YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS
DEPARTMENT OF COMPUTER SCIENCE
B.Sc. (COMPUTER SCIENCE & INFORMATION TECHNOLOGY)
FIRST SEMESTER
ACADEMIC YEAR 2024-25 OF 2024-27 BATCH (CBCS)

Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
1	I	EN23101	General English-I (AECC-1)	3	3	40	60	100	3
2	I	VE18101	Value Education and Personality Development (AECC-2)	2	3	40	60	100	2
3	II	BS19101	Mathematics-I (Core-1)	5	3	40	60	100	4
4	II	CSIT18101	Electronic Devices and Circuits (Core-2)	5	3	40	60	100	4
5	II	BS19123	Problem solving and Programming in C (Core-3)	4	3	40	60	100	4
	PRACTICALS								
6	II	BS18129	Engineering Drawing and Engineering Workshop- Lab (SEC-1)	6	3	40	60	100	3
7	II	CSIT18102	Electronic Devices and Circuits –Lab (Core-2)	2	3	40	60	100	1
8	II	BS19124	C Programming -Lab (Core-3)	2	3	40	60	100	1
	Total			**29**	**-**	320	480	800	**22**

***Ability Enhancement Compulsory Course (AECC)**
*** Skill Enhanced Compulsory Course (SEC)**

GENERAL ENGLISH – I

Credits: 3 **Semester: I**

Subject Code: EN23101 **No of Lecture Hours: 45**

Objectives:

- Through an exposure to contemporary passages, the students would be able to have a grasp on the language of today, with specific emphasis on the Listening, Speaking, Reading and Writing skills.
- Through the components of a passage, vocabulary and grammar section, speaking component and writing segments, there is a holistic development for language proficiency and fluency.

Outcomes:

CO1: To distinguish between words which are either spelt or pronounced alike, yet render distinct meanings; imparting a sound clarity on everyday usage of language, and for developing the art of parallel listening and writing.

CO2: To construct vocabulary and to gain understanding on the tense component, a pivotal constituent for language structuring and vocabulary building.

CO3: To identify with economical word constructions, paying specific attention in constructing sound writing skills.

CO4: To interpret functional grammar, the basic part involved in sentence constructing to improve linguistic skills.

CO5: To develop communication skills to provide a platform for language efficiency for effective language deliver

UNIT- I **9Hrs**

Fundamentals of Communication-I

Short Story - The Mystery Story (source – teacherluke.co.uk). 1

- Present Tense 2
- Past Tense 2
- Future Tense 2
- Paragraph Writing 2

UNIT- II

Language Proficiency for Effective Writing and Speaking Skills-I **9 Hrs**

Poem- Goodbye Party for Miss Pushpa T.S. by Nissim Ezekiel 2

- Subject- Verb Agreement 3
- Punctuations 2
- Review Writing 2

UNIT-III **9Hrs**

Wit and Humour

From the text Atea Party by Ruth Prawer Jhabvala

- Explanation of the text 2
- Grammar -------Nouns, Articles 2
- Vocabulary --- Homonyms, Homophones, Homographs 2
- Writing Skill ------Note- Making 2

UNIT-IV **9Hrs**

Human Values

From the text "India's Contribution to World Unity"

• Explanation of the text 2
• Grammar----adverbs 2
• Vocabulary----Adjective and Adverb Suffixes 2
• Writing Skill------Formal Letters and Curriculum Vitae 2

UNIT-V **9Hrs**

From the text "Sachin Tendulkar"
Explanation of the text 3
Grammar----- Adjectives, Comparison of Adjectives 3
Vocabulary-----Common Errors, Commonly Misspelt words 3
Commonly Confused Words
Writing Skill-----References and Bibliographies

ESSENTIAL READING: Skills Annexe. Functional English for Success. Orient Black Swan

SUGGESTED READING:

• Balasubramaniam, M. 1985 Business Communication. New Delhi: Vani Educational Books.
• Krishna Mohan and Meera Banerjee, 1990. Developing Communication Skills. New Delhi: Macmillan India Ltd.
• Krishnaswamy.N. and Sriraman, T. 1995. Current English for Colleges. Madras: Macmillan India Ltd.
• Narayanaswamy.V.R. 1979 Strengthen Your Writing. New Delhi: Orient Longman.
• Sharma.R.and Krishna Mohan. Business Correspondence. 1978. New Delhi. Tata McGraw-Hill Publishing Co

VALUE EDUCATION & PERSONALITY DEVELOPMENT

Credits : 2 **Semester: I**
Course code : VE18101 **No. of Lecture Hours: 30**

Objectives:

- To produce intellectually competent, morally upright, socially committed, spiritually inspired citizens in the service of the nation and the world.
- To transform the students into conscientious citizens through holistic education and contribute to nation building.

Course Outcomes:

CO1: **Differentiate** accepted norms and counter values and to identify the various dimensions of Human Development.
CO2: **Demonstrate** Love and Experience of God and identify the Basic Issues of Life and Happiness as a life goal.
CO3: **Understand** the importance of Concern for others and critique the various problems that deter the growth of the society.
CO4: **Recognize** the traits of a good personality and practice Self-exploration.
CO5: **Interpret** the Purpose of Life and Goal Setting and demonstrate Self-management.

UNIT- I **6Hrs**

Introduction to Ethics

1. Why Value Education?
2. Reasons to have Ethics for Life
3. Accepted Norms and Counter Values
4. Dimensions of Human Development: Physical, Intellectual, Emotional, Moral, Spiritual and Social

UNIT-II **6Hrs**

Approach to Life

1. Conscience and Pseudo-Conscience
2. Happiness as Life-goal
3. Values revealed and lived in Religions
4. Experience of God
5. Love: The three components of Love
6. Some of the basic stages and issues of Life: Family, Love, Sex, Marriage

UNIT-III **6Hrs**

Concern for others

1. Self and Another
2. Human Context

3. Moral Problems of a Society / True Society : Social Desire, Social Fear, Social Silence, Social Indifference

UNIT-IV **6Hrs**

Transformation of self

1. Definitions of personality
2. Characteristics of personality
3. Elements of personality
4. Traits of good personality
5. Self-Identity, self-concept
6. Self-Discovery, self-acceptance
7. Self-Esteem

WORK SHEET (1): Self Estimation

UNIT-V **6Hrs**

Life enrichment Skills

- Purpose of life - Goal setting
- Characteristics of Goals
- Building Relationships
- Time Management
- Stress Management
- Emotional Management
- Conflict Management
- Team Management (Group Dynamics)

WORK SHEETS (1) & (2): 1) Anger Management
2) Team Management

ESSENTIAL READING

1. Human Values - Development Programme - AIACHE
2. In Harmony

MATHEMATICS – I

Credits : 4 **Semester: I**
Course Code : BS19101 **No. Of Lecture Hours: 75**

Objective: To provide strong foundation on differential equations, applications of mean value theorems, infinite series and Fourier series.

Course Outcomes:
CO1: Categorize the differential equations with respect to their order and linearity. Solve differential equations of first order using numerical and analytical methods such as Integrating Factors.
CO2: Analyze and Solve basic application problems described by first order differential equations such orthogonal trajectories.
CO3: Solve second order Homogeneous Equations with Constant Coefficients. Obtain exact and numerical solutions using differential equations technology.
CO4: Combine the necessary Laplace transform techniques to solve second-order ordinary differential equations. **Solve** the Laplace transform of standard functions.
CO5: Analyze a Fourier series of a given periodic function by evaluating Fourier coefficients.

UNIT I **15 Hrs**
DIFFERENTIAL EQUATIONS OF THE FIRST ORDER AND FIRST DEGREE

1.	Exact differential equations – Integrating factors – Change of variables	5
2.	Linear differential equations	5
3.	Differential Equations reducible to linear form Bernoulli's equation	5

UNIT II **15 Hrs**
LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS

1.	Auxiliary equation, complementary function, particular integral	5
2.	Working rule for finding P.I. when $X=e^{ax}$, Sin ax, Cos bx, x^m, $e^{ax}v$, $x^m.v$,	5
3.	Cauchy's equation	5

UNIT III **15Hrs**
CALCULUS

1.	Mean Value theorems: Rolle's Theorem	5
2.	Lagrange's Mean Value theorem with their geometrical interpretations	5
3.	Cauchy's mean Value theorem and applications	5

UNIT IV **15 Hrs**
INFINITE SERIES

1.	Sequence: Definition of a sequence, Limit, Convergent ,divergent and	5

oscillatory sequences Series- General Properties of series

2. Necessary condition for convergence- Series of positive terms, Comparison tests- p-test 5
3. D' Alembert's ratio test, Cauchy's Root Test, Alternating Series(Without Proof), Absolute and conditional convergence 5

UNIT V **15 Hrs**

FOURIER SERIES

1. Fourier Series of a function in an interval of length 2π 5
2. Fourier Series for even and odd functions 5
3. Half range series: Half range Sine series and Cosine series 5

ESSENTIAL READINGS

1. Zafar Ahsan. **Differential Equations and their Applications.** 2nd Edition. Prentice Hall of India, (Units I ,II and III)
2. B.S. Grewal. 2014. **Higher Engineering Mathematics.** 3rd Edition**.** Khanna Publishers. India: New Delhi. Unit IV and V
3. Iyengar T.K.V, B. Krishna Gandhi, Ranganatham, Prasad M.V.S.S.N. 2009. **Engineering Mathematics Vol. II.** S.Chand & Co New Delhi.

ELECTRONIC DEVICES AND CIRCUITS

Credits : 4 **Semester: I**
Course Code : CSIT18101 **No. of Lecture Hours: 75**

Objectives:

- To define scope and application of Electronics.
- To study about Electronic components, electrical energy sources, semiconductor devices, electronic amplifier and Oscillator circuits.

Course Outcomes:
CO1: Define and classify the various electronic components
CO2: **Explain** the functioning of electronic devices
CO3: **Construct** and understand the functioning of BJT
CO4: **Apply** the behaviour of transistor in building amplifier
CO5: **Explain** the operation of amplifiers and oscillators

UNIT- I		**15 Hrs**
1	Introduction to Electronics , Electronic components(Passive and active)	2
2	Resistors, Types of resistors, Colour coding of resistors, Variable resistors (potentiometer)	3
3	Capacitors: Types of capacitors, Fixed and Variable capacitors	2
4	Inductors: Working principle, Types of Inductors	3
5	Ohms law, Introduction to KVL and KCL SI units	2
6	(Electrical and Electronics) Sources of electrical power (Batteries, Generators, Alternators, Oscillators) Internal impedance of sources, Concept of voltage source, Concept of current source	4

UNIT- II		**15Hrs**
1	Semiconductor materials Atomic Structure of some elements, electron energies and energy bands in solids, Metals, Insulators and Semiconductors	4
2	Intrinsic semiconductor, Extrinsic semiconductor, P N junction diode, Junction diode theory, V-I characteristics, Static and Dynamic resistance.	4
3	Block diagram of power supply, Study of Half Wave Rectifiers, Centre Tap Rectifier and Bridge Rectifier, Introduction to Filter.	4
4	Zener diode as voltage regulator, types of diodes, Signal diode, Light Emitting Diodes.	3

UNIT- III		**15Hrs**
1	Introduction to transistors, Transistor structure and working, Transistor amplifying action.	4
2	Transistor configurations(CE,CB,CC).Characteristics of transistor in CB and CE	4

	configuration, current relations	
3	Comparison of CE, CB and CC configurations.	3
4	Basic CE amplifier circuit, Introduction to load line.	4

UNIT- IV **15Hrs**

1	Biasing and selection of Q point, Stabilization of Q point, Different biasing circuits	5
2	Voltage divider biasing circuit, single stage transistor amplifier, DC and AC equivalent circuits of Amplifier	5
3	FET structure, characteristics and parameters, FET amplifier and its AC equivalent	5

UNIT- V **15Hrs**

1	Classification of amplifiers, Introduction to: Multistage amplifiers, Power amplifiers.	4
2	Resonance, series and parallel resonance, Single Tuned voltage amplifier.	4
3	Types of feedback, Voltage Gain of Feedback Amplifier	3
4	Classification of Oscillators .Tuned Circuit - Generation of Sine Wave ,Positive Feedback Amplifier as an Oscillator, Tuned Collector LC Oscillator , Phase Shift RC Oscillator, Introduction to Crystal Oscillator.	4

ESSENTIAL READING

1. Bhargava N.N, Gupta S.C and Kulshreshtha D.C. 2006. **Basic Electronic and Linear circuits.** New Delhi: Tata McGraw-Hill.

PROBLEM SOLVING AND PROGRAMMING THROUGH 'C'

Credits : 4 **Semester: I**
Course Code: BS19123 **No. of Lecture Hours: 60**

Objective: To understand major programming constructs this serves as the basis for any programming language.

Course Outcomes:
CO1: **Explain** the basic introduction of computer and programming languages.
CO2: **Categorize** different data types, operators and data input /output functions in 'C'.
CO3: **Develop** programs using 'C' control structures, arrays and string concept.
CO4: **Sub divides** larger problems into smaller ones using 'C' functions.
CO5: **Create** programs using the concept of structures, union and file handling in 'C'.

UNIT – I	**12Hrs**
1. Introduction to Computer, Block diagram of computer	2
2. Introduction to Computer software-System and application software	1
3. Algorithms and Flow charts	2
4. Introduction to C programming	2
5. Structure of C program	1
6. Files used in a C program	2
7. Compiling and executing C program	2

UNIT – II	**12Hrs**
1. C tokens, Constants, Character set in C, Keywords, Identifiers	2
2. Data Types in C, Enumerated data types, typedef	2
3. Variables and scope of a variables	2
4. Data input and output statements in C	2
5. Operators and expressions	2
6. Type conversion and Typecasting	2

UNIT – III	**12Hrs**
1. Conditional Branching Statement – if, if-else, if-else-if, switch case	2
2. Iterative Statements – while loop, do-while loop, for loop	2
3. Nested loops, break and continue statements, Go to statement	3
4. Arrays - Single and double dimensional arrays	3
5. String- string input output functions, string manipulation functions	2

UNIT-IV	**12Hrs**
1. Function- Declaring, defining and invoking functions	2
2. Categories of functions-Built-in functions	2
3. Passing parameters to functions – call by value & call by reference	1

4.	Storage classes, Recursion	2
5.	Pointers - Declaration, passing pointer to functions	2
6.	Pointers and one dimensional arrays	2
7.	Dynamic memory allocations.	1

UNIT – V **12Hrs**

1.	Structures - Simple structures, nested structure, Array of structures	3
2.	Unions-Differences between Structures and Unions.	2
3.	File handling - Various modes, File operations – fopen(), fclose()	2
4.	File input output functions – fputc(),fgetc(),fputs(),fgets(), getw(),putw(),getc(),putc(),fprintf(),fscanf(),getchar(), putchar()	3
5.	Random accessing file – fseek(),ftell(),rewind()	2

ESSENTIAL READING

1. Thareja Reema. 2016. **Programming in C.** 2nd edition**.** New Delhi : OUP.
2. Kanetkar Yashwanth. 2018. **Let us C.** 16th Edition**.** New Delhi : BPB.
3. Gottfried Byron. 2010. **Programming with C (**Schaum's Outline Series**).** 3rd Edition. New Delhi: McGraw Hill Education

ENGINEERING DRAWING AND ENGINEERING WORKSHOP LAB

ENGINEERING DRAWING LAB

Credits : 2 **Semester: I**
Course Code : BS18129 **No. of Practical Hours: 60**

Objectives:

- To provide all aspects and detailed study of Engineering Drawing
- To construct any structure correctly and methodically
- To describe the shape, size, finish, and construction of any object accurately and clearly

Outcome: Students will be able to gain knowledge on how to draw lines, curves, objects in two-dimensional views and demonstrate the objects in three-dimensional views

No. of Hours	TOPIC
2	**Drawing Instruments and their uses:**Drawing boards, drawing sheets, compass, divider, protractor, French curves, mini drafter, pencils etc..,
4	**Dimensioning and its Importance :**Aligned dimensioning, unidirectional dimensioning, chain dimensioning, parallel dimensioning, Lines and Lettering
10	**Geometrical constructions:** Bisecting a line,bisectingan angle, construction of regular polygons by inscribe circle method, arc method,4-6 methods.
18	**Curves used in Engineering practices:** Construction of an Ellipse, parabola, Hyperbola by General method, Tangent method, Rectangular method, Involutes of Square and Circle, Cycloids
10	**Orthographic projections :** Projection of Points, Lines, Planes
10	Conversion of simple pictorial view into Orthographic views using 1st angle projections
6	**Isometric View :**Conversion of Orthographic views into Isometric views using simple shapes such as square and Cylinder

ESSENTIAL READING

1. Bhatt, N.D and Panchal, V.M.2014.**Engineering Drawing.** 53rd Edition. Gujarat: Charotar Publishing House Pvt. Ltd.

ENGINEERING WORKSHOP LAB

Credits : 1 **Semester: I**
Subject Code : BS18129 **No. of Practical Hours: 30**

Objectives:

- To introduce the fundamentals of Manufacturing Process.
- To understand/familiar with the different processes
- To understand the process practically

Outcome: Students will be able to gain knowledge on patterns of working in factory on the subject of preparation of the objects, house wiring, and welding technology

No. of Hours	TOPIC
12	FITTING: To make a rectangular M.S.Plate, T-Cut, L- Cut, Step Cut and V Cut
6	HOUSE WIRING: Staircase wiring, parallel and series, Bulb Connection, Bell Connection and Fan Connection.
2	Study of WELDING: Butt joint, Lap joint, T-joint and Corner Joint
4	DRILLING: Drilling holes in M.S. Plate.
4	STUDY OF MACHINE TOOLS: Lathe, Drilling machines
2	Study of BRASING and SOLDERING.

ESSENTIAL READING

1. Choudhury Hajra, S.K. Choudhury Hajra, A.K and Roy Nirjhar. 2008. **Elements of Workshop Technology Vol: I Manufacturing Process**. Mumbai: Media Promoters and Publishers PVT Ltd.

ELECTRONIC DEVICES AND CIRCUITS LAB

Credits : 1 **Semester: I**
Course Code : CSIT18102 **No. of Practical Hours: 30**

Objective: To study the nature and behaviour of various electronic components and utilize this behaviour to build electronic modules such as rectifiers, power supplies and amplifiers.

Outcome: Students will be able to experience practical behaviour of electronic components and construct rectifiers, amplifiers etc.

No. of Hours **TOPIC**

1. VI characteristics of a moulded carbon composition resistor.
2. VI characteristics of a PN junction diode.
3. Zener Diode characteristics
4. Study of Variable DC Regulated Power Supply
5. Zener Diode as a voltage regulator
6. Construct and study the Half Wave Rectifier.
7. Construct and study the Centre Tapped Rectifier.
8. Construct and study the Bridge Rectifier.
9. Characteristics of Common Base Configuration
10. Study of Potential Divider Biasing Circuit.
11. Common Emitter Amplifier
12. FET Characteristics
13. FET Amplifier
14. RC Phase Shift Oscillator

C PROGRAMING LAB

Credits: 1 **Semester: I**
Course Code: BS19124 **No. of Practical Hours: 30**

Objective: To develop applications using structured programming.
Outcome: Students will be able to write, compile and debug programs in C language.

No. of Hours	Topic
1-2	Implementation of various arithmetic operators
3-4	Programs using If –condition statement
5-6	Programs using loop control structures
7-8	Programs using pointers and simple arrays
9-10	Programs using strings and functions
11-12	Programs using structures and union
13-14	Programs to implement various file opening modes.

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Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
	THEORY								
1	I	EN23201	General English-II (AECC-3)	3	3	40	60	100	3
2	I	IC23201	Indian Heritage and Culture (AECC-4)	2	3	40	60	100	2
3	II	BS19221	Engineering Physics (GE-1)	4	3	40	60	100	4
4	II	BS18201	Mathematics-II (Core-4)	5	3	40	60	100	4
5	II	CSIT19201	Logic and Digital Circuits (Core-5)	4	3	40	60	100	4
6	II	BS22202	C++ and Data Structures (Core-6)	5	3	40	60	100	4
	PRACTICALS								
7	II	BS19222	Engineering Physics- Lab (GE-1)	2	3	40	60	100	1
8	II	CSIT19202	Logic and Digital Circuits- Lab (Core-4)	2	3	40	60	100	1
9	II	BS19204	C++ and Data Structures-Lab (Core-5)	2	3	40	60	100	1
10	III	PL18001	PLANET* (Outreach)	-	-	-	-	-	1
	Total			**29**	**-**	360	540	900	**25**

***Ability Enhancement Compulsory Course (AECC)**
***Skill Enhancement Course (SEC)**
***Programme of Loyola Academy for Neighbourhood Empowerment and Transformation (PLANET)**

GENERAL ENGLISH -II

Credits : 3 **Semester: II**
Subject Code : EN23201 **No of Lecture Hours: 45**

Objectives:

- To enhance the learners' communication skills by giving adequate exposure in reading, writing, listening and speaking skills and the related sub-skills.
- To develop oral and written communicative skills among the students so that their employability enhances and English becomes the medium of their livelihood and personality.

Outcomes:

CO 1. To identify a sound understanding on the formation of words and to demonstrate the functional grammatical component in the sentence.

CO 2. To paraphrase ideas and thoughts in a coherent, neat and organized manner in order to utilize the writing skills for sound writing propagandas.

CO3. To create an understanding on Indian Literature, alongside to develop and chisel their communication skills.

CO4. To recognize the moral element which underlies in the short story; an exposure to informal language.

CO5. To develop listening and speaking skills through effective sentence constructions and efficient delivery.

Unit-I

Fundamentals of effective communication- II	**9Hrs**
Flash Fiction- The Mice by Lydia Davies	(1)
• Simple, Complex and Compound Sentences	(3)
• Conversion of sentences	(3)
• Information Transfer	(2)

UNIT-II	**9Hrs**
Language Proficiency for Effective speaking and Writing Skills-II	
Short Story- The Face on the Wall by E V Lucas	(2)
• Active and Passive Voice	(3)
• Conjunctions	(2)
• Essay Writing	(2)

UNIT-III	**9Hrs**
Health	
From the text "Three Days to See"	
• Explanation of the text	(3)

- Grammar -------Usage of Modal Auxiliary Verbs (2)
- Vocabulary --- Collective Nouns, Technical Vocabulary (2)
- Writing Skill ------News Paper Report (2)

UNIT-IV **9Hrs**

Short Story

From the text "Leela's Friend" by R.K.Narayan

• Explanation of the text (3)
• Grammar----Phrasal Verbs, Wh- Questions (2)
• Vocabulary----Noun and Verb Suffixes (2)
• Writing Skill------Writing a Narrative (2)

UNIT-V **9Hrs**

Inspiration

From the text "The Last Leaf" by O. Henry

• Explanation of the text (3)
• Grammar----- Prepositions (2)
• Vocabulary-----Idioms (2)
• Writing Skill----- Précis Writing (2)

ESSENTIAL READING

1. **Epitome of Wisdom**. Guntur: Maruthi Publications.

SUGGESTED READING

1. Mohan Krishna and Banerjee Meera. 1990. **Developing Communication Skills**. New Delhi:Macmillan India Ltd.
2. Krishnaswamy, N. and Sriraman,T. 1995. **Current English for Colleges**. Madras: Macmillan India Ltd.
3. Narayanaswamy, V.R. 1979.**Strengthen Your Writing**. New Delhi: Orient Longman.
4. Sharma, R.C. and Mohan Krishna. 1978. **Business Correspondence**. New Delhi: Tata McGraw-Hill Publishing Co.

INDIAN HERITAGE AND CULTURE

Credits : 2 **Semester: II**
Course Code: IC23201 **No. of Lecture Hours: 30**

Objectives:

- To apprise the students with a sound background of Indian Culture.
- To equip the students with social & community problems of India.
- To prepare the student for civil service exams where Indian Heritage & Culture paper is compulsory for all the streams.

Course Outcomes:

CO1: Students will have knowledge about Indian Customs and Traditions.
CO2: Students can make use of the subject knowledge to attempt all kinds of competitive exams, especially civil services
CO3: The Subject helps the student community to have knowledge of historical and contemporary social, religious and political issues of the nation

UNIT I **6hrs**

INTRODUCTION – ANCIENT INDIAN HERITAGE AND CULTURE

- Meaning of the culture-Characteristics of Indian culture
- Indus valley civilization and Vedic/Aryan Culture
- Mauryas and Guptas
- Ashoka the great and Harshavardhana
- South Indian Kingdoms-Satavahanas, Pallavas, Cholas
- Development of the art and architecture-contributions of Buddhism and Jainism

UNIT II **6hrs**

MEDIEVAL INDIA – INFLUENCE OF ISLAM ON INDIAN CULTURE

- Cultural Development under the Delhi Sultanate and Mughals
- Sufi and Bakti Movement in Medieval period
- Cultural Achievements of Kakatiyas and Qutubshahis
- Development of Art and architecture during medieval India

UNIT III **6hrs**

IMPACT OF WEST AND REFORM MOVEMENTS

- Influence of Western culture on Indian Society
- 19th century Socio Religious Reform Movement –Raja Ram Mohan Roy Ishwara Chandra Vidyasagar and Veerasalingam
- Subaltern Movements in India– Jyothirao Phule-Savitribai Phule E.V Ramaswamy Naikar –Narayana Guru-Dr.B.R.Ambedkar
- Indian National Movement-Moderate, Extremist and Gandhian Era

UNIT IV **6hrs**

RELIGION AND COSTITUTIONAL INSTITUTIONS

- Perceptions of all major religions-a critical analysis
- Rise of communalism in Indian society
- Democratic system in India and its functions-Evolution of the constitution and organs of democracy

UNIT V **6hrs**

SOCIAL GROUPS AND RIGHTS

- Fundamental rights,
- Women, Children and LGBTQ
- Tribal Culture-their issues

REFERENCE BOOKS

1. Jha, Dr K.N. 2006. **Studies in ancient & Medieval India**. COSMOS Book hive Ltd: Gurgaon.
2. Mahajan, V.D. 2008. **Ancient India**. S.Chand, New Delhi.
3. Manasseh, Dr P. 2010. **An Overview of Indian Culture**. Gamaleil Publishers, Hyderabad.
4. Malpani, Madanlal & Malpani, Shamsunder. 2014. **Indian Heritage and Culture**. Kalyani Publishers, Ludhiana.
5. Mhaske, Dr R.H. 2012. **Human Rights, Social Justice and Political Challenges**. Chandralok Prakashau, Kanpur.
6. Singh, Gurdip & Ahuja, V.K. 2012. **Human Rights in 21st Century**. Universal Law Publisher, New Delhi.

ENGINEERING PHYSICS

Credits : **4** **Semester**: **II**
Course Code: **BS19221** **No. of Lecture Hours**: **60**

Objective: To provide a bridge to the world of technology from the basics of science and to equip the students with skills in scientific inquiry, problem solving and laboratory techniques.

Course Outcomes:

CO1: Apply Fundamental electromagnetic concepts for various applications including wireless and optical communications.
CO2: Design different applications of lasers and fibre optics in the field of industry, medical and telecommunications
CO3: Distinguish the various crystalline materials and to understand the crystallographic techniques
CO4: Apply concepts of wave and particle nature of material particles for various engineering applications.
CO5: Develop different devices with more efficiency using superconducting and nano materials.

UNIT-I		**12 Hrs**
WAVE MECHANICS		
1	Matter waves – DeBroglie wavelength	1
2	Properties of wave function, Physical significance	1
3	Schrodinger time dependent and time independent wave equations	2
4	Particle in a 1-D box	1
ELECTRO MAGNETIC THEORY		
5	Basic laws of electricity and magnetism	1
6	Maxwell's equations in integral and differential forms	2
7	Conduction and displacement current, Relation between D,E and P	2
8	Electromagnetic waves –equation of plane wave in free space	1
9	Poynting theorem	1

UNIT-II		**12Hrs**
FIBRE OPTICS		
1	Introduction – Propagation of light through an optical fiber	1
2	Acceptance angle- Numerical aperture (NA)	1
3	Types of optical fibers and refractive index profiles	2
4	Fibre drawing process (double crucible method)	1
LASERS		
5	Characteristics of lasers, Spontaneous and stimulated emission of radiation	1
6	Einstein's coefficients, Population inversion	1
7	Ruby laser, Helium-Neon Laser, Semiconductor Laser	3
8	Applications of lasers	1

UNIT-III **12 Hrs**

ULTRASONICS

1	Introduction to Ultrasonic waves	1
2	Production of ultrasonic waves by Piezo electric method	1
3	Detection of ultrasonic waves(sensors) : Piezoelectric detector	1
4	Properties and applications of Ultrasonics	1
5	Wavelength of Ultrasonic's by Debye-Sears method	1

DIELECTRIC MATERIALS

6	Dielectrics-Introduction	1
7	Types of polarizations –electronic, ionic, orientation, space charge polarizations	1
8	Expression for Electronic polarizability	1
9	Frequency and temperature dependence of dielectric polarization	1
10	Determination of dielectric constant by capacitance bridge method	1
11	Ferro electricity-Barium titanate	1
12	Applications of Ferroelectrics	1

UNIT-IV **12 Hrs**

SEMICONDUCTORS & SUPERCONDUCTIVITY

1	Brief idea about semi-conductors	1
2	Thermistor as a temperature sensor its V-I characteristics	1
3	Hall effect	1
4	Introduction - General properties of super conductors – Applications	1
5	Meissner effect, Type I and Type II superconductors	1
6	BCS theory (qualitative)	1
7	Introduction to High T_c superconductors	1

MAGNETIC MATERIALS

8	Classification of magnetic materials: dia, para, ferro, antiferro and ferrimagnetic materials	1
9	Weiss molecular field theory of ferromagnetism	1
10	Magnetic domains, Hysteresis curve	1
11	Soft and hard magnetic materials	1
12	Ferrites: Applications of ferrites	1

UNIT-V **12 Hrs**

THIN FILMS

1	Distinction between bulk and thin films	1
2	Thin film preparation techniques	1
3	Thermal evaporation methods, Electron beam evaporation	2
4	Construction and working of Solar cell – Applications	2

NANO MATERIALS

5	Introduction- Properties of materials at reduced size, Surface to	1

	volume ratio at nano scale	
6	Classification of nanomaterials	1
7	Preparation of nanomaterials: Bottom-up methods (sol gel and CVD)	2
8	Top-down methods (ball milling)	2
9	Basic ideas of carbon nanotubes	1
10	Applications nano materials and their health hazards	1

ESSENTIAL READINGS

1. P.K.Palanisamy. 1998. **Engineering Physics**. 5th Edition. SciTech publications.
2. M.S. Avdhanulu and P.G. Kshirasagar. 1992. **Engineering Physics.** S.Chand & Co 1st Edition.
3. B.K. Pandey and S. Chaturvedi. 2012. **Engineering Physics**. Cengage Learning
4. Dr.S.L.Guptha, Sanjeev Guptha. 2015. **Unified physics**. Vol-I, III, IV, 47th edition. Jai Prakash Nath Publications. India: Meerut.

MATHEMATICS – II

Credits : 4 **Semester : II**
Course Code : BS18201 **No. of Lecture Hours:75**

Objective: To provide strong foundation and aptitude for understanding Computer Languages and pursue higher education.

Course Outcomes:
CO1: Categorize the vector-valued functions of a real variable and their curves, Gradient vector fields and constructing potentials.
CO2: **Analyze** the differential ideas of divergence, curl, and the Laplacian along with their physical interpretations
CO3: **Use** the applications of Green's theorem in the plane, Gauss divergence theorem and Stake's theorem.
CO4: **Formulate** the solution set of a system of linear equations
CO5: Solve the characteristic polynomial, eigenvectors, and eigenvalues.

UNIT- I		**15Hrs**
1	System of Linear Equations: Rank of a Matrix Rank-Echelon form	5
2	Normal form – Solution of Linear Systems	5
3	Homogeneous and non-Homogeneous Equations.	5

UNIT- II		**15Hrs**
1	Eigen values - Eigen vectors: Eigen values-Eigenvectors–Properties–Cayley Hamilton Theorem	5
2	Inverse and powers of a matrix by using Cayley-Hamilton theorem	5
3	Quadratic forms- Reduction of quadratic form to canonical form	5

UNIT- III	**Vector Calculus- I**	**15Hrs**
1	Vector Differentiation and the necessary and sufficient condition for a vector function to have constant magnitude and constant direction.	5
2	Vector Continuity- Differentiability- Vector Integration	5
3	Gradient – Directional derivative of a scalar function- Equation of the Tangent and normal to a surface	5

UNIT- IV	**Vector Calculus- II**	**15Hrs**
1	Divergence and Curl Operators	5
2	Formulae involving these operators	5
3	Vector Identities- Simple Problems there on	5

UNIT-V	**Vector Calculus: III**	**15Hrs**
1	Line Integrals-Surface integrals- Volume integrals	5
2	Green's theorem ,Gauss theorem, Stoke's Theorem (Without proofs)	5
3	Problems on Green's theorem ,Gauss theorem, Stoke's Theorems	5

ESSENTIAL READING

1. Vasistha, A.R and Vasistha, A.K.2014.**Matrices**. Meerut : Krishna Prakashan Media (For UNITS I, II)
2. Vasistha, A.R and Dr.Agarwal, D.C. 2015. **Vector Calculus**. 9th Edition. Meerut: Krishna Publications. (For UNITS-III,IV andV)

LOGIC AND DIGITAL CIRCUITS

Credits : 4 **Semester : II**
Course Code: CSIT19201 **No. of Lecture Hours: 60**

Objectives:

- To study the number systems, binary codes and binary logic.
- To study the concepts/principles used in design of digital data processing.
- To construct various combinational and sequential circuits and their applications.

Course Outcomes:

CO1: **Explain** the binary logic and switching circuits
CO2: **Solve** Boolean algebra and Boolean functions
CO3: **Design** Boolean functions using universal gates
CO4: **Construct** the arithmetic circuits and digital comparators
CO5: **Construct** and analyze the various combinational circuits

UNIT I		**12 Hrs**
1.	Introduction to Digital logic, Number systems(Decimal, Binary, Octal and Hexa decimal)	2
2.	Number Base conversion, complements	2
3.	Binary codes, Decimal codes ,Error detection codes, Reflected codes, Alpha numeric codes (ASCII)	4
4.	Two valued Boolean Algebra, Basic theorems, Venn diagrams	2
5.	Boolean Functions and their simplification	1
6.	Min terms and Max terms , Canonical forms and Standard forms	1

UNIT II		**12 Hrs**
1.	Karnaugh map method of simplification of Boolean functions	2
2.	Digital logic gates, Combinational logic design procedure	2
3.	Design of Arithmetic circuits (Half adder , half Subtractor, Full adder and full Subtractor)	2
4.	Design of code convertors	2
5.	Analysis of combinational circuits	1
6.	Implementation of Boolean functions using Universal gates	2
7.	Exclusive OR and Equivalence functions	1

UNIT III		**12 Hrs**
1.	Parity generator and error indicator	1
2.	Binary parallel adder and interfacing of parallel adder IC's, Binary multipliers	2
3.	Magnitude comparators, comparator with cascade inputs, interfacing of comparator ICs	3
4.	Encoders and priority encoders	2

5.	Decoders and combinational logic implementation using decoders	2
6.	Multiplexers and De-multiplexers	2

UNIT IV **12 Hrs**

1.	Introduction to sequential circuits	1
2.	Principle of operation of basic flip flop circuits, clocked RS,D,JK and T flip flops	2
3.	Flip flop direct inputs (master set and master clear)	1
4.	Analysis of clocked sequential circuits(state table, state diagram, state equations and FF input function)	4
5.	Flip-flop excitation tables, design procedure of sequential circuits and design of synchronous counters	4

UNIT V **12 Hrs**

1.	Registers ,register with parallel load	1
2.	Shift registers, serial transfer, bidirectional shift register with parallel load	2
3.	Serial adder	1
4.	Generation of word time and timing signals, Johnson counter	3
5.	Classification of memories (ROM,PROM,EPROM,EEPROM,RAM,SRAM,DRAM)	2
6.	Introduction to integrated circuits	1
7.	IC digital logic families and their characteristics/specifications	2

ESSENTIAL READING

1. Morris Mano, M. 2016. **Digital Logic and Computer Design.** 2nd edition. Pearson education

SUGGESTED READING

1. Morris Mano, M. 2002. **Digital Design.** 3rd edition. PHI

C++ and DATA STRUCTURES

Credits : 4 **Semester: II**

Course Code : BS22202 **No. Of Lecture Hours: 75**

Objectives:

- To understand and develop basic notions of object oriented programming through C++.
- To understand the concepts of various Data Structures and their algorithms.

Course Outcomes:

CO1: Differentiate between object-oriented programming and procedure-oriented programming.
CO2: Develop programs using object oriented programming features.
CO3: Organize the data using sorting and various linear data structures and determine the time complexity
CO4: Illustrate non-linear data structures like trees, graph
CO5: Choose appropriate data structures to represent data items in real world problems

UNIT-I **15 HRS**

1. Introduction to object-oriented programming **:** Features, characteristics And applications of OOP's — 2
2. Keywords, data types, variables and their declaration, reference variables, Scope resolution, member dereferencing & memory management operators, Manipulators, input and output objects (cin & cout) — 2
3. Functions : Definition, Function components, call by value, reference & address, Inline functions, functions with default arguments, Function overloading — 5
4. Defining classes, defining member functions, nesting of member functions, Private member functions, Memory allocation for objects, static data members And static member functions, friend classes — 5
5. Array of objects and Returning objects — 1

UNIT-II **15 HRS**

1. Constructors, default and parameterized constructors, copy constructors, Constructor overloading, constructors with default arguments, Destructors — 3
2. Inheritance: Defining derived classes, single inheritance, making private members Inheritable, multilevel, multiple, hierarchical and hybrid inheritances — 3
3. Virtual base classes, constructors in derived classes, abstract classes — 2
4. Pointers to objects, this pointer, pointers to derived classes, virtual functions, Pure virtual functions — 3
5. Operator overloading using member functions and friend functions — 2
6. Template: Template functions and Template classes — 2

UNIT-III **15 HRS**

1. Introduction to data structures : Linear and non-linear data structures, Stacks-Definition, implementing stack using arrays 3
2. Applications of stack: infix, prefix and postfix expressions, conversion of infix to prefix and infix to postfix, evaluation of postfix expression 4
3. Queues- Definition, implementing queue using arrays, circular queue and double ended queue 5
4. Sparse Matrix-definition, representation of sparse matrix in 3-tuple form 3

UNIT-IV **15 HRS**

1. Linked list- Definition, single linked lists, operations on single linked list (Insertion & deletion), Stack and queue using linked list. 5
2. Trees- Definition, linked representation of trees, Binary search tree, Tree Traversals (in-order, preorder and post order traversals) 3
3. Linear search and binary search 2
4. Sorting-Bubble, selection, insertion, quick and merge sort techniques 5

UNIT-V **15 HRS**

1. B-trees-insertion and deletion operations on B-trees 6
2. Graphs**:** Definition, Array and linked list representation of graphs 2
3. Graph traversals-BFS and DFS 4
4. Spanning tree and Kruskal's algorithm 3

ESSENTIAL READINGS

1. Balaguruswamy, E. 2004. **Object Oriented Programming with C++**. 4th Edition. New Delhi: Tata McGraw-Hill publications (For units I and II)
2. Kanetkar Yashwant, P. 2007. Data Structures through C++. 2nd Edition. New Delhi: BPB Publications(For units III, IV and V)

SUGGESTED READINGS

1. Ravichandran, D 2010. **Programming with C++.** 3rd Edition. New York: McGraw Hill.
2. Strousstrup Bjarne 2013. **The C++ Programming Language.** 4th Edition. New York: Addision-Wesley Professional.
3. Thareja Reema. 2015. **Object Oriented Programming with C++,** USA: Oxford University Press.
4. Sahini Sartaj. 2005. **Data Structures and Algorithms in C++.** 2nd Edition. India: Universities Press Private Limited

ENGINEERING PHYSICS LAB

Credits : 1 **Semester: II**
Course Code : BS19222 **No. of Practical Hours: 30**

Objective:

- To demonstrate an ability to make physical measurements, understand the limits of precision in measurements
- To use experimental statistics to determine the precision of a series of measurements.

Outcome: Students will be able to investigate theoretical background to an experiment and also to design experiments to test a hypothesis and to determine the value of unknown quantities.

List of Experiments:

1. To calculate the Numerical aperture (NA), acceptance angle of a given optical fiber.
2. Determination of wavelength of LASER using diffraction grating.
3. Determination of Velocity of ultrasonic waves in a liquid by Debye-Sears method.
4. To draw the I-V Characteristics of P-N Junction diode and to evaluate the value of potential barrier of the diode.
5. Determination of carrier concentration, Mobility and Hall Coefficient of Ge Crystal using Hall Effect Experiment.
6. To draw the curve between the magnetizing field and the intensity of magnetization of the specimen (soft iron rod) and to find out i) Coercivity ii) Retentivity and iii) Hysteresis loss.
7. To draw the I-V Characteristics of a solar cell and to calculate the i) Fill factor ii) Efficiency and iii) Series resistance.
8. To find the values of Electrical conductivity and energy gap of Ge crystal by Four probe method.
9. To determine the Dielectric constant and Phase transition temperature of Lead Zirconium Titanate (PZT).
10. To determine the constants of A, B and α using Thermistor characteristics.
11. To study the variation of magnetic field along the axis of a circular loop.
12. To study the angle of dip at a place on the earth surface using Dip circle .

LOGIC AND DIGITAL CIRCUITS LAB

Credits : 1 **Semester: II**
Course Code : CSIT19202 **No. of Practical Hours: 30**

Objective: To study the functioning of various digital modules and build data processing circuits such as arithmetic circuits, comparators, encoders, decoders, multiplexers, de-multiplexers, register, counters.
Outcome: Students will be able to construct and analyze various combinational and sequential circuits used in digital data processing/design of digital computers.

No. of Hours	List of Experiments
1	Study of Digital Trainer Kit
2	To verify the Truth table of Logic Gates
3-4	To construct and study the Arithmetic circuits (HA, HS, FA, FS)
5	To construct and study the 4-bit Parallel Adder (using the IC)
6	To study the magnitude comparator
7	To construct and study the BCD to seven segment decoder
8	To construct and study the Multiplexers
9	To construct and study the parity generator and error indicator
10	To construct and study the code convertors
11-12	To study and design the flip flops using gates and IC's
13-14	Design of counters using flip flops and IC's
15	Design of registers using flip flops and IC's

C++ and DATA STRUCTURES

Credits : 1 **Semester: II**
Course Code: BS19204 **No. of Practical Hours: 30**

Objective: To understand object oriented programming concepts in C++ and data structures
Outcome: Students are able to write programs using Object oriented features and ability to identify and implement the appropriate data structures for the given problems.

No. of Hrs	Topic
1	Basic C++ programs using operator, loops and decision
2-3	Programs using Class and object
4	Programs on Inline functions, friend functions
5-6	Programs on Constructors, overloading on constructors
7	Programs on Inheritance and files.
8	Programs on operator overloading and templates
9	Programs on exception handling and arrays
10-11	Programs on stack and queues- array and linked list
12	Programs on application on stacks
13	Programs on sorting and searching
14	Programs on single linked list- operations
15	Programs on graph traversals.