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY	4	-	-	20	80	03	100
2	Th. 2	INTERNET AND WEB TECHNOLOGY	4	-	-	20	80	03	100
3	Th. 3	SOFTWARE ENGINEERING	4	-	-	20	80	03	100
4	Th. 4	COMPUTER GRAPHICS AND MULTIMEDIA	4	-	-	20	80	03	100
5	Th. 5	MOBILE COMPUTING	4			20	80	03	100
		TOTAL	20	-	-	100	400	-	500
PRACTICAL / TERM WORK									
6	Pr. 1	WEB DEVELOPMENT LAB	-	-	4	25	50	03	50
7	Pr. 2	COMPUTER GRAPHICS & MULTIMEDIA LAB	-	-	4	25	50	03	100
8	Pr. 3	PYTHON PROGRAMMING LAB	-	-	4	25	50	03	50
9	Pr. 4	PROJECT PHASE-I	-	-	4	50	-	03	100
10		STUDENT CENTERED ACTIVITIES(SCA)	-	-	3	-	-	-	
		TOTAL	-	-	19	100	150	-	250
		GRAND TOTAL	20	-	19	200	550	-	750
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies etc. Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

Th1. ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

(Common to all Branches)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification (Business Planning)	08
3	Project report Preparation	04
4	Management Principles	05
5	Functional Areas of Management	10
6	Leadership and Motivation	06
7	Work Culture, TQM & Safety	05
8	Legislation	06
9	Smart Technology	06
	TOTAL	60

Rationale:

n the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students, so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mind set with managerial skill helps the student in the job market. The students can also be introduced with Startup and Smart Technology concept, which shall radically change the working environment in the coming days in the face of Industry 4.0

In this subject, the Students shall be introduced/ exposed to different concepts and Terminologies in brief only, so that he/she can have broad idea about different concepts/items taught in this subject. Solving numerical problem on any topic/item is beyond the scope of this subject.

OBJECTIVES:

After undergoing this course, the students will be able to :

- Know about Entrepreneurship, Types of Industries and Startups
- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- know the management Principles and functional areas of management
- Inculcate leadership qualities to motivate self and others.
- Maintain and be a part of healthy work culture in an organisation.
- Use modern concepts like TQM
- Know the General Safety Rules
- Know about IOT and its Application in SMART Environment.

DETAILED CONTENTS

1. **Entrepreneurship**
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship

- Characteristics, Qualities and Types of entrepreneur, Functions
- Barriers in entrepreneurship
- Entrepreneurs vrs. Manager
- Forms of Business Ownership: Sole proprietorship, partnership forms and others
- Types of Industries, Concept of Start-ups
- Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
- Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. **Market Survey and Opportunity Identification (Business Planning)**
- Business Planning
- SSI, Ancillary Units, Tiny Units, Service sector Units
- Time schedule Plan, Agencies to be contacted for Project Implementation
- Assessment of Demand and supply and Potential areas of Growth
- Identifying Business Opportunity
- Final Product selection

3. **Project report Preparation**
- Preliminary project report
- Detailed project report, Techno economic Feasibility
- Project Viability

4. **Management Principles**
- Definitions of management
- Principles of management
- Functions of management (planning, organising, staffing, directing and controlling etc.)
- Level of Management in an Organisation

5. **Functional Areas of Management**
   a) Production management
   - Functions, Activities
   - Productivity
   - Quality control
   - Production Planning and control
   b) Inventory Management
   - Need for Inventory management
   - Models/Techniques of Inventory management
   c) Financial Management
   - Functions of Financial management
   - Management of Working capital
   - Costing (only concept)
   - Break even Analysis
   - Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)
   d) Marketing Management
   - Concept of Marketing and Marketing Management
   - Marketing Techniques (only concepts)
   - Concept of 4P s (Price, Place, Product, Promotion)
   e) Human Resource Management
   - Functions of Personnel Management
   - Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. **Leadership and Motivation**
   a) Leadership
   - Definition and Need/Importance
   - Qualities and functions of a leader

- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)
  b) Motivation
    - Definition and characteristics
    - Importance of motivation
    - Factors affecting motivation
    - Theories of motivation (Maslow)
    - Methods of Improving Motivation
    - Importance of Communication in Business
    - Types and Barriers of Communication

7. **Work Culture, TQM & Safety**
   - Human relationship and Performance in Organization
   - Relations with Peers, Superiors and Subordinates
   - TQM concepts: Quality Policy, Quality Management, Quality system
   - Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. **Legislation**
   a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
   b) Features of Factories Act 1948 with Amendment (only salient points)
   c) Features of Payment of Wages Act 1936 (only salient points)

9. **9. Smart Technology**
   - Concept of IOT, How IOT works
   - Components of IOT, Characteristics of IOT, Categories of IOT
   - Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

Syllabus to be covered before IA: Chapter 1,2,3,4

Recommended Books:

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. https://www.fundable.com/learn/resources/guides/startup

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand the concepts of Entrepreneurship types of industries and start-up
2. Describe the various schemes of assistance by entrepreneurial support agencies to know the market survey and project support agencies to know the market survey and project report
3. Apply the management principle and functional areas of management and perform leadership qualities to motivate self and others
4. Analyse to maintain and be part of healthy work culture in an organisation and tochoose the use modern concepts like TQM
5. Discuss and know the General Safety Rules and learn about IOT and its application in SMART Environment

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	1	1	1	2	1	2
CO2	1	-	-	1	1	1	2	1	2
CO3	2	-	-	1	1	1	2	1	2
CO4	1	-	-	1	1	2	3	1	3
Total	7	-	-	4	4	5	9	4	9
Average	1.75	-	-	1	1	1.25	2.25	1	2.25

Th-2 INTERNET AND WEB TECHNOLOGY

(Common to CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Entrepreneurship	10
2	Market Survey and Opportunity Identification (Business Planning)	08
3	Project report Preparation	04
4	Management Principles	05
5	Functional Areas of Management	10
6	Leadership and Motivation	06
7	Work Culture, TQM & Safety	05
8	Legislation	06
9	Smart Technology	06
	TOTAL	60

B. RATIONALE: Now a days the usage of internet has become very essential in various areas like education, entertainment, business, sports etc. This subject will expose the learner to have an idea about the applications and services of Internet. Further the learner will able to plan and design a website to achieve the goal.

C. Objective: After completion of this course the student will be able to:
- Understand the concept of Internet and its wide application in various areas.
- Understand different internet connectivity and ISP.
- Understand the Internet security and Applications
- Know the methods of development of Portals using HTML
- Know the Client side Scripting using JavaScript
- Know the server side Scripting using PHP
- Know the what is ASP and what can it do

D. DETAIL CONTENTS:

1. Internet Basics
  1.1. Computer network
  1.2. Concept of Internet, Intranet, Modem
  1.3. IP Address, Internet Domains, CIDR Notation, ISP, TCP/IP

2. Internet Connectivity & WWW
  2.1. Introduction ot connectivity
  2.2. Medium and methods of connectivity, ISDN, VSAT, RF Link
  2.3. Working of Internet
  2.4. Introduction to WWW, Application Level Protocol
  2.5. Web Browser, URL, Hyper text, Hyperlinks, Hypermedia,
  2.6. Search Engine, Proxy sever, CGI, URI, Dreamweaver

3. Internet Security
  3.1. Introduction to security
  3.2. Types of security, Authentication & Authorization
  3.3. Firewalls, Encryption & Decryption, SSL

4. **Internet Application**
   4.1. E-Mail, Email protocols
   4.2. Telnet
   4.3. FTP
   4.4. Newsgroup
   4.5. Chartroom
   4.6. Internet Relay Chat
   4.7. Video Conferencing
   4.8. E-Commerce
5. **Website Classifications**
   5.1. Static Websites
   5.2. Dynamic websites
   5.3. Web portals
   5.4. Social Networking Sites
   5.5. RSS Feed, Blog, Netiquette
6. **Development of Portals Using HTML**
   6.1. Design a webpage, Good Web Design
   6.2. HTML Introduction
   6.3. HTML Tags, Anchor Tag, Table Tag
   6.4. HTML Frames, Forms
   6.5. Disadvantages of HTML
   6.6. Separating style from structure with style sheets
   6.7. CSS Rules, Types of CSS
7. **Client side Scripting with JavaScript**
   7.1. Introduction to script, Client side Scripting, Types of Scripting
   7.2. Variables in JavaScript, Built-in Function
   7.3. Arrays in JavaScript, Conditional statements, Loops
   7.4. Document Object Model
   7.5. Creating Functions, objects in JavaScript
   7.6. Event handling in JavaScript
   7.7. Embedding JavaScript with HTML
   7.8. Working with Cookies
   7.9. Connecting database using JavaScript in HTML Page
   7.10. Working with Browser, validating and submitting Forms
8. **Server Side Scripting**
   8.1. Introduction to server side Scripting
   8.2. Components of SSS
   8.3. Difference between CSS and SSS
   8.4. erver side Scripting method
   8.5. JavaScript on server
   8.6. SQL
9. **Server Side Programming using PHP**
   9.1. Introduction to PHP
   9.2. Variables, string, operator types
   9.3. Conditional statement, Loops
   9.4. Array
   9.5. GET and POST Method and Sessions

Coverage of Syllabus upto Internal Exams (I.A.)
Chapter 1,2,3,4

Books Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Neha Dutta, Adesh Pandey	Internet and Web Designing	Katson Books
2	Sisodia	Internet & Web page Design	BPB Publication
3	U.K Roy	Web Technologies	Oxford Univ.Press

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Explain the concept of Internet and its application.
2. Acquire knowledge of TCP/IP .
3. Express the concept of domain name system with a mapping various application and services of Internet i.e. E-mail, FTP,WWW
4. Analyse the brief concept on HTML

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	2	1	-	3	3	3	1
CO2	1	3	3	-	-	3	3	3	2
CO3	2	2	3	2	1	3	3	2	2
CO4	1	3	3	3	3	3	3	3	2
Total	5	11	11	6	4	12	12	11	7
Average	1.25	2.75	2.75	2	2	3	3	2.75	1.75

Th-3 SOFTWARE ENGINEERING

(Common to CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION TO SOFTWARE ENGINEERING	06
2	SOFTWARE PROJECT MANAGEMENT	10
3	REQUIREMENT ANALYSIS AND SPECIFICATION	06
4	SOFTWARE DESIGN	10
5	USER INTERFACE DESIGN	08
6	SOFTWARE CODING & TESTING	12
7	SOFTWARE RELIABILITY	08
	TOTAL	60

E. RATIONALE:

Software Engineering technology is now a days largely adopted by most computer based applications to bridge the gap between a human user & the computer. By this multiple media are implemented and used in computer based application to enhance their understanding ability before a common man. This will expose the students to various project building and testing techniques which they will encounter during there professional life as a software engineer or manager.

OBJECTIVE: After completion of this course the student will be able to:

- Understand the concept of Software Engineering.
- Understand how costs, schedule and quality drive a software project.
- Understand the role of software process and a process model in a project.
- Understand planning and estimation of a software project.
- Understand the role of SRS in a project and how requirements are validated
- Know the key design concepts of software engineering.
- Learn the structured code inspection process.
- Learn how testing is planned and testing done.

1. Introduction to Software Engineering

1.1. Program vrs. Software product

1.2. Emergence of Software Engineering.

1.3. Computer Systems Engineering

1.4. Software Life Cycle Models

    1.4.1. Classical Water fall model

    1.4.2. Iterative Water fall model

    1.4.3. Prototyping model

    1.4.4. Evolutionary model.

    1.4.5. Spiral model

2. Software Project Management

2.1. Responsibility of Project Manager

2.2. Project Planning

6.9. Debugging approaches
6.10. Debugging guidelines
6.11. Integration Testing
6.12. Phased and incremental integration testing
6.13. System testing alphas beta and acceptance testing
6.14. Performance Testing, Error seeding
6.15. General issues associated with testing

7. Software Reliability
7.1. Software Reliability.
7.2. Different reliability metrics
7.3. Reliability growth modeling
7.4. Software quality
7.5. Software Quality Management System

BOOKS:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Rajib Mall	Fundamentals of Software Engineering	PHI
2	Deepak Jain	Software Engineering: Principles and Practice	Oxford university press
3	Jawadekar	Software Engineering: A Primer	TMH

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand the systematic process of design and development of a software
2. Build life cycle models and estimate the project parameters
3. Understand various methods and procedures for designing, coding, testing, implementation and maintenance of a software
4. Develop high quality software with reduced cycle of time

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	2	1	2	2	1	1
CO2	3	2	2	2	1	2	2	2	1
CO3	3	2	2	2	1	2	2	2	1
CO4	3	2	2	2	1	2	2	2	1
Total	12	8	8	8	4	8	8	7	4
Average	3	2	2	2	1	2	2	1.75	1

Th-4 Computer Graphics and Multimedia

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	APPLICATIONS OF COMPUTER GRAPHICS & MULTIMEDIA	02
2	OVERVIEW OF GRAPHICS SYSTEM	05
3	GRAPHICS OUTPUT PRIMITIVE	05
4	TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS	03
5	TWO DIMENSIONAL VIEWING	04
6	THREE DIMENSIONAL OBJECT REPRESENTATIONS	10
7	THREE DIMENSIONAL GEOMETRIC & MODELING TRANSFORMATIONS	04
8	THREE DIMENSIONAL VIEWING	06
9	ILLUMINATION MODEL & SURFACE RENDERING METHODS	04
10	INTRODUCTION TO DIGITAL AUDIO	06
11	INTRODUCTION TO DIGITAL IMAGE	06
12	INTRODUCTION TO VIDEO	05
	TOTAL	60

B. RATIONALE:

Now a days the graphics and multimedia is the most popular topic in the development of computer technology in education, entertainment, business, sports etc. This subject will expose the learner to have an idea about the text, sound, video, graphics and animation. It will also give an idea about the 2D and 3D view of an object for better understanding.

C. OBJECTIVE: After completion of this course the student will be able to:
- Understand the basic use of graphics.
- Understand the use of graphics in different application area.
- Understand how to view and modify the image in 2D.
- Understand how to view and modify the image in 3D.
- Understand different image format.
- Understand different audio and video format.

D. DETAIL CONTENTS:

1. Applications of Computer Graphics & Multimedia
1.1. Computer graphics in CAD
1.2. Presentation Graphics
1.3. Computer Art
1.4. Entertainment
1.5. Education & Training
1.6. Visualization
1.7. Image Processing
1.8. Graphic User Interface
1.9. Multimedia Concepts.

2. Overview of Graphics System8
2.1. Graphics System

8.4. Perspective projection

8.5. Concept of 3D clipping.

9. **Illumination Model & Surface Rendering Methods**

9.1. Different light sources used in 3D modeling

9.2. Basic Illumination model

9.3. Ambient light

9.4. Diffuse reflection

9.5. Specular reflection,

10. **Introduction to Digital Audio**

10.1. Basics of Acoustics, Psychoacoustics

10.2. Musical sound and noise, elementary sound system

10.3. Microphones, Amplifiers, digital audio formats

10.4. Audio compression (LPC, Sub Band Encoding)

11. **Introduction to Digital Image**

11.1. Vector and raster Graphics

11.2. Digital representation of image, colour, 16 bit, 24 bit colour depth

11.3. Colour Characteristics-Hue, saturation, Luminance

11.4. Colour Palette

11.5. Image formats-JPEG, BMP, TIFF, GIFF

11.6. Image evaluation

11.7. Layers

11.8. Filters

11.9. Image manipulation-scaling, cropping, rotation

12. **Introduction to Video**

12.1. Video in Multimedia

12.2. Basics of Motion-Video

12.3. Sources of Motion-Video

12.4. Video formats, lines, frames, fields

12.5. TV Broadcast standards-PAL, NTSC, SECAM

12.6. MPEG Compression

<center>**Coverage of Syllabus upto Internal Exams (I.A.)**</center>

<center>Chapter 1,2,3,4</center>

Book Recommended :-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Donald Hearn, M.Pauline Baker	Computer Graphics	PHI
2	Buford	Multimedia Systems	Multimedia Systems
3	S.Pandey, M.Pandey	Multimedia Systems,Tech. & Communications	Katson

COURSE OUTCOMES:

After completion of this course the student will be able to

1. express computer graphics systems and its applications and use various scan conversion algorithms for creating line and circle.
2. demonstrate various transformation, viewing and clipping methods of 2D and 3D image.

3. distinguish various light sources used in 3D modelling.
4. analyze digital image, audio and video system, file formats and compression techniques.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	2	1	-	2	3	1
CO2	3	2	2	2	1	-	1	3	1
CO3	3	2	-	-	2	-	-	2	-
CO4	3	2	-	-	2	-	-	2	-
Total	12	9	4	4	6	-	3	10	2
Average	3	2.25	2	2	1.5	-	1.5	2.5	1

Th-5 MOBILE COMPUTING

(Common to CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Introduction to Wireless networks & Mobile Computing	06
2	Introduction to Mobile Development Framework	06
3	Wireless Transmission	06
4	Medium Access Control	06
5	Wireless LANs	06
6	Ubiquitous Wireless Communication	06
7	Mobile IP	06
8	Mobile Computing	06
9	Wireless Telecomm Networks	06
10	Messaging Services	06
	TOTAL	60

RATIONALE:

Now a days the communication technology has become very fast in development of various application areas. This subject will expose the learner to have an idea how the wireless network works along with the architecture of Mobile computing.

OBJECTIVE: After completion of this course the student will be able to:

- To learn Mobile Computing Principles and Architecture
- To understand Mobility Management, GSM, and GPRS networks
- To know Short Message Service (SMS) technology, GPRS, WAP, CDMA, 3G
- Understand Wireless LAN, WiFi, and WLL (Wireless Local Loop) Architecture
- Understand the concept of Mobile IP.
- Learn Bluetooth, RFID, and Satellite Communications.
- To Know Next Generation Networks (NGN)

Course Content

1. Introduction to Wireless networks & Mobile Computing
   1.1. Networks
   1.2. Wireless Networks
   1.3. Mobile Computing
   1.4. Mobile Computing Characteristics
   1.5. Application of Mobile Computing

2. Introduction to Mobile Development Framework
   2.1. C/S architecture
   2.2. n-tier architecture
   2.3. n-tier architecture and www

    7.8.   Mobile IPv6 Address Scope

    7.9.   Mobile IP Operation

8.   Mobile Computing

    8.1.   WWW architecture for Mobile computing

    8.2.   Need of WAP

    8.3.   Benefits of WAP

    8.4.   Examples of WAP

    8.5.   WAP- Architecture

    8.6.   WAP protocols

    8.7.   WML

    8.8.   WAP Push architecture

    8.9.   Push-Pull based data acquisition

    8.10. I-mode

    8.11. WAP 2.x

9.   Wireless Telecomm Networks

    9.1.   GSM

    9.2.   GPRS

    9.3.   IS-95

    9.4.   CDMA-2000

    9.5.   W-CDMA

    9.6.   Wireless Sensor Networks

10. Messaging Services

    10.1. Short Message Services (SMS)

    10.2. Multimedia Message Services (MMS)

    10.3. Multimedia transmission over wireless

Reference Books:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Dr. N.NJani, Kamaljit I. Lakhtaria, Dr. Ashish N. Jani & Nita Kanabar	Mobile Computing	S.Chand & Company Ltd

COURSE OUTCOMES:

After completion of this course the student will be able to

1. identify Mobile Computing Principles it's Architecture and Wireless Transmission
2. describes various Medium Access Control,Wireless LAN , Bluetooth, RFID, and Satellite Communications
3. explain Wi-Fi, and WLL (Wireless Local Loop) Architecture and the concept of Mobile IP.
4. design of Short Message Service (SMS) technology, GPRS, WAP, CDMA, 3G and Next Generation Networks (NGN).

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	1	-	2	2	1
CO2	2	-	-	-	2	-	2	2	1
CO3	2	-	-	-	2	-	2	2	1
CO4	2	-	-	-	2	-	2	2	2
Total	9	-	-	-	7	-	8	8	5
Average	2.25	-	-	-	1.75	-	2	2	1.25

Pr-1 WEB DEVELOPMENT LAB

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	Term End Examination:	50 Marks

RATIONALE:

This course will enable the students to understand and develop competency amongst the students to design professional database backed dynamic and feature based web sites. The course covers the use of programming with PHP and the concepts of database with My SQL.

OBJECTIVES

After going through the subject, the student will be able to

- Compare and contrast the use of various mark-up languages.
- Perform various logical operations in PHP
- Create simple programmes to validate forms in PHP
- Perform database connectivity using PHP

DETAILED CONTENTS

1. DEVELOPING PORTALS USING HTML

Introduction to HTML 5 and CSS 3. Basic structure of HTML, designing a web page, inserting liks images, horizontal rules, comments. Formatting text, title, headings, colors, fonts, sizes, simple tables and forms. HTML tags, hyperlinks. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and frames. Floating of web site/pages.

2. PHP

Introduction to PHP: How PHP Works , The php.ini File, Basic PHP Syntax, PHP variables, statements, operators, decision making, loops, arrays, strings, forms, get and post methods, functions.

Introduction to cookies, storage of cookies at client side, Using information of cookies. Creating single or multiple server side sessions. Timeout in sessions, Event management in PHP. Introduction to content management systems based on PHP.

3. PHP and My SQL

Introduction to My SQL, connecting to My SQL, database, creation, insertion, deletion and retrieval of My SQL data using PHP.

LIST OF PRACTICALS

1. Design PHP based web pages using correct PHP, CSS, and XHTML syntax, structure.
2. Create Web forms and pages that properly use HTTP GET and POST protocol as appropriate.
3. Design SQL language within My SQL and PHP to access and manipulate databases.
4. Install and configure both PHP and My SQL.
5. Create PHP code that utilizes the commonly used API library functions built in to PHP.
6. Design and create a complete web site that demonstrates good PHP/My SQL client/server design.
7. To store a cookie using PHP on client side.
8. To save the user session on server side.
9. Design website.

RECOMMENDED BOOKS

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Julie C. Meloni	Sams Teach Yourself PHP, MySQL, and Apache All in One"	SAMS ,ISBN 0-672-32976-X
2	Ivan Byross	Web enabled development application	TMH
3	Schafer	HTML, CSS, JavaScript, Perl, Python and PHP	Wiley India

COURSE OUTCOMES:

After completion of this course the student will be able to

1. compare and contrast the use of various mark-up languages
2. develop simple websites using HTML, Java Script and CSS
3. create simple programmes to validate forms in PHP
4. develop PHP programs using database.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	-	2	-	2	2	1	1
CO2	2	1	1	1	-	2	1	1	1
CO3	2	2	-	2	-	2	2	1	1
CO4	2	1	-	-	-	2	-	1	1
Total	8	6	1	5	-	8	5	4	4
Average	2	1.5	1	1.67	-	2	1.67	1	1

PR-2 Computer Graphics & Multimedia Lab

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	Term End Examination:	50 Marks

RATIONALE:

- Multimedia is creative combination of Multimedia Elements (Text, Video, Audio, Animation, Images).It combines audio, image, video, graphics, and text, multimedia deepens the need for efficient representation, networking, and support.
- It excites ears, eyes , fingertips and our thought (head).
- It is Science and Art
- It can be Interactive or Non Interactive
- It conveys concepts through words, pictures, and sounds
- The process of employing a variety of digital images, synchronized and perhaps embedded within one another, or within an application, to present and transmit information.

World is moving in direction of Multimedia Highway which is convergence of various services for several services anytime anywhere in the world. This content is being created to create a e-reference for students, professionals, learners in field of multimedia.

OBJECTIVES

After going through the subject, the student will be able to

- Write programs involving different multimedia formats
- Create simple 2D animations Write Java 3D components and reason about their behaviour
- Create dynamic 3D environments.

LIST OF PRACTICALS

Graphics

1. Program to implement a line using slope intercept formula.
2. Program to implement line using DDA algorithm.
3. Program to implement line using Bresenham's algorithm.
4. Program to implement circle using mid-point algorithm.
5. Program to implement translation of a line and triangle.
6. Program to implement rotation of a line and triangle.
7. Program to implement scaling transformation.
8. Write a program using function & Fill the Circle with Red color.

Photoshop

1. The concept of Photoshop.
2. How to open a document. How to save the document.
3. How to create a new document with the needed resolution.
4. How to select an area, copy and paste the selection.
5. How to save images for the web and their formats.
6. The use of layers and the history palette. How to print our document.
7. How to use the text editor. How to Crop Image in Photoshop & Sharpen Image?
8. Procedure to Removing & Adding Backgrounds images. Procedure to Convert Color Photos to Black & White.
9. How to Create a passport size images? How to Change Eye Color & Hair Color?
10. How to Add Rain in Photoshop? How to make a GIFs File?

Flash
1. Procedure to create an animation to represent the growing moon.
2. Procedure to create an animation to indicate a ball bouncing on steps.
3. Procedure to simulate movement of a cloud. Procedure to draw the fan blades and to give proper animation. Procedure to display the background given (filename: tulip.jpg) through your name.
4. Procedure to create an animation with the following features.
5. Procedure to design a visiting card containing at least one graphic and text information.
6. Procedure to prepare a cover page for the book in your subject area. Plan your own design. Procedure to adjust the brightness and contrast of the picture so that it gives an elegant look.
7. Procedure to position the picture preferably on a plain background of a colour of your choice - positioning includes rotation and scaling.
8. Procedure to type a word and apply the effects shadow embosses.

RECOMMENDED BOOKS

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	MALAY K. PAKHIRA	Computer Graphics, Multimedia and Animation	PHI
2	D. P. MUKHERJEE	FUNDAMENTALS OF COMPUTER GRAPHICS AND MULTIMEDIA	PHI

COURSE OUTCOMES:

After completion of this course the student will be able to

1. create images by writing programs using different graphics algorithms
2. acquire knowledge to create images in proper file formats.
3. create 2D animations.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	2	1	1	2	1	1
CO2	2	-	-	1	1	1	2	1	2
CO3	2	-	-	1	1	1	2	1	2
Total	6	-	-	4	3	3	6	3	5
Average	2	-	-	1.33	1	1	2	1	1.67

PR-3 PYTHON PROGRAMMING LAB

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	Term End Examination:	50 Marks

RATIONALE:

This course introduces to the students the Python language. Upon completion of this course, the student will be able to write non trivial Python programs dealing with a wide variety of subject matter domains. Topics include language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions

LEARNING OUTCOMES

After undergoing the course, the students will be able to:

- Execute Python code in a variety of environments
- Use correct Python syntax in Python programs
- Use the correct Python control flow construct
- Write Python programs using various collection data types
- Write home grown Python functions
- Use many of the standard Python modules such as os, sys, math, and time
- Trap various errors via the Python Exception Handling model
- Use the IO model in Python to read and write disk files
- Create their own classes and use existing Python classes. Understand and use the Object Oriented paradigm in Python programs
- Use the Python Regular Expression capabilities for data verification

DETAILED CONTENTS

1. Introduction
- Brief History of Python
- Python Versions
- Installing Python
- Environment Variables
- Executing Python from the Command Line
- IDLE
- Editing Python Files
- Python Documentation
- Getting Help
- Dynamic Types
- Python Reserved Words
- Naming Conventions

2. Basic Python Syntax
- Basic Syntax
- Comments
- String Values
- String Methods

- Standard Modules - math
- Standard Modules - time
- The dir Function

7. Exceptions
- Errors
- Runtime Errors
- The Exception Model
- Exception Hierarchy
- Handling Multiple Exceptions
- Raise
- assert

8. Input and Output
- Introduction
- Data Streams
- Creating Your Own Data Streams
- Access Modes
- Writing Data to a File
- Reading Data From a File
- Additional File Methods
- Using Pipes as Data Streams
- Handling IO Exceptions

9. Classes in Python
- Classes in Python
- Principles of Object Orientation
- Creating Classes
- Instance Methods
- File Organization
- Special Methods
- Class Variables
- Inheritance
- Polymorphism

10. Regular Expressions
- Introduction
- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling Regular Expressions

- Flags

LIST OF PRACTICALS

1. Write instructions to perform each of the steps below
   a. Create a string containing at least five words and store it in a variable.
   b. Print out the string.
   c. Convert the string to a list of words using the string split method.
   d. Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).
   e. Print out the sorted, reversed list of words.
2. Write a program that determines whether the number is prime.
3. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?
4. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.
5. Find the largest of n numbers, using a user defined function largest().
6. Write a function my Reverse() which receives a string as an input and returns the reverse of the string.
7. Check if a given string is palindrome or not.
8. WAP to convert Celsius to Fahrenheit
9. Find the ASCII value of charades
10. WAP for simple calculator

Methodology

The Students shall be taught about the Syntax of Python Language which is similar to other High level languages in the initial 8 to 10 classes. Then after learning the syntax the students shall Write the codes for the Practical Exercise and Test its results in the Lab.

RECOMMENDED BOOKS

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	C Satyanarayan M, Radhika Mani, B N Jagdesh	Python Programming	University Press
2	Mark Lutz	Learning Python by Mark Lutz	Pratham Books, Bangalore
3	Robert Richards	Python Programming For Beginners: A Must Read Introduction to Python Programming	Pratham Books, Bangalore

COURSE OUTCOMES:

After completion of this course the student will be able to

1. express the the basic concept of Phython programming language
2. write programs using the concept of Phython
3. analyze various errorsthrough the Python Exception Handling model

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	3	3	-	1	-	2	1
CO2	2	1	3	2	-	1	-	1	1
CO3	2	2	2	2	-	1	-	1	1
Total	6	4	8	7	-	3	-	4	3
Average	2	1.3	2.7	2.33	-	1	-	1.33	1

Pr 4. PROJECT WORK (Phase-I)

Total Period:	60	Maximum marks:	75 Marks
Lab periods:	4P / week	Term Work/ Sessional:	25 Marks
Examination:	3 Hours	Term End Examination:	50 Marks

RATIONALE:

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of software engineering/ Hardware design and practices in real life situations, so as to participate and manage a large software engineering projects and /or appropriate Hardware with embedded software, in future.

Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as _Project Phase-I_ and balance portion to be covered in 6th Semester shall be named as _Project Phase-II_.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in software/hardware design.
- To develop the skill of writing Project Report

General Guidelines

The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. Preferably there should not be more than 5 students, if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

Following are the broad suggestive areas of project work

- Database Management Systems.
- Software Engineering and Software Development.
- Web page Designing.
- Computer Graphics and Animation.
- Multimedia Systems.
- Computer Networks.
- Internet and e-commerce.
- Computer Security and Cryptography.
- Computer hardware and embedded systems.
- Improving existing systems / equipment.
- Any other related area found worth.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1	Selection of project assignment
2	Planning and execution of considerations
3	Quality of performance
4	Providing solution of the problems or production of final product
5	Sense of responsibility
6	Self expression/ communication/ Presentation skills
7	Interpersonal skills/human relations
8	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

Project Phase-I and Phase-II

The Project work duration shall cover 2 semesters(5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th sem under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Requirements specification, DFD and Design of the system have to be complete in Phase-I. Coding may also begin in this phase. Project Milestones are to be set so that progress can be tracked. In Phase-II Coding, Testing, Documentation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-I in 5th semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. gather knowledge over the field of programming language and design or plan about the proposed project
2. analyze and design a software project.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	2	2	1	2	3	2	1
CO2	2	2	2	2	2	2	3	2	1
Total	4	4	4	4	3	4	6	4	2
Average	2	2	2	2	2	2	3	2	1

		STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA							
		TEACHING AND EVALUATION SCHEME FOR SIXTH SEMESTER INFORMATION TECHNOLOGY (w.e.f. 2020-21)							
DISCIPLINE: INFORMATION TECHNOLOGY			**SEMESTER: 6TH**						
			PERIODS			**EVALUATION SCHEME**			
SL. NO.	**SUBJECT CODE**	**SUBJECT**	**L**	**T**	**P**	**INTERNAL ASSESSMENT/ SESSIONAL**	**END SEM EXAM**	**EXAM (HOURS)**	**TOTAL**
THEORY									
1	Th. 1	CRYPTOGRAPHY & NETWORK SECURITY	4	-	-	20	80	03	100
2	Th. 2	INTERNET OF THINGS	4	-	-	20	80	03	100
3	Th. 3	CLOUD COMPUTING	4	-	-	20	80	03	100
4	Th. 4	**ELECTIVE** A. SOFTWARE TESTING, B. DATA SCIENCE & ANALYTICS C. C. E-COMMERCE	4	-	-	20	80	03	100
		TOTAL	**16**	**-**	**-**	**80**	**320**	**-**	**400**
PRACTICAL / TERM WORK									
6	Pr. 1	NETWORK SECURITY LAB	-	-	4	25	50	03	75
7	Pr. 2	INTERNET OF THINGS LAB	-	-	4	50	50	03	100
8	Pr. 3	PROJECT PHASE - II	-	-	10	50	100	03	150
9	Pr. 4	LIFE SKILL	-	-	2	25	-	03	25
10		STUDENT CENTERED ACTIVITIES(SCA)	-	-	3	-	-	-	
		TOTAL	**-**	**-**	**23**	**150**	**200**	**-**	**350**
		GRAND TOTAL	**16**	**-**	**23**	**230**	**520**	**-**	**750**
Abbreviations: L-Lecturer, T-Tutorial, P-Practical. Each class is of minimum 55 minutes duration									
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%									
SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies etc. Seminar and SCA shall be conducted in a section.									
There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester									

Th-1 CRYPTOGRAPHY & NETWORK SECURITY
COMMON TO (CSE/IT)

Theory periods:	4P / week	**Internal Assessment:**	20
Total Period:	60	**End Semester Examination:**	80
Examination:	3 hrs	**Total marks:**	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	POSSIBLE ATTACKS ON COMPUTERS	05
2	CRYPTOGRAPHY CONCEPTS	10
3	SYMMETRIC & ASYMMETRIC KEY ALGORITHMS	15
4	DIGITAL CERTIFICATE & PUBLIC KEY INFRASTRUCTURE	10
5	INTERNET SECURITY PROTOCOLS	10
6	USER AUTHENTICATION	04
7	NETWORK SECURITY & VPN	06
	TOTAL	60

B. RATIONALE:

Now a day almost all It related jobs use the internet as the backbone service. Therefore, it is highly essential for an IT professional to have a fare idea on the security aspect of internet service. This paper aims to provide the student with the various security threats in internet and discuss the different techniques to implement this. One of such technique is implementation of cryptography in the confidential data to be floated in the internet.

C. OBJECTIVE: After completion of this course the student will be able to:
- Understand the basic concepts that of security approach.
- Learn about different attack on the computer systems.
- Learn about the measures to save computer hardware and software.
- Understand different certification to ensure security.
- Learn about basic concepts of firewalls and their use.
- Understand privacy and security.

D. DETAIL CONTENTS:
1. Possible attacks on Computers
   1.1. The need for security
   1.2. Security approach
   1.3. Principles of security
   1.4. Types of attacks
2. Cryptography Concepts
   2.1. Plain text & Cipher Text
   2.2. Substitution techniques
   2.3. Transposition techniques
   2.4. Encryption & Decryption
   2.5. Symmetric & Asymmetric key cryptography
3. Symmetric & Asymmetric key algorithms
   3.1. Symmetric key algorithm types

3.2. Overview of Symmetric key cryptography

3.3. Data encryption standards

3.4. Over view of Asymmetric key cryptography

3.5. The RSA algorithm

3.6. Symmetric & Asymmetric key cryptography

3.7. Digital signature

4. **Digital certificate & Public key infrastructure**

4.1. Digital certificates

4.2. Private key management

4.3. PKIX Model

4.4. Public key cryptography standards

5. **Internet security protocols**

5.1. Basic concept

5.2. Secure socket layer

5.3. Transport layer security

5.4. Secure Hyper text transfer protocol(SHTTP)

5.5. Time stamping protocol (TSP)

5.6. Secure electronic transaction (SET)

6. **User authentication**

6.1. Authentication basics

6.2. Password

6.3. Authentication Tokens

6.4. Certificate based authentication

6.5. Biometric authentication

7. **Network Security & VPN**

7.1. Brief introduction of TCP/IP

7.2. Firewall

7.3. IP Security

7.4. Virtual Private Network (VPN)

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

BOOKS Recommended: -

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	A. Kahate	Cryptography & Network security	TMH
2	W.Stallings	Cryptography & Network Security Principals and Practices	Prentice Hall
3	Pachghare	Cryptography & Information security	PHI

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the basic concepts of security approaches and examining various attacks on the computer system
2. apply symmetric & asymmetric algorithms to save computer hardware

3. learn about various internet security protocols and evaluating different certifications
4. acquire knowledge of the basic concepts of Firewalls, IP Security, VPN and their use.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	2	-	1	2	2
CO2	1	3	-	2	2	-	1	2	1
CO3	1	2	-	2	2	-	1	2	2
CO4	3	1	2	2	3	1	2	2	3
Total	7	7	3	7	9	1	5	8	8
Average	1.75	1.75	1.5	1.75	2.25	1	1.25	2	2

TH-2 INTERNET OF THINGS

(Common to CSE/IT)

Theory periods:	4P / week	**Internal Assessment:**	20
Total Period:	60	**End Semester Examination:**	80
Examination:	3 hrs	**Total marks:**	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	Introduction to Internet of Things	06
2	IoT Networking	06
3	Connectivity Technologies	06
4	Wireless Sensor Networks	06
5	M2M Communication	06
6	Programming with Arduino	05
7	Programming with Raspberry Pi	05
8	Software defined Networking	06
9	Smart Homes	05
10	Smart Cities	05
11	Industrial IoT	04
	TOTAL	60

B. RATIONALE:

IoT is a new Technology which shall make revolutionary changes in all fields of Life including Industries. Smart cities are the best place where applications of IoT can be predominantly seen. IoT involves extensive use of sensors, network, actuators, micro controllers ,software. Using such components in network shall bring versatile usage of IoT through Cloud service.

C. OBJECTIVE: After completion of this course the student will be able to:
- Know what IoT is
- Know Physical and Logical design of IoT
- Understand the other Technology associated with IoT
- Know the areas of applications of IoT
- Understand the concept of IIoT
- Know the working with Arduino and Raspberry Pi

D. D. DETAIL CONTENTS:

1. Introduction to Internet of Things
1.1. Introduction
1.2. Characteristics of IoT
1.3. Applications of IoT
1.4. IoT Categories
1.5. IoT Enablers and connectivity layers
1.6. Baseline Technologies
1.7. Sensor
1.8. Actuator
1.9. IoT components and implementation
1.10. Challenges for IoT

2. IOT Networking

2.1. Terminologies

2.2. Gateway Prefix allotment

2.3. Impact of mobility on Addressing

2.4. Multihoming

2.5. Deviation from regular Web

2.6. IoT identification and Data protocols

3. Connectivity Technologies

3.1. Introduction

3.2. IEEE 802.15.4

3.3. ZigBee, 6LoWPAN

3.4. RFID, HART and wireless HART

3.5. NFC, Bluetooth, Z wave, ISA100.11.A

4. Wireless Sensor Networks

4.1. Introduction

4.2. Components of a sensor node

4.3. Modes of Detection

4.4. Challenges in WSN

4.5. Sensor Web

4.6. Cooperation and Behaviour of Nodes in WSN

4.7. Self Management of WSN

4.8. Social sensing WSN

4.9. Application of WSN

4.10. Wireless Multimedia sensor network

4.11. Wireless Nanosensor Networks

4.12. Underwater acoustic sensor networks

4.13. WSN Coverage

4.14. Stationary WSN, Mobile WSN

5. M2M Communication

5.1. M2M communication

5.2. M2M Ecosystem

5.3. M2M service Platform

5.4. Interoperability

6. Programming with Arduino

6.1. Features of Arduino

6.2. Components of Arduino Board

6.3. Arduino IDE

6.4. Case Studies

7. Programming with Raspberry Pi

7.1. Architecture and Pin Configuration

7.2. Case studies

7.3. Implementation of IoT with Raspberry Pi

8. Software defined Networking

8.1. Limitation of current network

8.2. Origin of SDN

8.3. SDN Architecture

8.4. Rule Placement, Open flow Protocol

8.5. Controller placement

8.6. Security in SDN

8.7. Integrating SDN in IoT

9. Smart Homes

9.1. Origin and example of Smart Home Technologies

9.2. Smart Home Implementation

9.3. Home Area Networks(HAN)

9.4. Smart Home benefits and issues

10. Smart Cities

10.1. Characteristics of Smart Cities

10.2. Smart city Frameworks

10.3. Challenges in Smart cities

10.4. Data Fusion

10.5. Smart Parking

10.6. Energy Management in Smart cities

11. Industrial IoT

11.1. IIoT requirements

11.2. Design considerations

11.3. Applications of IIoT

11.4. Benefits of IIoT

11.5. Challenges of IIoT

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

Books Recommended :-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Jeeva Jose	Internet of Things	Khanna Books
2	Arsheep Bhaga, Vijay Madisetti	Internet of Things-A Hands-on approach	University press

COURSE OUTCOMES:

After completion of this course the student will be able to

1. identify the factors that contributes to IOT networking and connectivity technology
2. analyse basic protocols in wireless sensor network and communications.
3. slove problems using the programming skill in Arduino and Raspberry Pi.
4. Relate the use and application of IOT in industry

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	1	2	1	2	2	2
CO2	1	3	2	2	2	1	2	2	1
CO3	1	2	3	2	2	1	2	2	2
CO4	3	1	2	2	3	1	2	2	3
Total	8	7	8	7	9	4	8	8	8
Average	2	1.75	2	1.75	2.25	1	2	2	2

Th-3 CLOUD COMPUTING

(Common to CSE/IT)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION TO CLOUD COMPUTING	05
2	CLOUD COMPUTING ARCHITECTURE	08
3	SCALABILITY AND FAULT TOLERANCE	08
4	CLOUD MANAGEMENT AND VIRTUALISATION TECHNOLOGY	08
5	VIRTUALISATION	08
6	CLOUD SECURITY	08
7	CLOUD COMPUTING SECURITY ARCHITECTURE	05
8	MARKET BASED MANAGEMT OF CLOUDS	05
9	HADOOP	05
	TOTAL	60

B. RATIONALE:

Cloud computing is one of the emerging topics in Information Technology. It is the biggest buzz in the computer world. Cloud computing means you can deliver applications to your end user faster than ever, without investing in new infrastructure, training new personnel or licensing new software. It is a practical approach to experience direct cost benefits and easy to use for the users.

C. Objective : After completion of this course the student will be able to:
- Understand the basic concepts of cloud and cloud architecture.
- Learn about different cloud computing technology.
- Learn about the service levels for cloud applications.
- Provides a practical exposure to professionals intending to work in cloud computing environment.
- Understand the map reduce model and its application.
- Learn about basic concepts of software productivity in a cloud.
- Understand web services and platforms.

D. DETAIL CONTAINS:

1. Introduction To Cloud Computing
   1.1. Historical development
   1.2. Vision of Cloud Computing
   1.3. Characteristics of Cloud computing
   1.4. Cloud computing Reference model
   1.5. Cloud computing environment
   1.6. Cloud Service requirements
   1.7. Cloud and Dynamic Infrastructure
   1.8. Cloud Adoption
   1.9. Cloud applications

2. Cloud Computing Architecture
   2.1. Introduction
   2.2. Cloud Reference Model
   2.3. Types of Clouds

2.4. Cloud Interoperability and standards

2.5. Cloud computing Interoperability use cases

2.6. Role of standards in Cloud Computing environment

3. Scalability and Fault Tolerance

3.1. Introduction

3.2. Scalability and Fault Tolerance

3.3. Cloud solutions

3.4. Cloud Ecosystem

3.5. Cloud Business process management

3.6. Portability and Interoperability

3.7. Cloud Service management

3.8. Cloud Offerings

3.9. Testing under Control

3.10. Cloud service Controls

3.11. Virtual desktop Infrastructure

4. Cloud Management and Virtualisation Technology

4.1. Create a virtualised Architecture

4.2. Data Centre

4.3. Resilience

4.4. Agility

4.5. Cisco Data Centre Network architecture

4.6. Storage

4.7. Provisioning

4.8. Asset Management

4.9. Concept of Map Reduce

4.10. Cloud Goverance

4.11. Load Balancing

4.12. High Availability

4.13. Disaster Recovery

5. Virtualisation

5.1. Virtualisation

5.2. Betwork Virtualisation

5.3. Desktop and Application Virtualisation

5.4. Desktop as a service

5.5. Local desktop Virtualisation

5.6. Virtualisation benefits

5.7. Server Virtualisation

5.8. Block and File level Storage Virtualisation

5.9. Virtual Machine Monitor

5.10. Infrastructure Requirements

5.11. VLAN and VSAN

6. Cloud Security

6.1. Cloud Security Fundamentals

6.2. Cloud security services

6.3. Design Principles

6.4. Secure Cloud software requirements

6.5. Policy Implementation

    6.6.   Cloud Computing Security Challenges

7.   Cloud Computing Security Architecture

    7.1.   Architectural Considerations

    7.2.   Information Classification

    7.3.   Virtual Private Networks

    7.4.   Public Key and Encryption Key management

    7.5.   Digital certificates

    7.6.   Key management

    7.7.   Memory Cards

    7.8.   Implementing Identity Management

    7.9.   Controls and Autonomic System

8.   Market Based Management of Clouds

    8.1.   Cloud Information security vendors

    8.2.   Cloud Federation, charactrization

    8.3.   Cloud Federation stack

    8.4.   Third Party Cloud service

    8.5.   Case study

9.   Hadoop

    9.1.   Introduction

    9.2.   Data Source

    9.3.   Data storage and Analysis

    9.4.   Comparison with other system

<u>**Coverage of Syllabus upto Internal Exams (I.A.)**</u>

Chapter 1,2,3,4

BOOKS Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Pankaj Sharma	Cloud Computing	Katson Books
2	Dr. U.S. Pandey , Dr. KavitaChoudhary	Cloud Computing	S. Chand
3	PrasantkumarPattnaik, ManasRanjanKabat , Souvik Pal	Fundamentals of Cloud Computing	Vikas

COURSE OUTCOMES:

After completion of this course the student will be able to

1.   Acquire knowledge of cloud and cloud architecture and understand cloud computing technology
2.   Understand the service levels for cloud applications and use these applications to work in cloud computing environment.
3.   Simplify the map reduce model and its application.
4.   Implement the concept of software productivity in a cloud and web services and platforms.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	2	-	2	-	2
CO2	-	2	-	-	1	-	2	-	2
CO3	1	2	-	-	1	-	2	-	1
CO4	-	-	2	2	2	1	2	-	1
Total	4	4	2	2	6	1	8	-	6
Average	2	2	2	2	1.5	1	2	-	1.5

Th-4(a) SOFTWARE TESTING (ELECTIVE)

Theory periods:	4P / week	**Internal Assessment:**	20
Total Period:	60	**End Semester Examination:**	80
Examination:	3 hrs	**Total marks:**	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION TO S/W TESTING	08
2	S/W VERIFICATION AND VALIDATION	06
3	FUNCTIONAL TESING TECHNIQUES	10
4	STRUCTURAL TESTING TECHNIQUES	10
5	GRAY BOX TESTING	06
6	REDUCING NUMBER OF TEST CASES	06
7	LEVELS OF TESTING	06
8	AUTOMATED TESTING	08
	TOTAL	60

B. RATIONALE:

Software Testing has emerged as a special branch of software engineering which focuses on different techniques used for testing a software. Success of software lies on this step which is very critical in nature. This paper mostly deals with the different testing strategies and methods.

C. Objective : After completion of this course the student will be able to:
- Understand the basic need of software testing.
- Learn about different techniques of authenticity software development.
- Learn about the kinds of Tools available for software testing.
- Understand different validation and verification procedure of software for certification.
- Learn about basic concepts of automated testing.
- Understand how to make a developed software ready for implementation

D. COURSE CONTENT
1. Introduction to S/w Testing
1.1. Introduction
1.2. Testing Process
1.3. What is s/w Testing
1.4. Purpose of testing
1.5. who should test
1.6. what to test
1.7. selection of good test case
1.8. Measurement of progress
1.9. Incremental testing approach
1.10. Basic terminology
1.11. Testing Life cycle
1.12. when to stop testing
1.13. Principle of testing
1.14. Limitation of testing
1.15. Availability of testing tool, techniques, metrics

2. S/W verification and Validation
2.1. Introduction
2.2. Verification and Validation

8.4. problems with manual Testing

8.5. Benefits of Automated Testing

8.6. Disadvantages of Automated testing

8.7. Skill needed for using automated tools

8.8. Test Automation

8.9. Debugging

8.10. criteria for selection of test tools

8.11. steps for tool selection

Coverage of Syllabus upto Internal Exams (I.A.)

Chapter 1,2,3,4

BOOKS Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Er. Rajiv Chopra	Software Testing	S.K Kataria &sons

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand the methods to find out the defects which may get created by the programmer while developing the software.
2. Make sure that the end product meets the user requirements.
3. Gain confidence in providing information about the level of quality of a software product
4. Develop framework to detect defect and reduce or stop defect propagation to other phases of Software Development

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	2	1	2	2	1	-
CO2	3	2	2	2	1	2	2	2	1
CO3	3	2	2	2	1	2	2	1	1
CO4	3	2	2	2	1	2	2	1	2
Total	12	8	8	8	4	8	8	5	4
Average	3	2	2	2	1	2	2	1.25	1.33

Th-4 (b) DATA SCIENCE AND ANALYTICS (Elective)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

A. Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTRODUCTION TO DATA SCIENCE	10
2	DATA MANAGEMENT USING 1BM SPSS	10
3	DATA ANALYSIS USING R PROGRAMMING LANGUAGE	10
4	DATA VISUALISATION	08
5	APPLICATION OF DATA SCIENCE,TECHNOLOGY FOR VISUALISATION AND BOKEH	12
6	RECEND TRENDS IN DATA SCIENCE	10
	TOTAL	60

B. RATIONALE:

Voluminous data are being created in the world every year. Ability to take data, to be able to understand it, to process it, to extra value from it, to visualize it etc are important at the professional level. Data Science and Data Analytics is the are the upcoming concepts in IT field to look after the voluminous data analysed and presented in meaningful manner.

C. Objective : After completion of this course the student will be able to:
- Understand the basic concepts of Data Science.
- Learn about data management acivities
- Learn basics of Data Analysis.
- Learn about data visualisation
- Learn Applications of Data Science, Technologies for visualisation.
- Learn about Recent Trends in Data Science.

D. COURSE CONTENT

1. Introduction to Data Science
   1.1. Data Science
   1.2. Related Terminology
   1.3. Methods of Data Repository
   1.4. Personnel involved in Data Science
   1.5. Types of Data
   1.6. Data Science Process
   1.7. Popular Data Science Toolkits
   1.8. Existing Applications

2. Data Mangement Using 1BM SPSS
   2.1. Data Management Planning
   2.2. Data management Plan
   2.3. Data Collection and Management
   2.4. Application Programming Interface
   2.5. Exploring Data and Building Models
   2.6. Storage Management, Importing Data

3. Data Analysis using R Programming Language
   3.1. Applied Statistical Techniques
   3.2. Types of Statistical Data

3.3. Types of Big Data Analytics

3.4. Collecting Data for Sampling and Distribution

3.5. Probability, Frequency Distribution

3.6. Population and Parameters

3.7. Central tendency and Central Value

3.8. Measures of Central Tendency

3.9. Different types of Statistical Means

3.10. Estimation Problem

3.11. Normal Distribution Curve

4. **Data Visualisation**

4.1. Data Visualisation and its importance

4.2. Data Visualization methods

4.3. Variables and Encoding

5. **Applications of Data Science, Technologies for Visualisation**

5.1. Applications of Data Science Technologies for visualisation

5.2. Python Programming

5.3. Data Types, Operations

5.4. Modules, Library

5.5. Introduction to Bokeh

6. **Recent Trends in Data Science**

6.1. Data collection and Analysis Techniques

6.2. Big Data Visualisation Tools and Visualising

6.3. Preattentive Attributes

6.4. Challenges of Big Data Visualisation

6.5. Potential Solution

6.6. Future Progress of Big Data Visualisation

<u>**Coverage of Syllabus upto Internal Exams (I.A.)**</u>
Chapter 1,2,3,4

BOOKS Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	V.K Jain	Data Science and Analytics	Khanna Publishing House

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understand the basic concepts of Data Science
2. Describe about data management activities and basics of Data Analysis.
3. Acquire knowledge about data visualisation
4. Classify the applications of Data Science, Technologies for visualisation and get knowledge about Recent Trends in Data Science

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	1	-	-	-	1	1	1
CO2	1	-	1	-	-	-	1	1	1
CO3	2	-	1	-	-	-	1	1	1
CO4	2	-	1	-	-	-	1	1	1
Total	7	-	4	-	-	-	4	4	4
Average	1.75	-	1	-	-	-	1	1	1

Th-4 (c) E-Commerce (Elective)

Theory periods:	4P / week	Internal Assessment:	20
Total Period:	60	End Semester Examination:	80
Examination:	3 hrs	Total marks:	100

Topic wise distribution of periods

Sl. No.	Topic	Periods
1	INTORODUCTION TO E-COMMERCE	08
2	BUSINESS MODELS OF E-COMMERCE	05
3	B2B E-COMMERCE AND EDI	10
4	BUSINESS APPLICATIONS OF E-COMMERCE	07
5	E-COMMERCE IN TECHNOLOGY	08
6	ELECTRONIC PAYMENT SYSTEM	08
7	SECURITY ISSUES IN E-COMMERCE	08
8	CURRENT TRENDS IN ELECTRONIC WORLD	06
	TOTAL	60

RATIONALE:

The internet revolution is sweeping the globe with such swiftness that firms and companies around the world are trying to understand, what is occurring, what it all means, where it is going and how to leverage this new opportunity. The purpose of this study are to address several of the underline rational to analysis digital divide, to purpose possible some specific proposition best on the extensive literature search provided here. It is identified that the e-commerce platform is one of the top most technology in investment priorities'-commerce platform are the backbone of any digital channel and replacing legacy home grown systems.

OBJECTIVES:

- Understand the concept of market and availability of products.
- Understand how to make trading in online mode.
- Have a concept of selection of commodities and goods.
- Know the process of searching for your requirements electronically.
- Find a way to compare the quality and cost of each and every item as per your requirement.
- Know the way to make purchase in online mode by electronic payment system.
- Understand how to make the payments secured and private.
- Know the concepts and requirement of different Firewalls.

COURSE CONTENT

1. **Intoroduction to E-Commerce**
   1.1. Introduction
   1.2. what is E-commerce
   1.3. E-Business
   1.4. Categories of E-Commerce Applications
   1.5. Global Trading Environment & Adoption of E-commerce
   1.6. Comparison between traditional and E-commerce
   1.7. Advantage and Disadvantage
2. **Business Models of E-Commerce**

6.5. Risk Management option

6.6. Payment Gateway

6.7. Issues of Electronic Payment Technology

6.8. Recommendations

6.9. Internet Banking

6.10. Security Requirement

6.11. Secure Socket Layer

6.12. Biometrics

7. Security Issues in E-Commerce

7.1. Introduction

7.2. E-commerce security issues

7.3. Risks involved in e-commerce

7.4. Protecting e-commerce system

7.5. Common E-commerce Security Tools

7.6. Client server Network security

7.7. Data and Message Security

8. Current Trends in Electronic World

8.1. E-waste

8.2. E-Surveillance

8.3. E-governance

BOOKS Recommended:-

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	U.S Pandey and S Sukla	E-commerce and Mobile Commerce Technology By	S.Chand
2	A.K.Pandey	Concepts of e-commerce	Katson
3	Bhushan Dewan	e-commerce	S.Chand & Company Ltd

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the concept and importance of E-Commerce and analyze the impact of E-Commerce on business models and strategy.
2. apply the technologies for supporting e-commerce and internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
3. acquire the knowledge of electronic payment system and implement it in day to day life.
4. understand the security issues in e-commerce and implement the security mechanism and develop current trends in electronic world.

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	-	3	-	2	-	3
CO2	3	2	-	-	-	-	-	-	2
CO3	3	3	-	-	3	-	2	-	3
CO4	3	3	2	2	3	-	2	-	3
Total	12	10	4	2	9	-	6	-	11
Average	3	2.5	2	2	3	-	2	-	2.75

Pr-1 NETWORK SECURITY LAB

Total Period:	60	**Maximum marks:**	75 Marks
Lab periods:	4P / week	**Term Work/ Sessional:**	25 Marks
Examination:	3 Hours	**Term End Examination:**	50 Marks

CONTENTS:

LIST OF PRACTICALS

1. Installation and comparison of various anti virus software
2. Installation and study of various parameters of firewall.
3. Writing program in C to Encrypt/Decrypt using XOR key.
4. Study of VPN.
5. Study of various hacking tools.
6. Practical applications of digital signature

COURSE OUTCOMES:

After completion of this course the student will be able to

1. understand the procedure for installation and comparison of various antivirus software
2. acquire the knowledge of installation and various parameters of firewall and VPN
3. apply the program in 'C' language to Encrypt/Decrypt using XOR key.
4. learn and understand about various hacking tools and practical applications of digital signature

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	1	1	-	-	2	2	2
CO2	1	1	1	1	1	-	2	2	2
CO3	1	-	-	-	-	-	2	1	1
CO4	1	2	2	2	1	-	2	-	2
Total	4	4	4	4	2	-	8	5	7
Average	1	1.3	1.3	1.3	1	-	2	1.7	1.8

Pr-2 IoT LAB

Total Period:	60	Maximum marks:	100 Marks
Lab periods:	4P / week	Term Work/ Sessional:	50 Marks
Examination:	3 Hours	Term End Examination:	50 Marks

CONTENTS

1. Basics of C language using Arduino IDE
    - Understating basics of Arduino IDE
    - Variables, datatype, loops, control statement, function
2. Practical using Arduino-interfacing sensors
    - Interfacing Light Emitting Diode(LED)- Blinking LED
    - Interfacing Button and LED – LED blinking when button is pressed
    - Interfacing Light Dependent Resistor (LDR) and LED, displaying automatic night lamp
    - Interfacing Temperature Sensor(LM35) and/or humidity sensor (e.g.DHT11)
    - Interfacing Liquid Crystal Display(LCD) – display data generated by sensor on LCD
    - Interfacing Air Quality Sensor-pollution (e.g. MQ135) – display data on LCD , switch on LED when data sensed is higher than specified value.
    - Interfacing Bluetooth module (e.g. HC05)- receiving data from mobile phone on Arduino and display on LCD
    - Interfacing Relay module to demonstrate Bluetooth based home automation application. (using Bluetooth and relay).

Books Recommended:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	Vijay Madisetti, ArshdeepBahga,	Internet of Things: A Hands-On Approach	UniversityPress
2	YashavantKanetkar, ShrirangKorde,	Internet Of Things (IOT) xperiments	
3	Neerparaj Rai	Arduino Projects For Engineers	

COURSE OUTCOMES:

After completion of this course the student will be able to

1. Understating basics of Arduino IDE
2. write programs for Arduino
3. interface various sensory devices with Arduino
4. impliment the IoT technologies in practical domains of society

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	-	1	1	2	1
CO2	2	1	1	1	-	1	1	2	1
CO3	2	1	1	1	-	1	1	2	1
CO4	2	1	1	1	-	1	1	2	1
Total	6	3	3	3	-	4	4	8	4
Average	1.5	0.75	0.75	0.75	-	1	1	2	1

Pr-3 PROJECT PHASE – II

Total Period:	150	Maximum marks:	150 Marks
Lab periods:	10P / week	Term Work/ Sessional:	50 Marks
Examination:	3 Hours	Term End Examination:	100 Marks

RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of software engineering/ Hardware design and practices in real life situations, so as to participate and manage a large software engineering projects and /or appropriate Hardware with embedded software, in future. Entire Project spreads over 5th and 6th Semester. Part of the Project covered in 5th Semester was named as Project Phase-I and balance portion to be covered in 6th Semester shall be named as Project Phase-II.

OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in software/hardware design.
- To develop the skill of writing Project Report

Project Phase-I and Phase-II

The Project work duration covers 2 semesters (5th and 6th sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of 5th sem under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Requirements specification, DFD and Design of the system also have to be complete in Phase-I. Coding may also begin in this phase. Project Milestones are to be set so that progress can be tracked.

In Phase-II Coding, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-II in 6th semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1	Selection of project assignment
2	Planning and execution of considerations
3	Quality of performance
4	Providing solution of the problems or production of final product
5	Sense of responsibility
6	Self expression/ communication/ Presentation skills
7	Interpersonal skills/human relations
8	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense intact.

Organisation of Project Report

1. Cover page:
   It should contain the following (in order)
   i)   Title of the Project
   ii)   ―Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>‖
   iii) By Name of the Student(s)
   iv)   Logo of the Institution
   v)   Branch Name/Depart Name and Institution Name with Address
   vi)   Academic Year

2. 1st Inner page
   Certificate:
   It should contain he following
   ―this is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> jas been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>‖ during
   session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).
   Seal and signature of the Supervisor/Guide with date

3. 2nd Inner Page
   Acknowledgement by the Student(s)

4. Contents.

5. Chapter wise arrangement of Reports

6. Last Chapter: Conclusion
   It should contain
      (i) Conclusion
      (ii) Limitations
      (iii) Scope for further Improvement

7. References

COURSE OUTCOMES:

After completion of this course the student will be able to

1. apply Information Technology principles and practices to read world solution.
2. demonstrate effective uses of retain verbal and non verbal comunication
3. Plan a simple project and be able to cintribute to a more complex project as a team member.
4. Develop and apply personal management and team member skills as a proffessional software developers

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	2	2	1	2	3	2	1
CO2	2	2	2	2	2	2	3	2	1
CO3	2	2	2	2	2	2	3	2	2
CO4									
Total	6	6	6	6	5	6	9	6	4
Average	2	2	2	2	1.7	2	3	2	1.3

Pr-4 LIFE SKILL

(Common to All Branches)

Total Period:	30	Maximum marks:	25 Marks
Lab periods:	2P / week	Term Work/ Sessional:	25 Marks

Objective: After completion of this course the student will be able to:

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today's competitive world
- Face interview without fear

DETAIL CONTENTS:

1. **SOCIAL SKILL**

   Society, Social Structure, Develop Sympathy and Empathy
   Swot Analysis – Concept, How to make use of SWOT
   Inter personal Relation: Sources of conflict, Resolution of conflict ,
   Ways to enhance interpersonal relation

2. **PROBLEM SOLVING**

   Steps of Problem solving:

   - ⬜ Identify and clarify the problem,
   - ⬜ Information gathering related to problem,
   - ⬜ Evaluate the evidence,
   - ⬜ Consider alternative solutions and their implications,
   - ⬜ Choose and implement the best alternative,
   - ⬜ Review
   - ⬜ Problem solving techniques:

   1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

3. **PRESENTATION SKILL**

   Body language , Dress like the audience
   Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,
   Voice and language – Volume, Pitch, Inflection, Speed, Pause
   Pronunciation, Articulation, Language, Practice of speech.
   Use of AV aids such as Laptop with LCD projector, white board etc.

4. **GROUP DISCUSSION AND INTERVIEW TECHNIQUES**

   Group Discussion:
   Introduction to group discussion, Ways to carry out group discussion,
   Parameters— Contact, body language, analytical and logical thinking,
   decision making
   Interview Technique :
   Dress, Posture, Gestures, facial expression, Approach
   Tips for handling common questions.

5. **WORKING IN TEAM**

   Understand and work within the dynamics of a groups.
   Tips to work effectively in teams,
   Establish good rapport, interest with others and work effectively with them

to meet common objectives,
Tips to provide and accept feedback in a constructive and considerate way ,
Leadership in teams, Handling frustrations in group.

6. **TASK MANAGEMENT**

Introduction, Task identification, Task planning ,
organizing and execution, Closing the task

PRACTICAL

List of Assignment: *(Any Five to be performed including Mock Interview)*

1. **SWOT analysis:-**

Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.

2. **Solve the True life problem assigned by the Teacher.**

3. **Working in a Team**

Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group where Team work shall be exhibited)

4. **Mock Interview**

5. **Discuss a topic in a group and prepare minutes of discussion.**

6. **Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.**

7. **Task Management**

Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

Note: -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.

Note: -2. The following Topics may be considered for Seminar/GD in addition to other Topics at the discretion of the Teacher.

(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation ,Harassment of Women at Workplace)

METHODOLOGY:

The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.

Books Recommended:

Sl.No	Name of Authors	Title of the Book	Name of Publisher
1	E.H. Mc Grath , S.J	Basic Managerial Skills for	PHI
2	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
3	Adair, J	Decision making & Problem Solving	Orient Longman
4	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
5	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

COURSE OUTCOMES:

After completion of this course the student will be able to

1. develop the social skill and use problem solving process for a given situation
2. understand the effective presentation skill
3. apply task management techniques for given projects in a team

COs, POs and PSOs Mapping

Cos, Pos and PSOs mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	-	-	2	1	1	1
CO2	1	-	-	-	-	1	1	1	1
CO3	1	-	-	-	-	1	2	1	1
Total	3	-	-	-	-	4	4	3	3
Average	1	-	-	-	-	1.33	1.33	1	1