

## SCHEME OF INSTRUCTION &amp; EXAMINATION

## B.E (Computer Science and Engineering)

## SEMESTER-I

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P / D	Contact Hrs / Wk	CIE	SEE	Duration in Hrs	
<b>Theory Courses</b>										
1.	<b>Three Week Induction Program</b>									
2.	MC 802 CE	Environmental Sciences	3	-	-	3	30	70	3	-
3.	MC 803 PY	Essence of Indian Traditional Knowledge	2	-	-	2	30	70	3	-
4.	BS 201 MT	Mathematics-I	3	1	-	4	30	70	3	4
5.	BS 204 CH	Chemistry	3	1	-	4	30	70	3	4
6.	ES 302 CS	Programming for Problem Solving	3	1	-	3	30	70	3	3
<b>Practical / Laboratory Courses</b>										
7.	BS 252CH	Chemistry Lab	-	-	3	3	25	50	3	1.5
8.	ES 351 CS	Programming for Problem Solving Lab	-	-	2	2	25	50	3	1
9.	ES 352 ME	Workshop Practice	-	-	2x3	6	50	50	3	3
<b>Total</b>			<b>14</b>	<b>03</b>	<b>08</b>	<b>27</b>	<b>250</b>	<b>500</b>		<b>17.5</b>

BS: Basic Science

ES: Engineering Science

MC: Mandatory Course

L: Lecture

T: Tutorial

P: Practical

D: Drawing

CIE: Continuous Internal Evaluation

SEE: Semester End Evaluation

*Proposed for the academic years 2020-2024*

**SEMESTER-II**

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P / D	Contact Hrs / Wk	CIE	SEE	Duration in Hrs	
<b>Theory Courses</b>										
1	MC 801 PO	Indian Constitution	2	-	-	2	30	70	3	-
2	HS 101 EG	English	2	-	-	2	30	70	3	2
3	BS 202 PH	Physics	3	1	-	4	30	70	3	4
4	BS 203MT	Mathematics-II	3	1	-	4	30	70	3	4
5	ES 301 EE	Basic Electrical Engineering	3	1	-	4	30	70	3	4
<b>Practical / Laboratory Courses</b>										
6	HS 151EG	English Lab	-	-	2	2	25	50	3	1
7	BS 251PH	Physics Lab	-	-	2	2	25	50	3	1
8	ES 353 CE	Engineering Graphics		-	3x2	6	50	50	3	3
9	ES 354 EE	Basic Electrical Engineering Lab	-	-	2	2	25	50	3	1
<b>Total</b>			<b>13</b>	<b>03</b>	<b>12</b>	<b>28</b>	<b>275</b>	<b>550</b>		<b>20</b>

## ENVIRONMENTAL SCIENCES

### MC 802CE

Instruction: 3 periods per week

CIE: 30 marks

Credits : 0

Duration of SEE: 3 hours

SEE: 70 marks

### Objectives:

1. To create awareness and impart basic knowledge about the environment and its allied problems.
2. To know the functions of ecosystems, social and environment related issues and their preventive measures
3. To understand importance of biological diversity, different pollutions and their impact on environment

### Outcomes: Student will be able to:

1. Adopt environmental ethics to attain sustainable development
2. Develop an attitude of concern for the environment
3. Conservation of natural resources and biological diversity
4. Creating awareness of Green technologies for nation's security
5. Imparts awareness for environmental laws and regulations

### UNIT – I

**The Multidisciplinary Nature of Environmental Studies:** Definition, scope and importance, need for public awareness.

**Natural Resources:** Water Resources – Use and over utilization of surface and ground water, flood, drought, conflicts over water, Dams: Benefits and Problems. Food Resources –World Food Problems, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, Forest Resources – Use and over exploitation, deforestation & its effect on tribal people. Land Resources –Land Degradation, environmental effect of mining, man induced landslides, soil erosion and desertification. Energy Resources –Growing energy needs, Renewable and Non-renewable energy resources.

### UNIT – II

**Ecosystems:** Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in ecosystem, food chains, ecological pyramids, ecological succession, types of ecosystems (marine, pond, river, forest, grassland, desert)

### UNIT – III

**Biodiversity:** Levels of Biodiversity, Bio-geographical classification of India, Value of biodiversity, Threats to biodiversity, endangered and endemic species of India, Conservation of biodiversity, global and national efforts.

### UNIT – IV

**Environmental Pollution:** Definition, Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution, solid waste management.

**Environment Protection Act:** Air, water, forest and wildlife Acts, issues in the enforcement of environmental legislation

### UNIT – V

**Social Issues and the Environment:** Watershed management and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion.

**Environmental Disaster Management:** Types of disasters, impact of disasters on environment,

***Proposed for the academic years 2020-2024***

infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology. Disaster management cycle and disaster management in India.

**Field Work:** Visit to a local area to document environmental issues- agricultural area/pond/lake/terrestrial ecosystem. Visit to a local polluted area- market/slum area/Industrial area/traffic area.

**Suggested Readings:**

1	De Anil Kumar, " <i>Environmental Chemistry</i> ", New Age Publisher International Pvt Ltd, New Delhi , 2016
2	E.P. Odum, ' <i>Fundamentals of Ecology</i> ', W.B. Sanders Co., USA.,1971
3	M.N. Rao and A.K. Datta, " <i>Waste Water Treatment</i> ", Oxford and IBK Publications, New Delhi, 2009.
4	Benny Joseph, " <i>Environmental Studies</i> ", Tata McGraw Hill, New Delhi, 2009
5	V.K. Sharma, " <i>Disaster Management</i> ", National Centre for Disaster Management, IPE, New Delhi, 1999

## ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

MC 803 PY

Instruction: 2 periods per week

CIE: 30 marks

Credits : 0

Duration of SEE: 3 hours

SEE: 70 marks

### Objectives:

1. To get a knowledge in Indian Culture
2. To Know Indian Languages and Literature and the fine arts in India
3. To explore the Science and Scientists of Medieval and Modern India

### Outcomes: Student will be able to:

1. Understand philosophy of Indian culture
2. Distinguish the Indian languages and literature.
3. Learn the philosophy of ancient, medieval and modern India.
4. Acquire the information about the fine arts in India
5. Know the contribution of scientists of different eras.

### UNIT – I

**Introduction to Culture:** Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

### UNIT – II

**Indian Languages, Culture and Literature:** Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India.

**Indian Languages and Literature-II:** Northern Indian languages & literature

### UNIT – III

**Religion and Philosophy:** Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

### UNIT – IV

**Fine Arts in India (Art, Technology & Engineering):** Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India.

### UNIT – V

**Education System in India:** Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

### Suggested Readings:

*Proposed for the academic years 2020-2024*

1	Kapil Kapoor, " <i>Text and Interpretation: The India Tradition</i> ", D. K. Print world, 2005
2	Gopala Krishnan , " <i>Science in Samskrit</i> ", Samskrita Bharti Publisher, New Delhi, 2017
3	NCERT, " <i>Position paper on Arts, Music, Dance and Theatre</i> " NCERT, New Delhi, 2010.
4	S. Narain, " <i>Examinations in Ancient India</i> ", Arya Book Depot, New Delhi, 1993
5	Satya Prakash, " <i>Founders of Sciences in Ancient India</i> ", Vijay Kumar Publisher, New Delhi, 1989
6	M. Hiriyanna, " <i>Essentials of Indian Philosophy</i> ", Motilal Banarsidass Publishers, New Delhi, 2005

## MATHEMATICS-I

### BS 201 MT

Instruction: 3+1 periods per week

CIE: 30 marks

Credits : 4

Duration of SEE: 3 hours

SEE: 70 marks

### Objectives:

1.To introduce the concepts of sequences, series and their properties
2.To introduce the concepts of functions of several variables and multiple integrals
3.To study vector differential and integral calculus

### Outcomes: Student will be able to:

1.Find the nature of sequences and series
2.Apply this knowledge to solve the curriculum problems
3.Evaluate multiple integrals

### UNIT – I

**Sequences and Series:** Sequences, Series, General properties of series, Series of positive terms, Comparison tests, tests of Convergence D’Alembert’s ratio test, Cauchy’s  $n^{\text{th}}$  root test, Raabe’s test, Logarithmic test, Alternating series, Series of positive and negative terms, Absolute convergence and Conditional convergence.

### UNIT – II

**Calculus of one Variable:** Rolle’s theorem, Lagrange’s, Cauchy’s mean value theorems, Taylor’s series, Curvature, Radius of curvature, Circle of curvature, Envelope of a family of curves, Evolutes and Involutives.

### UNIT – III

**Multivariable Calculus (Differentiation):** Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobian, Higher order partial derivatives, Taylor’s series of functions of two variables, Maximum and minimum values of functions of two variables, Lagrange’s method of undetermined multipliers.

### UNIT – IV

**Multivariable Calculus (Integration):** Double integrals, Change of order of integration, Change of Variables from Cartesian to plane polar coordinates, Triple integrals

### UNIT – V

**Vector Calculus:** Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green’s theorem in a plane, Gauss’s divergence theorem, Stoke’s theorem (without proofs) and their verification.

### Suggested Readings:

R.K. Jain & S.R.K Iyengar, “Advanced Engineering Mathematics”, Alpha Science
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*Proposed for the academic years 2020-2024*

1	International Limited, 2014.
2	Erwin Kreyszig, " <i>Advanced Engineering Mathematics</i> ", John Wiley, 9 <sup>th</sup> Edition, 2012.
3	B.S. Grewal, " <i>Higher Engineering Mathematics</i> ", Khanna Publishers, 43 <sup>rd</sup> Edition, 2014.
4	G.B. Thomas, Maurice Weir and Joel Hass, " <i>Thomas' Calculus</i> ", Pearson Education, 12 <sup>th</sup> Edition, 2010.
5	B.V. Ramana, " <i>Higher Engineering Mathematics</i> ", Tata Mc Graw Hill Education, 23 <sup>rd</sup> reprint, 2017.



## CHEMISTRY

### BS 204 CH

Instruction: 3+1 periods per week

CIE: 30 marks

Credits : 4

Duration of SEE: 3 hours

SEE: 70 marks

### Objectives:

1. Correlate the properties of materials with their internal structure and use for Engineering applications
2. Apply the principles of electrochemistry in storage of electrical energy in batteries.
3. Gains knowledge about the causes of corrosion and its prevention.
4. Attains knowledge about the hard water and treatment of water for drinking purpose.
5. Exposed to qualitative and quantitative parameters of chemical fuels and aware of eco-friendly materials and processes.

### Outcomes: Student will be able to:

1. Apply concept of electrode potential in identifying feasibility of electrochemical reaction; illustrate electro analytical techniques and working of batteries.
2. Identify the mechanism of corrosion of materials on basis of electrochemical approach and devise corrosion control methods.
3. Estimate the physical & chemical parameters of quality of water and explain the process of water treatment
4. Analyze the influence of chemical structure on properties of materials and their choice in engineering applications.
5. Classify chemical fuels and grade them through qualitative analysis and relate the concept of green chemistry to modify engineering processes and materials.

### UNIT – I

**Electrochemistry:** Electrochemical cells, Electrolytic and Galvanic cells-notation, cell reaction and cell potentials. Types of electrodes, Calomel Quinhydrone and Glass electrodes. Determination of pH of a solution by using Quinhydrone electrode. Thermodynamics of emf of cells, Nernst equation and its derivation. Applications of Nernst equation to electrode potential and emf of cells. Numerical problems.

**Battery Chemistry:** Primary batteries: Zn - Carbon battery. Secondary batteries: Pb-Acid battery and Li-Ion battery, Applications. Flow batteries (Fuel cells): Methanol-Oxygen fuel cells, Construction, Applications.

### UNIT – II

**Water Chemistry:** Hardness of Water-Types and units of hardness, estimation of temporary and permanent hardness of water by EDTA method. Alkalinity of water and its determination. Water softening by Ion exchange and Reverse Osmosis methods. Numerical problems. Specifications of potable water. Sterilization by Chlorination. Break Point Chlorination.

**Corrosion:** Causes and its effects. Types of Corrosion-Dry or Chemical corrosion and

<p>Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion – Waterline and Pitting Corrosion. Factors influencing rate of corrosion.  <b>Corrosion control methods:</b> Cathodic protection methods - Sacrificial anodic and impressed current methods.  <b>Surface coating methods:</b> Hot Dipping-Galvanizing.</p>
<p><b>UNIT – III</b></p> <p><b>Engineering Materials:</b> Polymers: Basics of terms polymers: Monomer and its functionality, Polymers and degree of polymerization. Classification of polymers - Thermoplastics &amp; Thermosetting resins.</p> <p>Types of Polymerization-Addition, Condensation, Co-Polymerization. Mechanism of free radical polymerization. Preparation, Properties &amp; Uses of the following polymers: Plastics - PVC and Bakelite, Fibres - Nylon 6:6, and Kevlar, Elastomers - Buna-S, Butyl and Silicone Rubbers.  <b>Conducting polymers:</b> Introduction, Classification and Mechanism of conduction in Poly-acetylene, Applications of conducting polymers.  <b>Biodegradable polymers:</b> Introduction preparation, properties and applications of polylactic acid.</p>
<p><b>UNIT – IV</b></p> <p><b>Chemical Fuels:</b> Classification of fuels: Introduction, definition and classification of chemical fuels-Primary and secondary fuels. Solid, liquid and gaseous fuels. Requirements of a good fuel. Calorific Value – HCV and LCV. Theoretical calculations of calorific value by Dulong’s formula – Numerical problems.  <b>Solid Fuels:</b> Coal and its Ranking. Analysis of coal - Proximate and Ultimate analysis.  <b>Liquid Fuels:</b> Fractionation of Petroleum. Composition and uses of Gasoline, Diesel and Kerosene. Cracking &amp; its Significance- Catalytic cracking by moving bed method, Knocking. Fuel rating – Octane and Cetane numbers.  <b>Gaseous Fuels:</b> LPG, CNG -Composition and Uses.  <b>Combustion:</b> Ignition temperature of a fuel, calculation of air quantities by weight and volume required for combustion of a fuel- Numerical problems.</p>
<p><b>UNIT – V</b></p> <p><b>Green Chemistry:</b> Concept, Principles of green chemistry – Atom Economy, Catalysis. and examples of clean technology.  <b>Biodiesel:</b> Sources, Concept of Transesterification and carbon neutrality, Properties and significance  <b>Composites:</b> Introduction to composites, composition and characteristic properties of composites.          Classification of composites based on matrix, reinforcement and ply. Applications of composites.</p>

**Suggested Readings:**

1	B.R. Puri, L.R. Sharma, Madan S. Pathania , “ <i>Principles of Physical Chemistry</i> ”, S.N. Chand & Co. New Delhi, 1987
2	P C Jain and M Jain , “ <i>Engineering Chemistry</i> ”, Dhanpat Rai & Sons , 15 <sup>th</sup> Edition, New Delhi, 2004
3	J C Kuriacose and J Rajaram , “ <i>Chemistry in Engineering and Technology</i> “, Tata Mc Graw Hill, New Delhi, 2010
4	O G Palanna, “ <i>Engineering Chemistry</i> ”, Tata Mc Graw Hill, New Delhi, 2009
	S S Dara and SS Umare, “ <i>Engineering Chemistry</i> ”, S.N. Chand & Co. New Delhi, 2004

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6	Sashi Chawla, " <i>Engineering Chemistry</i> ", Dhanpat Rai & Sons, New Delhi, 2017
7	Prasanta Rath, " <i>Engineering Chemistry</i> ", Cengage Learning India Pvt. Ltd, 2015

## PROGRAMMING FOR PROBLEM SOLVING

### ES 302 CS

Instruction: 3+1 periods per week

CIE: 30 marks

Credits: 3

Duration of SEE: 3 hours

SEE: 70 marks

### Objectives:

1.To introduce the concepts of Computing environment, number systems, flowcharts and algorithms
2.To familiarize the basic constructs of C language – data types, operators and expressions
3.To understand modular and structured programming constructs in C
4.To learn the usage of structured data types and memory management using pointers
5.To learn the concepts of data handling using pointers

### Outcomes: Student will be able to:

1. Formulate simple algorithms and translate the algorithms to programs using C language.
2. Implement conditional branching, and iteration and arrays.
3.Apply the function concepts to implement searching and sorting algorithms
4. Analyse the usage of structures and pointer variables.

### UNIT – I

**Introduction to Programming:** Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.).  
**Idea of Algorithm:** steps to solve logical and numerical problems.  
**Representation of Algorithm:** Flowchart / Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

### UNIT – II

**Control Structures:** Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching.  
**Arrays:** Arrays (1-D, 2-D), Character arrays and Strings.

### UNIT – III

**Basic Algorithms:** Searching, Basic Sorting Algorithms (Bubble and Selection), Finding roots of Equations.  
**Functions:** Functions (including using built in libraries), Parameter passing in functions, call by value. Passing arrays to functions: idea of call by reference

### UNIT – IV

**Recursion:** Recursion, Example programs, such as Finding Factorial, Fibonacci series  
**Structure:** Structures, Defining structures and Array of Structures

### UNIT – V

**Pointers :** Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), Introduction to File Handling.

### Suggested Readings:

1	Byron Gottfried, “Theory and practice of Programming with C”, Schaum’s Outline McGraw-Hill, 1996
2	A.K. Sharma, “Computer Fundamentals and Programming in C”, Universities Press, 2 <sup>nd</sup> Edition, 2018.
3	E. Balaguruswamy, “Programming in ANSI C”, Tata McGraw-Hill Education, 2008
4	Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India, 1988.

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## CHEMISTRY LAB

### ES 252 CH

Instruction: 3 periods per week

CIE: 25 marks

Credits: 1.5

Duration of SEE: 3 hours

SEE: 50 marks

### Objectives:

- |   |
|---|
| 1. Conduct experiments, take measurements and analyse the data through hands-on experience in order to demonstrate understanding of the theoretical concepts of quantitative Analysis while working in small group. |
| 2. Interpret the electro analytical principles with experimental results graphically  |
| 3. Demonstrate writing skills through clear laboratory reports  |

### Outcomes: Student will be able to:

- |  |
|--|
| 1. Apply the principles of Colourimetry and Electrochemistry in quantitative estimations.                    |
| 2. Estimate the rate constants of reactions from concentration of reactants/ products as a function of time. |
| 3. Synthesize small drug molecules.  |

### List of Experiments:

- |  |
|--|
| <ol style="list-style-type: none"><li>1. Introduction to Chemical Analysis.</li><li>2. Techniques of Weighing. <u>Volumetric Analysis:</u></li><li>3. Preparation of Standard Mohr's salt solution, Standardization of <math>\text{KMnO}_4</math> and estimation ferrous ion.</li><li>4. Estimation Iron(II) by Dichromatometry</li><li>5. <u>Water Analysis:</u></li><li>6. Preparation of Standard Magnesium sulphate solution, standardization of EDTA and Estimation of Total Hardness.</li><li>7. Preparation of Standard Sodium Carbonate Solution, Standardization of HCL and Estimation of Carbonate and Bicarbonate Alkalinity. <u>Conductometry:</u> Estimation of HCL</li><li>8. Estimation of <math>\text{CH}_3\text{COOH}</math> and mixture of Acids <u>Potentiometry</u></li><li>9. Estimation of HCL</li><li>10. Estimation of Iron <u>pH Metry:</u></li><li>11. Estimation of HCL <u>Colorimetry:</u></li><li>12. Verification of Beer-Lambert's law and estimation of Manganese. <u>Chemical Kinetics:</u></li><li>13. Determination of rate constant of acid catalysed hydrolysis of methyl acetate.</li><li>14 Drug Synthesis Preparation of spirin</li></ol> <p>Note: Minimum ten experiments should be conducted in the semester</p> |
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**Suggested Readings:**

1	B.D. Khosla, A. Gulati and V. Garg , “ <i>Senior Practical Physical Chemistry</i> ”, R. Chand & Co., Delhi, 2011.
2	K. K. Sharma and D.S. Sharma , “ <i>An Introduction to Practical Chemistry</i> ”, Vikas publishers, New Delhi, 1982.

## WORKSHOP PRACTICE

### ES 352 ME

Instruction: 6 periods per week

CIE: 25 marks

Credits: 3

Duration of SEE: 3 hours

SEE: 50 marks

### Objectives:

1. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
2. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
3. To gain a good basic working knowledge required for the production of various engineering products.
4. To Study different hand operated power tools, uses and their demonstration.
5. Adopt safety practices while working with various tools

### Outcomes: Student will be able to:

1. Demonstrate an understanding of and comply with workshop safety regulations.
2. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
3. Study and practice on machine tools and their operations
4. Undertake jobs connected with Engineering Workshop trades including fitting, carpentry, sheet metal, house wiring, welding, smithy and foundry.
5. Apply basic electrical engineering knowledge for house wiring practice

### List of Experiments:

#### A. TRADE FOR EXERCISES:

1. Carpentry
2. Fitting
3. House wiring
4. Sheet metal working
5. Smithy
6. Welding
7. Plumbing

#### B. TRADES FOR DEMONSTRATION AND EXPOSURE:

1. Machining (Lathe & Drilling)
2. Injection moulding
3. Mould making and casting
4. Basic Electronics lab instruments

#### C. PRESENTATIONS AND VIDEO LECTURES

1. Manufacturing Methods
2. Rapid Prototyping
3. Glass Cutting
4. 3D printing
5. CNC LATHE

#### D. IT WORKSHOP: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, operating system installation.

Note: At least two exercises from each trade.



**Suggested Readings:**

1	Venugopal, K, " <i>Workshop Manual</i> ", Anuradha Publications, Kumbakonam, TN, 2012
2	K.C. John, " <i>Mechanical Workshop</i> " 2 <sup>nd</sup> Edn., PHI, 2010.
3	Hajra Choudary, " <i>Elements of Workshop Technology</i> " Vol. 1, Asian Publishers, Edn., 1993.
4	G.S. Sawhney, " <i>Mechanical Experiments and Workshop Practice</i> ", I.K. International Publishing House, New Delhi, 2009.

## PROGRAMMING FOR PROBLEM SOLVING LAB

### ES 351 CS

Instruction: 2 periods per week

CIE: 25 marks

Credits: 1

Duration of SEE: 3 hours

SEE: 50 marks

### Objectives:

1. Understand the fundamentals of programming in C Language
2. Write, compile and debug programs in C
3. Formulate solution to problems and implement in C.
4. Effectively choose programming components to solve computing problems

### Outcomes: Student will be able to:

1. Choose appropriate data type for implementing programs in C language
2. Design and implement modular programs involving input output operations, decision making and looping constructs.
3. Implement search and sort operations on arrays.
4. Apply the concept of pointers for implementing programs on dynamic memory management and string handling.
5. Design and implement programs to store data in structures and files.

### List of Experiments:

1. Finding maximum and minimum of given set of numbers, finding roots of quadratic equation.
2. Sin x and Cos x values using series expansion.
3. Conversion of binary to decimal, octal, hexadecimal and vice versa.
4. Generating Pascal triangle, pyramid of numbers.
5. Recursion: factorial, Fibonacci, GCD.
6. Matrix addition and multiplication using arrays, linear search and binary search using recursive and non-recursive procedures.
7. Bubble sort and selection sort.
8. Programs on pointers: pointer to arrays, pointer to functions.
9. Functions for string manipulations.
10. Programs on structures and unions.
11. Finding the number of characters, words and lines of given text file.
12. File handling programs

### Suggested Readings:

1	Byron Gottfried, "Theory and practice of Programming with C", Schaum's Outline McGraw-Hill, 1996
2	A.K. Sharma, "Computer Fundamentals and Programming in C", Universities Press, 2 <sup>nd</sup> Edition, 2018.
3	E. Balaguruswamy, "Programming in ANSI C", Tata McGraw-Hill Education, 2008
4	Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Prentice Hall of India, 1988.