Level 4.5 | First Year

Curriculum for UG Degree Course in BTech. Computer Engg and Information Technology Programmes

(Academic Year: 2023-24 Onwards)

Semester-I

Course Code	Course Title	Teaching Scheme Hours / Week			Cr	Examination Scheme			Total Marks
		L	T	P		ISE	ESE	Pr/Or	
BSC102	Chemistry	3	0	0	**3**	50	50	0	100
BSC103	Linear Algebra and Univariate Calculus	3	1	0	**4**	50	50	0	100
ESC102	Basics of Electrical & Electronics Engineering	3	0	0	**3**	50	50	0	100
IKS101	Indian Knowledge System	2	0	0	**2**	50	0	0	50
CC101	Liberal Learning Course-1	1	0	2	**2**	50	0	0	50
AEC101	Professional Communication	1	0	2	**2**	50	0	0	50
BSC102L	Chemistry Lab	0	0	2	**1**	25	0	0	25
ESC102L	Basics of Electrical & Electronics Engineering Lab	0	0	2	**1**	25	0	0	25
VSEC101L	Programming Skills in C Language Lab	0	0	4	**2**	25	0	25	50
	Total =	**13**	**01**	**12**	**20**	**375**	**150**	**25**	**550**

L=Lecture, T=Tutorial, P= Practical, Cr= Credits, ISE =In Semester Evaluation, ESE =End Semester Examination, Pr/Or = Practical/Oral.

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BSC102 Chemistry

Teaching Scheme
Lectures: 3Hrs/week
Credits: 3

Examination Scheme
In-Semester: 50Marks
End-Semester: 50Marks

Course Objectives

The Chemistry course is designed such that the learners imbibe chemical principles relevant in the engineering context. The course facilitates undergraduates to understand chemical processes, methods of analysis, structure-property relationship and evaluate role of chemical substances for engineering applications. Further the course inculcates basic problem-solving skills involving chemistry principles.

Course Outcomes:

After completion of this course a student should be able to

1. Interpret properties and applications of molecules based on their atomic structure.
2. Analyze quality parameters for water, coal, petrol using analytical methods.
3. Apply chemical principles for problems related to water, batteries, fuel or polymers.
4. Outline the process of synthesis for inorganic substances and nanomaterials.
5. Elucidate the construction and functioning of a device/chemical reagent.

Module 1: Physical Chemistry (13)

Unit 1. Chemical Bonding: Types of bonds, intermolecular forces, bonding in molecules: valence bond theory, molecular orbital theory for diatomic molecules.

Unit 2. Electrochemistry: Electrochemical cell, Nernst equation, EMF of cell, reference and indicator electrodes, battery characteristics, Lead-acid, Lithium-ion battery, Fuel cell technology.

Module 2: Inorganic and Materials Chemistry (13)

Unit 3. General overview of the Periodic table and properties; chemistry of some elements like H, Si and their compounds, Si for chipmaking, H_2 gas as fuel.

Unit 4. (A) Engineering materials: Structural features, properties and applications of OLEDs - PPV (- solar cell), liquid crystal polymers, conducting polymers – as a chemical sensor, polymer composites.

(B) Nanomaterials:

Introduction to nanomaterials, synthesis by top down and bottom-up methods. Structure, synthesis and some typical applications of nanomaterials.

Module 3: Analytical Chemistry (16)

Unit 5. Analysis of -

(A) Water: Hardness determination in water, TDS, effect of hard water in boilers, Internal and external treatment of hardness, water softening techniques -zeolite and ion exchange method. Desalination methods-Reverse osmosis. Electrodialysis. Waste water recycling.

(B) Carbon based fuels: Analysis of coal/petrol.

Unit 6. Analytical techniques such as spectroscopy, pH-metry, conductometry and their applications.

Text Books:

1. S.S. Dara 'Engineering Chemistry' S. Chand Publications (2010)
2. B.S. Chauhan 'Engineering Chemistry': Univ Sc Press. (Third edition)2009
3. Shashi Chawla 'A Text Book of Engineering Chemistry': Dhanpat Rai & Co. (2015)
4. Jain and Jain 'A Text Book of Engineering Chemistry' Dhanpat Rai & Co.
5. G. Chatwal 'Instrumental methods of Chemical Analysis' Himalaya publication house

Reference Books:

1. Steven S. Zumdahl, 'Chemistry concepts and applications', Cengage learning publication (2009)
2. Ram D. Gupta, 'Hydrogen fuel 'C.R.C. Publications (2009)
3. Puri, Sharma, Pathania 'Principles of Physical Chemistry': Vishal Publ. Co.
4. Robert Braun' Instrumental methods of analysis' Pharma med press (2010)
5. J.D. Lee, 'Concise Inorganic Chemistry', 4th edition, Wiley Publication (2019)

BSC103 Linear Algebra and Univariate Calculus

Teaching scheme
Lectures: 3hrs/week

Tutorial: 1hr/week

Number of Credits: 4

Examination scheme
In-Sem Exam: **50** Marks

End-Sem Exam: **50** Marks

Course Objectives:

1. To familiarize the prospective engineers with techniques in linear algebra and calculus of one variable.
2. To equip the students with standard concepts and tools in linear algebra and calculus of one variable which they will find useful in their disciplines.

Course Outcomes:
After completion of this course a student should be able to

CO1: Use matrix method to solve linear system of equations, Linear Transformations.

CO2: Calculate eigenvalues, eigenvectors and apply it to diagonalize a matrix.

CO3: Apply knowledge of linear algebra to solve simple real life problems.

CO4: Compute differentiation, series expansion, integration of function of one variable.

Unit-I: Matrices **(08)**

Rank of a matrix, Echelon form, System of linear equations, Euclidean vector spaces and Linear Transformations

Unit-II: Diagonalization of a Matrix **(08)**

Eigenvalues, Eigenvectors, Properties of Eigenvalues, Diagonalization of a matrix

Unit-III: Applications of Linear Algebra **(09)**

Introduction to Modular Arithmetic, Euclid's algorithm, Encrypt and decrypt the statement using matrix, Applications to simple real life problems

Unit-IV: Differential Calculus **(08)**

Successive differentiation, nth order derivatives of some standard functions, Taylor's and Maclaurin's theorem, Standard series expansions

Unit-V: Integral Calculus **(09)**

Reduction formulae, Beta Function, Gamma function, Differentiation under integral sign, Error function

Text-Books:

1. David Poole,' Linear Algebra: A Modern Introduction', 2nd Edition, Brooks/Cole (2005).
2. B. V. Ramana ,'Higher Engineering Mathematics', *Tata McGraw-Hill Publications*, (2007).
3. B.S. Grewal, 'Higher Engineering Mathematics', *Khanna publishers*, Delhi (40thedition), (2008).

Reference Books:

1. C.R. Wylie, L. C. Barrette, 'Advanced Engineering Mathematics', *McGraw-Hill Publications, New Delhi* (6 th edition),(2006)
2. Maurice Weir, Joel Hass, Thomas 'Calculus' , 12th edition, *Pearson India*(2016)
3. George Thomas, Jr., Ross Finney, Late, Calculus, 9th edition, *Pearsons India*
4. Sudhir Ghorpade, Balmohan Limaye, 'A Course in Calculus and Real Analysis', (Undergraduate Text in Mathematics), *Springer*(2006).
5. Erwin Kreyszig, 'Advanced Engineering Mathematics', *Wiley Eastern Ltd*(10thEdition), (2017)

ESC102 Basic Electrical and Electronics Engineering

Teaching Scheme:	**Examination Scheme**
Lectures: 3 Hrs./Week	In-Semester: **50** Marks
Credits: 3	End-Semester: **50** Marks

Course Objectives:

1. To educate the students about the realization of basic theoretical concepts & laws in electrical engineering in real physical world.
2. To make students familiar with three phase supply.
3. To make students familiar with single phase transformers.
4. To understand the construction and applications of diode and BJT
5. To understand basics of combinational logic, Boolean algebra and flip -flops.

Course Outcomes:

After completion of course, students will be able to
CO1: Analyze and calculate parameters of DC circuits
CO2: Analyze and calculate parameters of AC circuits
CO3: Calculate performance parameters of single-phase transformer.
CO4: Analyze I-V characteristics of semiconductor diodes and transistors and design simple analog circuits using these devices
CO5: Build simple combinational and sequential logic circuits.

Unit – I: DC Networks **(08)**

Kirchhoff's laws, Mesh and Nodal Analysis, Thevenin and Superposition Theorems, maximum power transfer theorem, Network Simplifications using star-delta / delta-star transformations.

Unit – II: AC Circuits **(07)**

Series and parallel RL, RC and RLC circuits , concept of Impedance and admittance, power triangle and power factor. Resonance in series and parallel RLC circuit, Three phase voltage generation and waveform, star and delta balanced systems. Relationship between phase and line quantities, phasor diagram, power in a three phase circuit.

Unit – III: Electromagnetism and Single Phase Transformers **(06)**

Magnetic materials and B-H curve, self and mutual inductance,1 Φ transformer: concept, types, working, ideal transformer, practical transformer, equivalent circuit, phasor diagram, efficiency and regulation calculations.

Unit – IV: Diodes and rectifiers **(07)**

Construction and characteristic of p-n junction diode, LED, photodiode, Half wave, full wave and bridge rectifiers, need of capacitor filter, rectifier operation with capacitor filter, Zener diode as a voltage regulator, block diagram of Regulated power supply

Unit – V: Junction Transistor Amplifiers **(07)**

Bipolar junction transistor, Construction of BJT, Types of biasing:-fixed bias and self bias circuit, BJT characteristics for-CE,CB,CC configurations, relationship between α and β, load line for a transistor, application of transistor as a switch and amplifier.

Unit – VI: Digital Electronics **(07)**

Basic gates, implementation of basic gates using universal gates, Boolean algebra, standard representation of logic functions (SOP and POS forms), Introduction of Combinational logic circuits like multiplexer ,demultiplexer, half adder and full adder, Introduction of Sequential logic circuits like flip- flops (SR, D), counters and shift registers.

Text Books:

1. Hughes, 'Electrical and Electronic Technology', Pearson education, (10th edition), (2008)

Reference Books:

1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', McGraw-Hill, (3rd edition), (2010)
2. A.E.Fitzgerald, A.Grabiel,'Basic Electrical engineering',McGraw-Hill, (5th edition), (2009)
3. Floyd, 'Electronic Devices and Circuits', pearson education, (7th edition),(2008)
4. AP Malvino & Donald Leach,'Digital Principles and Applications', McGraw Hill Education,(6 th edition), (2009)

IKS101 Indian Knowledge System

Teaching Scheme:
Lecture: 2 Hrs. /week
Credits: 2

Examination Scheme:
In semester: 50 marks

Course Objectives:

1. Creating awareness amongst the student about the true history and rich culture of the country
2. Understanding the scientific value of the traditional knowledge of Bhārata
3. Converting the Bhāratīya wisdom into the applied aspect of the modern scientific paradigm
4. After completion of this course the students will get a holistic insight into the understanding the working of nature and life

Course Outcome:

After completion of this course a student should be able to

CO1. Reproduce ancient Indian philosophy and knowledge

CO2. Describe ancient Indian Science & Arts

CO3. State ancient Indian Medicine practices

CO4. Describe ancient Indian Architecture and Technology

Unit – I: Ancient Indian philosophy and knowledge system (07)
Vedic Period: Vedas and their Significance, Upanishads: Philosophy and Knowledge, The Six Schools of Indian Philosophy: Overview, Indian Linguistics: Panini and Sanskrit, Evolution of Other Indian languages - Tamil, Marathi, Hindi etc , Ancient Indian Education System: Gurukul System, Ancient Indic Religions: Hinduism, Buddhism, Jainism and Sikhism: Teaching & Philosophy

Unit- II: Ancient Indian Science (08)
Ancient Indian Mathematics: Overview and Contributions, Ancient Indian Astronomy and Astrology: Overview and Contributions, Charak & Sushrut Samhita, Ayurveda: Principles and Practices, Trade and Commerce in Ancient India, Arthashastra, Ancient Indian Farming Practices

Unit- III: Ancient Indian Art and crafts (06)
Ancient Indian Art and Culture, Ancient Indian Music and Dance, Ancient Indian craftsmanship

Unit- IV: Ancient Indian Architecture **(07)**

Ancient Indian Architecture: Vastu Shastra and Temple Architecture, Ancient Indian Warfare and Weaponry, Ancient Indian Engineering and Technology, Ancient Indian Knowledge Systems: Global Influence

Text Books:

Introduction to Indian knowledge system: Concepts and Applications by B. Mahadevan, Vinayak Rajat Bhat, Nagendra Panana R.N. PHI Publication

Reference Books:

1. Knowledge System in India by Amit Jha, Atlantic Publishers & Distributers (P) LTD
2. Textbook on the Knowledge System of Bhārata by Bhag Chand Chauhan.

CC101 Liberal Learning course - 1

Teaching Scheme:
Lecture: 1 Hrs. /week
Practical: 2 Hr/week
Credits: 2

Examination Scheme:
In semester: 50 marks

Course Objectives:

1. To encourage the holistic development of students through art forms.
2. To develop life skills of the students through individual and group activities.

Course Outcome:

After completion of this course the students will be able to

CO1: Present the creative work through art forms.

CO2: Demonstrate the ability to lead and participate in teams.

NOTE:

1. Hands on session of 2 hrs/ week for 12 weeks will be conducted.
2. Student will opt for any **one** of the following five modules.

Module 1: Culinary Arts **(12)**

Planning a meal, Pre-cooking preparation, ingredients measurements, cleaning of vegetables, chopping and actual cooking.
Preparation and cooking Chinese dishes sandwiches, donuts, mocktails, cookies, salads, noodles, pasta, wheat brownie etc.

Module 2: Dance **(12)**

Warm up sessions, basic dance steps on Bollywood music, Zumba, folk dance, choreography.

Module 3: Gardening **(12)**

Fundamentals of gardening, projects like terrarium, kokedama, etc. knowledge of soil, fertilizers and seeds. Fundamentals of landscape designing.

Module 4: Painting **(12)**

Indian art forms, viz. Warli, Madhubani, Mandala, and Dot Painting. Familiarity with variety of materials, viz. acrylic, pencil, and water colour paints.

Module 5: Theatre **(12)**

Variety of exercises and activities such as improvisation, character development, scene work, vocal and physical warm-ups, script analysis, and feedback sessions. Technical aspects of theatre production such as lighting, sound, and set design.

Textbooks:

Culinary arts: "Theory of Cookery" by Krishna Arora, Macmillan Publishers

Dance: "Text book of Dance" by Gyanendra Dutt Bajpai, Kanishka Publisher

Gardening: "Gardening in India" 2nd Edition, by T K Bose, D Mukharjee, Oxford and IBH Publishers

Painting: "Panoramic Indian Painting" by R C Luthera, C K Luthera, Nidhi Sekhon Vishal Publishing Co.

Theatre: "Indian Theatre: Drama, Music and Dance" by Shovana Narayan, Shubhi Publishers.

References: Online resources:

Culinary arts:

Kai Sean Lee, "Culinary aesthetics: World-traveling with culinary arts", Annals of tourism research, 97 (1) Nov 2022

Dance:

Malathi B, "Development of Dance In India", International Educational Applied Scientific Research Journal, Volume: 5 ¦ Issue: 1 ¦ Jan 2020

Gardening:

Selma Lunde Fjaestad , Jessica L Mackelprang , Takemi Sugiyama "Mental health outcomes associated with gardening" July 2023, Book: Cultivated Therapeutic Landscapes (pp.104-130)

Painting:

Maarit Anna Maleka, Tero Heinkkinen, Nithikul Nimkulrat "Drawing as a research tool: Making and understanding in art and design practice" article, February 2014, ResearchGate

Theatre:

Heli Aaltonen , Ellen Foyn Bruun "Practice as research in drama and theatre: Introducing narrative supervision methodology:, July 2014, Nordic Journal of Art and Research 3(1)

Dr.C.M.Vinay Kumar , Romesh Chaturvedi "Art of the Theatre on New Media Platform & Audience viewing Experience.", Global Media Journal-Indian Edition, Winter Issue/December 2013/Vol. 4/No. 2

AEC 101 Professional Communication

Teaching Scheme
Lecture: 1 Hr/week
Practical: 2Hrs/week
Credits: 2

Examination Scheme:
In semester: 50 marks

Course Objectives:

1. Enable engineering students to communicate effectively and work smoothly with classmates, clients and people involved in projects.
2. Nurture students' professional skills encompassing written, verbal and electronic communication realms, with a primary focus on refining their soft skills.

Course Outcome:

After completion of this course a student should be able to

CO1. Illustrate their Communication Skills through impactful presentations.

CO2. Develop proficient written communication skills for tasks such as drafting resumes, cover letters, and summary of articles on recent trends in technology

CO3. Compose well organized professional emails and create social media profiles.

Module I: Verbal Communication **(06)**
Key concepts and barriers in effective communication, Elevator pitch for self: Delivery and practice, Presenting a news item: Analysis and delivery, Presentation on a topic related to technology / science / social science, Group Discussion.

Module II: Written Communication **(06)**
Resume Writing and Cover letter, Writing summary of an article on recent trends in technology, Book/ Movie review.

Module III: Email Communication **(02)**
Professional e-mails and creating an effective social media presence (e.g., LinkedIn Profile)

Text Books:

1. M. Ashraf Rizvi, "Effective Technical Communication", Tata McGraw-Hill Publishing Company Limited, New Delhi (2008)
2. Jeff Butterfield, "Soft Skills for Everyone" Cengage Learning India Private Limited, New Delhi (2019)

Reference Books:

1. William Strunk and E. B. White, "Elements of style", CreateSpace Independent Publishing Platform, (2018).

2. William K Zinsser, "On Writing well", HarperCollins, (2012).

3. Stephen King, "On Writing: A Memoir of the Craft", Pocket Books, (2002)

Website URL:
TED talks - https://www.ted.com/talks

Lab Sessions: (2hrs each)

1. Exercise on Listening Skills to understand barriers in Communication.
2. Elevator Pitch.
3. Presenting a News item
4. Group Discussion on topics related to technology/ science / social science.
5. Preparing a Cover Letter and Resume.
6. Writing a summary of an article on recent trends in Technology.
7. Creating a LinkedIn Profile.
8. Writing a Book/Movie review.
9. Drafting a professional email.

BSC102L Chemistry Lab

Teaching Scheme:
2 hours / week
Number of Credits: 1

Examiation scheme:
Term Work: 25Marks

Course outcomes

After completion of this course a student should be able to

CO1 : Apply chemistry principles for quantitative analysis.
CO2 : Make use of an instrument for chemical analysis.
CO3 : Calculate chemical parameter based on recorded observations.
CO4 : Evaluate quality of coal and polymer based on their chemical properties.
CO5 : Prepare a chemical substance such as soap, zeolite, biopolymer etc. based on experimental procedure.

LIST OF EXPERIMENTS:

1. Determination of total hardness of sample water by EDTA Method (complexometric titration)
2. Determination of total alkalinity of sample water.
3. Measuring EMF of electrochemical cell to predict spontaneity as well as to calculate Gibb's free energy and equilibrium constant.
4. Viscometric method to determine Molecular weight of a Polymer.
5. Estimation of sodium from given solution using flame photometry.
6. Colorimetric estimation of $KMnO_4$ from solution.
7. Proximate analysis of coal samples and Comment on it's quality.
8. Laboratory preparation of soap.

ESC102L Basic Electrical and Electronics Engineering Lab

Teaching Scheme:

Practical: 2 Hrs./Week

Credits: 1

Examination Scheme:

In semester : 25 marks

Course Outcomes:

After completion of course, students will be able to

CO1: Perform basic domestic wiring

CO2: Apply circuit laws to find the parameters of given electrical network

CO3: Build a basic regulated DC power supply

CO4: Obtain frequency response of CE amplifier

CO5: Build basic digital circuits

List of experiments:

- Introduction of different electrical and electronics components and instruments.
- To perform electrical wiring to control lamps using one way and two-way switches.
- To verify Thevenin's theorem & superposition theorem.
- To determine phase angle of L-C-R series circuit.
- To perform load test on single phase transformer to determine regulation and efficiency.
- To determine output voltage and ripple voltage of half wave, full wave rectifier with center tap transformer and bridge rectifier with and without filter.
- Assemble and build simple DC regulated power supply.
- To determine frequency response of CE amplifier.
- Assemble and build half adder & full adder circuits.

VSEC101L Programming Skills in C Language Lab

Teaching Scheme:
Practical: 4 Hr/week

Examination Scheme:
In-Sem: 25 Marks
Practical/oral: 25 Marks

Credits: 2

Course Objectives:
To facilitate the learners:
1. To learn the fundamentals of C programming for logic building.
2. To implement a solution of given problem using appropriate data type, operators of C language.
3. To understand the decision and iteration interpretation in a programming language.
4. To implement the logic using arrays, strings, functions, pointers and structures of C programming language.

Course Outcomes:
After completion of course, students will be able to

CO1: Develop the logic for a given problem using flowchart/ algorithm/ pseudo code.
CO2: Apply appropriate basic language constructs, decision and iterative constructs for solving the given problem.
CO3: Implement the solution for a given problem using Arrays, String, Structures and functions.
CO4: Apply C programming skills to simulate real life problems/scenarios/applications.

Intent of this laboratory is to build the logic development and problem solving skills of students and build proficiency and competency in C language. For this purpose a sample list of assignments are grouped into Group A, Group B and Group C with increasing levels of difficulty and understanding.

Group A assignments are based on real life problems using language constructs such as constant, variable, data type, operator, array, string, expressions, decision, iteration etc.

Group B assignments are based on the applications of language constructs and combination of language constructs, control structures, String, Arrays, Pointers, Structures, Functions.

Group C assignments are a little more challenging. Assignments will be open ended which can either be a mini project or simulation of real life problems/scenarios/applications. It can also include Debugging and Feature enhancement / Alternative solution/ testing / Code-refactoring of

given problem statements or Analyze the given code and comment on the output**.**

Instructors can conduct a total of 10 assignments, six from Group A, three from Group B, one from Group C. Other assignments can be considered as extra assignments.

Instructors must enhance assignment by coming up with new application domains, by combining multiple constructs in one assignment or more complex logic.

Suggestive List of Assignments

Assignment 0: Get acquainted with Windows/Linux Platform, C environment, IDE installation, structure of basic C program, compilation, debugging and execution of C program.

Group A - Language constructs

For Group A problem statements, students should draw flowchart/ algorithm/ pseudo code and convert it into a C program. Problems are based on constructs such as concepts of constant, variable, data type, operator and expressions, arrays, strings, iteration, decision making and others.

1) Convert measurement units such as feet to inches, inches to centimeters, and centimeters to meters, Kilograms to grams, grams to milligrams, Dollar to Rupees, Euro to Rupees, temperature conversion Degree to Fahrenheit, days into years, weeks and days and vice versa.
2) Basic problems of Engineering Mathematics and Physics like area calculation, sine wave calculation, speed calculation, determining type of triangle, verify pythagoras theorem etc.
3) Obtain the first 25 numbers of a Fibonacci sequence/prime numbers with and without recursion etc.
4) Search the data from an array of numbers/ characters/ string.
5) Calculate the total number of characters in the string and the total number of vowels in the string with the number of occurrences in the string.
6) Operations on matrices.
7) Find the maximum/minimum of given numbers.
8) Order the numbers in sequence.
9) Swap two data elements using pass by value, pass by reference and without using a third variable.
10) Number conversion (decimal to binary, binary to decimal, binary to octal, octal to binary)
11) Reverse a string without using a third variable.

Group B - Applications of Language Constructs

Group B problem statements address the applications of language constructs such as Loops for iteration, Arrays, Strings, Structures, Functions for modularity wherever required. They should implement the application using a function (call by reference/ call by value) wherever appropriate. Problems are based on real life applications/ scenarios.

1) Perform employee operations such as accept, display, search by name, search by number, update a record. Explore the possibility of modularity for implementation.
2) For a class an examination is conducted and the results for the students of all the 5 subjects are recorded. Write a C program to display the record of students. On the basis of the record compute:
   i. The average score of class
   ii. Highest score and lowest score of class
   iii. Marks scored by most of the students
   iv. List of students who were absent for the test
3) Write a menu-based modular program in C to perform following operations for complex numbers:
   i. reading a complex number
   ii. writing a complex number
   iii. addition of two complex numbers
   iv. subtraction of two complex numbers
   v. multiplication of two complex numbers
4) Two friends issued 5 books each from the library, Write a program in C to compute operations
   i List of all books with them
   ii. List common titles with them
   iii. List of books with friend 1 but not with friend 2
5) A list of names of users of a product of a company is provided. Write a modular C program to calculate the total number of characters in the name and the total number of vowels in the name with the number of occurrences in the name, search set of characters in name, and sort names.

6) Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume a maximum of 200 customers in the bank. (a) Write a function to print the Account number and name of each customer with balance below Rs. 100. (b) If a customer requests for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal) Write a program to give a message, "The balance is insufficient for the specified withdrawal"

7) Find Permutations in which n people can occupy r seats in a theatre.

8) In a secret language DOG is written as HSK, CAT is written as GEX. Write a program to accept a string from a user and convert it into the secret language and accept a string in the secret language and convert it back to English.

Group C

Group C problem statements address big real life problem solving. Students are expected to apply the learnt concepts to solve these problems. Students should choose any one of the following:-

1) Mini Project - Small games like - tic-tac-toe, Create Crossword, Solving sudoku, Information system projects

   Students should implement a mini project/ game which simulates real life problems/scenarios/applications. They are expected to make use of the appropriate constructs of C language.

2) Debugging and Feature enhancement / Alternative solution / testing / Code-refactoring of given problem statement.

   Students will be given a large and ready code. Students are expected to read and understand the code, be able to debug the code, be able to enhance the feature in given code, to be able to find alternative solutions, or refactor the given code.

Text Books:-

1) Kernighan and Ritchie, " The C programming language" (2nd edition)., Prentice Hall of India, 1988.

2)G.Dromey,"How to Solve it by Computer",Prentice-HallInc.,Upper Saddle River,NJ, 1982.

3) Yashwant Kanetkar, "Let's C", Allied Publishers,1998.

Reference books:-

1) Reema Thareja, "Introduction to C programming", Oxford University press(2nd edition),2015.

2) Alan R. Feuer, "The C Puzzle book", Pearson,1999

3) E Balagurusamy, "Computing Fundamentals and C Programming", (2nd edition), TMH,