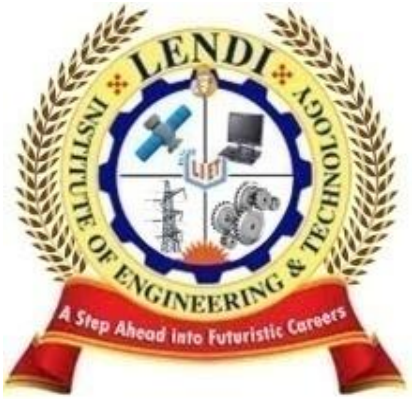
COURSE STRUCTURE(R19)
AND
DETAILED SYLLABUS
(I YEAR)

COMPUTER SCIENCE & ENGINEERING

For
B.Tech., Four Year Degree Course
(Applicable for the batches admitted from 2019-20)



LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY
An Autonomous Institution
Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with "A" Grade and NBA (CSE, EEE & ME)
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B.Tech Course Structure –R19
(w.e.f the Academic Year 2019-20)

Semester – 0							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-HM1001	Physical Activities (Sports, Yoga and Meditation, Plantation)	BS	0	0	3	0
2	R19CSE-ES1001	Career Counseling	ES	3	0	0	0
3	R19CSE-ES1002	Orientation (Know your Department)	ES	3	0	0	0
4	R19CSE-ES1003	Fundamentals of Computers	ES	3	0	2	0
5	R19BSH-MA1001	Basic Aptitude and Mathematical Skills	BS	3	0	0	0
6	R19BSH-MA1002	Remedial Training in Foundation Courses	BS	5	0	0	0
7	R19BSH-HM1002	Human Values & Professional Ethics	HM	3	0	0	0
8	R19BSH-HM1003	Communication Skills (Listening, Speaking, Reading skills Writing skills)	HM	2	1	2	0
			Total	**22**	**1**	**7**	**0**

I Year - I Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA1104	Numerical Method and Ordinary Differential Equations	BS	3	0	0	3
2	R19EEE-ES1104	Essentials of Electrical & Electronics Engineering	ES	3	0	0	3
3	R19BSH-EN1101	English	HM	3	0	0	3
4	R19BSH-CH1101	Applied Chemistry	BS	2	0	0	2
5	R19CSE-ES1101	Problem Solving and Programming using C	ES	3	0	0	3
6	R19BSH-EN1102	Communicative English Lab -I	HM	0	0	3	1.5
7	R19CSE-ES1102	Problem Solving and Programming using C Lab	ES	0	0	3	1.5
8	R19EEE-ES1105	Essentials of Electrical & Electronics Engineering Lab	ES	0	0	2	1
9	R19BSH-MC1101	Environmental Science	MC	3	0	0	**0**
			Total	**17**	**0**	**8**	**18**

I Year - II Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA1201	Linear Algebra and Multivariable Calculus	BS	3	0	0	3
2	R19BSH-MA1203	Mathematical Methods for Computer Science	BS	3	0	0	3
3	R19CSE-ES1201	OOPS through C++	ES	3	0	0	3
4	R19ECE-ES1201	Digital Logic Design	ES	3	0	0	3
5	R19BSH-PH1203	Applied Physics	BS	2	0	0	2
6	R19MEC-ES1203	Engineering Drawing	ES	1	0	3	2.5
7	R19BSH-BS1201	Applied Science Lab	BS	0	0	2	1
8	R19BSH-EN1201	Communicative English Lab -II	HM	0	0	3	1.5
9	R19CSE-ES1202	OOPS through C++ Lab	ES	0	0	3	1.5
10	R19BSE-MA1202	MAT LAB for Computational Methods	BS	0	0	3	1.5
			Total	**16**	**0**	**14**	**22**

II Year – I Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA2101	Mathematical Foundations of Computer Science	BS	3	0	0	3
2	R19CSE-PC2101	Software Engineering	PC	3	0	0	3
3	R19CSE-PC2102	Python Programming	PC	3	0	0	3
4	R19CSE-PC2103	Data Structures through C++	PC	3	0	0	3
5	R19CSE-PC2104	Computer Organization & Architecture	PC	3	0	0	3
6	R19CSE-PC2105	Python Programming Lab	PC	0	0	3	1.5
7	R19CSE-PC2106	Data Structures through C++ Lab	PC	0	0	3	1.5
8	R19BSH-MC2101	Essence of Indian Traditional Knowledge	MC	0	0	2	0
9	R19BSH-MC2102	Employability Skills - I	MC	3	0	0	0
10	R19CSE-MC2101	MOOC S-1	MC	0	0	0	0
			Total	**18**	**0**	**8**	**18**

II Year – II Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA2201	Probability & Statistics	BS	3	0	0	3
2	R19CSE-PC2201	Java Programming	PC	3	1	0	4
3	R19CSE-PC2202	Operating Systems	PC	3	0	0	3
4	R19CSE-PC2203	Database Management Systems	PC	3	0	0	3
5	R19CSE-PC2204	Formal Languages and Automata Theory	PC	3	0	0	3
6	R19CSE-PC2205	Java Programming Lab	PC	0	0	3	1.5
7	R19CSE-PC2206	UNIX Operating System Lab	PC	0	0	3	1.5
8	R19CSE-PC2207	Database Managements Systems Lab	PC	0	0	3	1.5
9	R19BSH-MC2201	Professional Ethics & Human Values	MC	3	0	0	0
10	R19BSH-MC2202	Constitution of India	MC	3	0	0	0
11	R19CSE-SI2201	Summer Internships	SI	0	0	0	0
12	R19CSE-MC2202	MOOC S-2	MC	0	0	0	0
			Total	**21**	**1**	**9**	**20.5**

III Year – I Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19CSE-PC3101	Web Services	PC	3	0	0	3
2	R19CSE-PC3102	Computer Networks	PC	2	1	0	3
3	R19CSE-PC3103	Compiler Design	PC	3	0	0	3
4	R19CSE-PC3104	Artificial Intelligence	PC	3	0	0	3
5	R19CSE-PE3101	**Professional Elective – I**	PE	3	0	0	3
	R19CSE-PE3101.1	1. Computer Graphics					
	R19CSE-PE3101.2	2. Advanced Operating Systems					
	R19CSE-PE3101.3	3. Advanced Data Structures					
	R19CSE-PE3101.4	4. Software Testing Methodologies					
	R19CSE-PE3101.5	**5.** Human Computer Interaction					
6	R19CSE-PC3105	Computer Networks Lab	PC	0	0	3	1.5
7	R19CSE-PC3106	AI Tools & Techniques Lab	PC	0	0	3	1.5
8	R19CSE-PC3107	Web Services Lab	PC	0	0	3	1.5
9	R19BSH-MC3101	Employability Skills – II	MC	3	0	0	0
10	R19CSE-PJ3101	Socially Relevant Projects	PJ	0	0	1	0.5
11	R19CSE-MC3102	MOOCS-3	MC	0	0	0	0
			Total	**17**	**1**	**10**	**20**

III Year – II Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19CSE-PC3201	Data Warehousing and Data Mining	PC	3	0	0	3
2	R19CSE-PC3202	Principles of Programming Languages	PC	3	0	0	3
3	R19CSE-PC3203	Design and Analysis of Algorithms	PC	3	0	0	3
4	R19CSE-PE3201	**Professional Elective – II**	PE	3	0	0	3
	R19CSE-PE3201.1	1. Mobile app Development					
	R19CSE-PE3201.2	2. Scripting languages					
	R19CSE-PE3201.3	3. OOAD					
	R19CSE-PE3201.4	4. Pattern recognition					
	R19CSE-PE3201.5	5. Advanced computer networks					
5	R19CSE-OE3201	**Open Elective- I(Inter Disciplinary)**	OE	3	0	0	3
	R19BSH-OE3201.1	1.Fuzzy Sets, Logic and Systems(MATHS)					
	R19ECE-OE3201.2	2. Micro Processors and Interfaces(ECE)					
	R19EEE-OE3201.3	3. Smart City Planning(EEE)					
	R19MECH-OE3201.4	4. Industrial Management(MECH)					
6	R19BSH-HM3201	Managerial Economics and Financial Accountancy	HM	3	0	0	3
7	R19CSE-PC3204	Data Mining Lab	PC	0	0	3	1.5
8	R19CSE-PC3205	UML Lab	PC	0	0	3	1.5
9	R19CSE-SI3201	Summer Internships	SI	0	0	0	0
10	R19CSE-MC3201	MOOCS-4	MC	0	0	0	0
			Total	**18**	**0**	**11**	**21**

IV Year – I Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19CSE-PC4101	Cryptography and Network Security	PC	3	0	0	3
2	R19CSE-PC4102	UML & Design Patterns	PC	3	0	0	3
3	R19CSE-PC4103	Machine Learning	PC	3	0	0	3
4	R19CSE-OE4104	**Open Elective – II(Inter Disciplinary)**	OE	3	0	0	3
	R19ECE-OE4104.1	1.RFID, Sensors & Data Acquisition(ECE)					
	R19ECE-OE4104.2	2.Digital Image Processing(ECE)					
	R19BSH-OE4104.3	3. Optimization Techniques(MATHS)					
	R19EEE-OE4104.4	4..Geen Energy Models(EEE)					
5	R19CSE-PE4101	**Professional Elective – III**	PE	3	0	0	3
	R19CSE-PE4101.1	1. Mobile Computing					
	R19CSE-PE4101.2	2. Data Science					
	R19CSE-PE4101.3	3. No SQL Data Bases					
	R19CSE-PE4101.4	4. Internet of Things					
	R19CSE-PE4101.5	5. Software Project Management					
6	R19CSE-PE4102	**Professional Elective – IV**	PE	3	0	0	3
	R19CSE-PE4102.1	1. Distributed Systems					
	R19CSE-PE4102.2	2. Parallel Computing					
	R19CSE-PE4102.3	3. Social Networks & Semantic Web					
	R19CSE-PE4102.4	4. Ad- hoc and Sensor Networks					
	R19CSE-PE4102.5	5. Cyber Security & Forensics					
7	R19CSE-PC4104	Machine Learning Lab	PC	0	0	3	1.5
8	R19BSH-MC4101	IPR & Patents	MC	3	0	0	0
9	R19CSE-PJ4101	Mini Project	PJ	0	0	8	4
			Total	**21**	**0**	**6**	**23.5**

IV Year – II Semester							
S. No.	**Course code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-OE4201	Management & organizational Behaviour	HM	3	0	0	3
2	R19CSE-OE4201	**Open Elective –III (Inter Disciplinary)**	OE	3	0	0	3
	R19ECE-OE4201.1	1.VLSI Design(ECE)					
	R19EEE-OE4201.2	2. Optical Networks (EEE)					
	R19ECE-OE4201.3	3. Embedded Systems(ECE)					
	R19ECE-OE4201.4	4.Medical Image Processing(ECE)					
3	R19CSE-PE4201	**Professional Elective – V**	PE	3	0	0	3
	R19CSE-PE4201.1	1. Deep Learning					
	R19CSE-PE4201.2	2. Cloud Computing					
	R19CSE-PE4201.3	3. Natural Language Processing					
	R19CSE-PE4201.4	4. Block Chain Technologies					
	R19CSE-PE4201.5	5. Big Data Analytics					
4	R19CSE-PJ4201	Project	PJ	0	0	16	8
			Total	**9**	**0**	**16**	**17**

I Year –I Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-MA1104	Numerical Methods and Ordinary Differential Equations	3	0	0	3

Course Objectives:

- To familiarize the numerical techniques for solving non-linear equations, interpolation, differentiation, integration and ordinary differential equations.
- To enlighten the learners in the concept of ordinary differential equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Course Outcomes:

At the end of the course, the student will be able to

1. Solve non-linear equations using various numerical methods.(L2)
2. Apply numerical methods to find interpolation polynomial for a given data and solutions of ordinary differential equations. (L3)
3. Apply mean value theorems to real world problems.(L3)
4. Solve the first order ordinary differential equations related to various engineering fields. (L3)
5. Solve the higher order differential equation and analyze physical situations. (L3)

Unit I

Solution of Algebraic and Transcendental Equations: Intermediate value theorem (statement only), geometrical representation of a solution of an equation, Bisection method, Regula-Falsi method, Iterative Method, Newton-Raphson method for one variable and two variables.

Learning Outcomes:

At the end of this unit, the student will be able to

- find approximate roots of an equation by using different numerical methods. (L3)

Unit II

Interpolation and Solutions of Ordinary differential equations:

Interpolation: Finite differences, symbolic relations between operators, interpolation using Newton's forward, backward formulae, Gauss central difference formulae, Interpolation with unequal intervals using Lagrange's formulae.

Solutions of Ordinary differential equations: Taylor's series method, Picard's method of successive approximation, Euler's method, modified Euler's method and Runge-Kutta method of fourth order for solving first order differential equations.

Learning Outcomes:

At the end of this unit, the student will be able to

- explain various discrete operators and find the relation among operators. (L2)
- apply forward and backward interpolation formulae for equal intervals to find interpolating polynomial/values. (L3)
- apply Lagrange's formulae for unequal intervals to find interpolating polynomial/values. (L3)
- solve ordinary differential equations by using different numerical schemes. (L3)

Unit III

Mean Value Theorems & Sequences and Series (without proofs):

Mean Value Theorems: Rolle 's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders.

Sequences and Series**:** Sequence, series, convergence and divergence of series, geometric series, auxiliary series, comparison tests, ratio test, integral test, Cauchy's root test, Raabe's test, alternating series, Leibnitz test, absolute and conditional convergence.

Learning Outcomes:

At the end of this unit, the student will be able to

- analyze the behaviour of functions by using mean value theorems. (L3)
- translate the given function as series of Taylor's and Maclaurin's with remainders. (L3)
- apply the suitable test to study the convergence of a given series. (L3) **.**

Unit IV

Differential Equations of first Order and First Degree: Linear and Bernouill's differential equations, exact differential equations and differential equations reducible to exact equations.

Application: Orthogonal trajectories, simple electrical circuits.

Learning Outcomes:

At the end of this unit, the student will be able to

- solve the first order differential equation by appropriate method. (L2)
- formulate the first order linear differential equation for a physical situation. (L3)
- apply suitable method to solve the real world problem using the concept of differential equations. (L3)

Unit V

Linear Differential Equations of Higher Order: Definitions, complete solution, operator D, rules for finding complementary function, inverse operator, rules for finding particular integral (The RHS term of the type e^{ax} , Sin ax, cos ax, polynomial in x, e^{ax} V(x), xV(x)), method of variation of parameters, simultaneous linear equations with constant coefficients.

Applications: L-C-R circuits.

Learning Outcomes:

At the end of this unit, the student will be able to

- solve the linear differential equations with constant coefficients by appropriate method. (L3)
- solve the higher order differential equation by analyzing physical situations. (L3)

Textbooks

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44/e, 2017.
2. B.S. Grewal, Numerical Methods in Engineering & Science, Khanna Publishers, 2014.

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
5. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
6. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9/e, Wiley India, 2009.
7. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
8. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2/e, Reprint 2012.
9. Sastry, S.S, Introductory Methods of Numerical Analysis, 5^{th} edition, , Prentice Hall , 2017.

I Year –I Semester

Subject Code	Subject Name	L	T	P	C
R19EEE-ES1104	Essential of Electrical & Electronics Engineering	3	0	0	3

Course Objectives:

- To familiarize with the basic DC and AC networks.
- To explain the concepts of electrical machines and their characteristics.
- To identify the importance of transformers in transmission and distribution of electric power.
- To impart knowledge about the characteristics of Semi conductor devices.
- To expose basic concepts and applications of Operational Amplifiers.

Course Outcomes:

At the end of the course, the students are able to

1. Apply concept of KVL/KCL and network theorems in solving electrical circuits (L3).
2. Measure the performance quantities such as losses, efficiency of DC machines and transformers (L5).
3. Measure the performance quantities such as losses, efficiency of transformers and Induction motor (L5).
4. Understand the importance and applications of p-n junction diode (L2).
5. Understand the configurations and applications of Op-Amps (L2).

Unit I

Basic laws and Theorems: Ohms law, Kirchoff's Laws, Series and Parallel circuits, Types of Elements and Sources, Source transformations, Delta-wye conversion.Mesh analysis, Nodal analysis, Linearity and superposition theorem, Thevenin's and Norton's theorem with simple examples, Maximum power transfer theorem with simple examples, Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply Ohms and Kirchhoff's Laws (L3)
- Analyze theorems such as Linearity &superposition theorem, Thevenin's & Norton's theorem and maximum power transfer theorem. (L4)
- Determine the current, voltage and power in a given electrical circuit(L5)

Unit II

DC Machines: Constructional features, induced EMF and Torque expressions, Different types of Excitation, Performance characteristics of different types of DC machines, Starters: 3-point, 4-point starters, Losses and Efficiency, Efficiency by direct and indirect loading, Applications of DC machines.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the constructional features of DC machines. (L2)
- Analyze EMF, torque and performance characteristics of DC machines. (L4)
- Utilizesuitable starters for DC motors. (L3)
- Estimate losses and efficiency of electrical machines. (L5)

Unit III

AC Machines: Representation of Sinusoidal wave form, Phasor diagram of R, L and C Parameters,Constructional details of Transformer, types of Transformers, EMF equation, Equivalent circuit of Transformer, voltage regulation, losses and efficiency, open/short-circuit tests and determination of efficiency,Applications of Transformer.

Three Phase Induction Motors: Construction, production of rotating magnetic field, working principle of three phase induction motor, types of Induction Motors, Torque and Torque-Slip characteristics-Applications of Three Phase Induction Motors.

Learning Outcomes:

At the end of this unit, the student will be able to

- Outline the constructional details and principle of transformers. (L2)
- Analyze the efficiency and voltage regulation of a transformer. (L4)
- Explain the principle of three phase induction motor. (L2)
- Identify the characteristics, losses and efficiency of a three phase induction motor. (L3)

Unit IV

Semiconductor Devices: p-n Junction diode - Basic operating principle, current-voltage characteristics, rectifier circuits (half-wave, full-wave, rectifier with filter capacitor), Zener diode as Voltage Regulator, Transistor-Types-configurations,FET as an amplifier and switch, MOSFET operation, Applications of Semiconductor Devices.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze the device structure, operation and characteristics of a p-n junction diode. (L4)
- Apply p-n diode for various applications. (L3)
- Explain the construction, operation and applications of FET(L2)

Unit V

Operational Amplifiers: The Ideal Op Amp, The Inverting Configuration, The closed loop gain, Effect of Finite open-loop gain,The Noninverting Configuration, The closed loop gain, Characteristics of Non Inverting Configuration, Effect of finite open loop gain, the voltage follower, Difference amplifiers, A Single Op-amp difference amplifier, Applications of Operational Amplifiers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Illustrate the operation of Op Amps. (L2)
- Explain different modes of operationof Op Amps. (L2)
- Make use of Op Amp in different applications. (L3)

Text Books

1. D.P. Kothari, I.J. Nagrath, Basic Electrical and Electronics Engineering, 1st edition, McGraw Hill Education (India) Private Limited, 2017.
2. B.L. Theraja, Fundamentals of Electrical Engineering and Electronics, 1st edition, S. Chand Publishing, New Delhi, 2006.
3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits 6th edition, Oxford University Press, 2014.

References

1. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education, 2011.
2. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2/e, Pearson Education, 2008.
3. R.K. Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi, 2012.

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BS- EN1101	English	3	0	0	3

Course Objectives:

- Educate students in the acquisition of the English language through the study of literature and other contemporary forms of culture.
- Help students to explore literature in order to learn how the world works to understand the complex dynamics of human interpersonal relationships.
- Promote the development of empathy by engaging students in a discussion of literary works, highlighting the emotional aspects of the pieces.
- Assist students in the development of intellectual flexibility, creativity, and cultural literacy by involving them in life-long learning.
- Acquire a wide range of vocabulary, an understanding of grammar and knowledge to demonstrate students' ability to think creatively in order to express effectively.

Course Outcomes:

At the end of the course, the student will be able to:

1. Understand the value of Human Conduct for career development through life skills: Ethics & Values and use root words and Prepositions without errors. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading
2. Observe the significance of imagery in poetry to use it in real-time contexts and learn to use and misuse of Articles, Prefixes, Suffixes, and Punctuations. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading
3. Acquire conversation skills through drama and enhance the correct use of Nouns, Pronouns, Verbs and Concord to write paragraphs effectively. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading
4. Develop reading for inspiration, interpretation & innovation and learn to use modifiers, synonyms and antonyms to write essays effectively. Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading
5. Learn meaningful use of language by avoiding meaningless cliches, bureaucratic euphemisms and academic jargon in order to acquire the skill of summarising.Gain reading skills for comprehension, specific information, gist, and pleasure through extensive reading

Unit I

On the Conduct of Life: William Hazlitt-**Reading**; **Grammar**-Prepositions; **Vocabulary**-Word Formation-I; Introduction to Word Formation; **Writing**-Clauses and Sentences; **Life-Skills**: Values and Ethics. If-- Rudyard Kipling.

Wings of Fire" An Autobiography of Dr.APJ Abdul Kalam--1. Strong Roots--2.Early Influences-3.Education Provides a Solid Foundation-for Extensive reading-Reading for Pleasure-Information and General Understanding

Learning Outcomes:

At the end of this unit, the student will be able to

- instill one's own creativity through poetry and prose for LSRW skills development(L3)
- build one's critical thinking skills (L3)
- enrich social skills which in turn make him/her a good engineer to the society(L3)
- impart reading skills that sensitize about worldly topics.(L2)
- understand new phrases and vocabulary to use in both communication and writing (L2)
- inculcate a sense of extensive reading and imbibe the habit of reading text independently.(L3)
- read to write effectively through a biography(L2)

Unit II

The Brook: Alfred Tennyson: Reading; Grammar-Articles; **Vocabulary**-Word Formation-II: Root Words from Other Languages; **Writing**-Punctuation; **Life-Skills**: Self-Improvement. How I Became a Public Speaker:George Bernard Shaw.

Wings of Fire" An Autobiography of Dr.APJ Abdul Kalam--4.Preparing to Start a Career--5.Work Begins in Earnest--6. From Hovercraft to Rockets -for Extensive reading-Reading for Pleasure-Information and General Understanding

Learning Outcomes:

At the end of this unit, the student will be able to

- experience literary imagery to use it in conversational English(L4)
- become aware of his/her responsibility towards nation(L2)
- understand his/her ability to write effectively through reading(L2)
- acquaint with perfect use of grammar and language(L3)
- inculcate a sense of extensive reading and imbibe the habit of reading text independently.(L3)
- read to write effectively through a biography(L2)

Unit III

The Death Trap: Saki: Reading; Grammar-Noun-Pronoun Agreement-Subject-Verb Agreement; **Vocabulary**-Word Formation-III: Prefixes and Suffixes from Other Languages; **Writing**-Principal of Good Writing-Paragraph Writing; **Life-Skills**: Time Management- On Saving Time: Seneca

Wings of Fire" An Autobiography of Dr.APJ Abdul Kalam--7.Adding Momentum to Space Research--8.Balancing Defence Technology with Space Research--for Extensive reading-Reading for Pleasure-Information and General Understanding

Learning Outcomes:

At the end of this unit, the student will be able to

- instill empathy and a sense of humanity through the given literary piece (L3)
- acquire the ability to manage time in terms of goal setting (L3)
- communicate effectively with proper grammatical syntax and semantics (L3)
- understand new phrases and vocabulary to use in both communication and writing (L2)
- inculcate a sense of extensive reading and imbibe the habit of reading text independently.(L3)
- read to write effectively through a biography(L2)

Unit IV

Chindu Yellamma: Reading; Grammar-Misplaced Modifiers; **Vocabulary**-Synonyms & Antonyms; **Writing**-Essay Writing; **Life-Skills**: Innovations. Muhammad Yunus.

Wings of Fire" An Autobiography of Dr.APJ Abdul Kalam--9. Dreaming of Satellites--10.The End of an Era--for Extensive reading-Reading for Pleasure-Information and General Understanding

Learning Outcomes:

At the end of this unit, the student will be able to

- understand the significance of art that brings the change in human.(L2)
- construct sentences with appropriate usage of grammar.(L3)
- develop writing skills through essay writing. (L3)
- acquire a wide range of vocabulary through synonyms and Antonyms.(L2)
- inculcate a sense of extensive reading and imbibe the habit of reading text independently.(L3)
- read to write effectively through a biography(L2)

Unit V

Politics and the English Language-George Orwell: Reading; Grammar-Cliches and Redundancies; **Vocabulary**-Common Abbreviations; **Writing**-Writing a summary; **Life-Skills**: Motivation- The Dancer with a White Parasol: Ranjana Deva

Wings of Fire" An Autobiography of Dr.APJ Abdul Kalam--11. Leading a Team--12. Dear ones Pass On--for Extensive reading-Reading for Pleasure-Information and General Understanding

Learning Outcomes:

At the end of this unit, the student will be able to

- develop the Imagery techniques for speaking and writing. (L3)
- understand the gradual evolution in the field of Indian cinema. (L2)
- optimize the acquired skills of grammar and vocabulary contextually.(L3)
- inculcate a sense of extensive reading and imbibe the habit of reading text independently.(L3)
- read to write effectively through a biography(L2)

Textbooks

1. Language and Life -A skills Approach by Orient Black Swan.
2. Wings of Fire An Autobiography APJ Abdula Kalam with Arun Tiwari Abridged by Universities Press

Online References

1. https://www.gradesaver.com/the-poetry-of-dh-lawrence/study-guide/summary
2. https://englicist.com/notes/summary-where-the-mind-is-without-fear-rabindranath-tagore.
3. http://www.authorstream.com/Presentation/cse1amity-2314117-stench-kerosene-amrita-pritam/.
4. https://www.poemhunter.com/poem/dream-love-8/comments/
5. https://www.poetryfoundation.org/collections

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH- CH1101	Applied Chemistry	2	0	0	2

Course Objectives:

- To familiarize various properties and applications of polymers.
- To impart knowledge on the basic concepts of battery technology.
- To explain the working principle and materials used in Floppy, CD and pen drive.
- To demonstrate the construction of photovoltaic cells.
- To introduce different types of Nano materials.

Course Outcomes:

At the end of the course, the student will be able to

1. Distinguish thermoplastics, thermosetting plastics and elastomers. (L4)
2. Discuss the working principle and applications of primary, secondary battery cells and fuel cells. (L6)
3. Compare the working principle and materials used in Floppy, CD and pen drive. (L4)
4. Demonstrate the working principle of Photo Voltaic Cell. (L2)
5. Illustrate the preparation, properties and applications of Nano materials. (L2)

Unit I

Polymer Chemistry: Introduction to polymers, functionality of monomers, chain growth, step growth polymerization, Stereo regular polymers

Plastics: Thermoplastics and Thermosettings - Preparation, properties and applications of – Bakelite, Urea-Formaldehyde, Nylon-66.

Elastomers: Preparation, properties and applications of Buna-S, Buna-N.

Applications:

1. Polymers also used in automobile industries for making body panel, vision window.
2. Polymers used for making house hold purpose articles like water bottles, refrigerator components, curtains, dining table cloths and carrier bags.
3. Polymers used in bulletproof vests, bullet proof cars and fire-resistant jackets.

Learning Outcomes:

At the end of this unit, the students will be able to

- Explain different types of polymers and their applications (L2)
- Explain the preparation, properties and applications of Bakelite, Nylon-66 (L2)
- Discuss Buna-S and Buna-N elastomers and their applications (L2)

Unit II

Electrochemical Energy Systems: Classification of batteries-Important applications of batteries, Primary batteries-dry/Leclanche cell, secondary batteries- lead acid cell, lithium cells-Li MnO_2 cell, Fuel cells – hydrogen and oxygen fuel cell, Methanol and oxygen fuel cell.

Applications:

1. The lead acid battery is used in lightning and ignition system of automobiles.
2. Alkaline batteries are designed for long lasting performance in remote controls, clocks, and radios. The high run time makes alkaline batteries ideal for digital cameras, hand held games, MP3 players.
3. These long life batteries are used in portable consumer instruments like calculators, iPods, digital diaries, wrist watches and stop watches, toys, and artificial pacemakers.

Learning outcomes:

At the end of this unit, the students will be able to

- Classify different types of batteries. (L-2)
- Explain the concepts involved in the construction of lithium cells. (L-2)
- Apply principles for construction of batteries and fuel cells. (L-3)

Unit III

Semiconductors, Storage Devices & Applications:

Semiconductors- Preparation of semi conductors-Zone refining and Czochralski process, Stiochiometric, Non stichometric, Organic and Controlled Valency Semiconductors applications.

Storage Devices - Materials used and working of Floppy, CD, and Pen drive.

Applications:

1. Semi conductors are used in electronic circuit devices
2. Floppy, CD and pen drive are used to store large data.

Learning Outcomes:

At the end of this unit, the students will be able to

- Demonstrate the applications of semiconductors (L2)
- Discuss the materials used in floppy, CD, pen drive. (L2)

Unit IV

Energy Sources:

Solar energy: Introduction-Thermal conversion (Solar water heater, parabolic dish and parabolic trough), photo voltaic conversion- construction and working of photo voltaic cell and its importance, applications of solar energy.

Applications:

1. Solar energy is used at residential homes for heating water and for generation of electricity for domestic use.
2. PV cells are used in electrical goods such as cookers, calculators, toys.
3. Solar energy used for large amounts of electricity production using solar power plants.

Learning outcomes

At the end of this unit, the students will be able to

- Explain how photovoltaic cells convert light into energy. (L-2)
- Illustrate the construction of PV cell. (L-2)

Unit V

Nanomaterials: Introduction – sol-gel method, chemical reduction method for preparation of metal Nano particles, Types of nano materials – carbon nano tubes and fullerenes (preparation, properties and applications)-Applications of nano materials.

Applications: Nano materials are used in paints, lubricants and medicine technology.

Learning outcomes:

At the end of this unit, the students will be able to

- Classify nano materials. (L-2)
- Explain the synthesis and applications of nano materials. (L-2)

Text Books

1. P.C. Jain and M. Jain, Engineering Chemistry, 15/e, Dhanapat Rai & Sons, Delhi (2014).
2. B.K. Sharma, Engineering Chemistry, Krishna Prakashan, Meerut.
3. O G Palanna, Engineering Chemistry, Tata McGraw Hill Education Private Limited, (2009).

References

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003)
2. B.S Murthy and P. Shankar, A Text Book of Nano Science and NanoTechnology , University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S.Chand & Co, (2010)
4. N. Krishna Murthy and Anuradha, A text book of Engineering Chemistry, Murthy Publications (2014).
5. K. Sesha Maheshwaramma and Mridula Chugh, Engineering Chemistry, Pearson India Edn services, (2016).

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19CSE-ES1101	Problem Solving and Programming using C	3	0	0	3

Course Objectives:

- Formulating solutions to problems using algorithms and flowcharts and also Learning
- Structure of C program, basic C programs, Compiling and executing C Programs
- Understand branching, iteration statements
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation and Comprehension of file
- handling and user defined data types.

Course Outcomes:

At the end of the course, the student will be able to

1. Develop algorithms and flowcharts and also Understand the compilation, debugging, execution and writing of basic C programs
2. Develop C Programs using control and iterative statements
3. Develop C programs using Arrays and functions
4. Apply the knowledge of strings and pointers in programming
5. Comprehend file handling and user defined data types

Unit I

Introduction to Computers, Algorithm and Flowchart design through Raptor:

Introduction-Computer Hardware, Bits and Bytes, Components, types of languages

Algorithm- Definition, Characteristics, Steps to develop, examples.

Flow chart-Definition, symbols, Input/output, Assignment, conditional if, repetition, function and sub charts.

Introduction to C Programming- structure of c program, Identifiers, The main () Function, The printf () Function, - Indentation, Comments, Data Types, Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization, Compiling and Executing C program

Learning Outcomes:

Student will be able to

- Acquire the knowledge on basic computer components, algorithms and flowcharts(L2)
- Understand the structure of algorithm and flowchart(L2)
- Develop basic flowcharts and algorithms for performing Input, Output and Computations (L3)
- Solve numerical problems using Raptor (L3)
- Acquire the knowledge on fundamentals of c programming.(L2)

Applications: Computer Networks, Word Processor, Email Client

Unit II

Programming Style Assignment: Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement

Learning Outcomes:

Student will be able to

- Analyze the structure of c programming (L4)
- Develop basic sequential programs(L3)
- Acquire the knowledge on control statements(L2)
- Analyze the different programs using loops and conditional statements.(L4)
- Implement programs using loops and branching statements.(L3)

Applications: Embedded Software's, Simulators, Development of New languages

Unit III

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Multi Dimensional Arrays-Matrices

Modular Programming: Function and Parameter Declarations, Returning a Value, Functions with Empty Parameter Lists, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Storing Addresses, Using Addresses, Declaring and Using Pointers, Passing Addresses to a Function. Case Study: Swapping Values, Recursion - Mathematical Recursion, Recursion versus Iteration.

Learning Outcomes:

Student will be able to

- Acquire the knowledge on arrays and strings.(L2)
- Analyze the different types of arrays
- Acquire the knowledge on functions.(L2)
- Analyze the pre defined and user defined functions(L4)
- Implement functions of their own to solve complex problem.(L3)

Applications: Computer and Mobile Games, Design Compilers

Unit IV

Pointers, Strings:

Pointers: Concept of a Pointer, Initialisation of pointer variables, pointers as function arguments, passing by address, Dangling memory, address arithmetic, character pointers and functions, pointers to pointers, Dynamic memory management functions, command line arguments

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions

Learning Outcomes:

Student will be able to

- Acquire the basic knowledge on pointers.(L2)
- Understand user defined data types(L2)
- Implement string editing operations of their own to solve complex problem.(L3)

Applications: Operating Systems, Test code, Developing Verification software

Unit V

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, enumeration.

Data Files: Declaring, Opening, and Closing File Streams, Reading from and Writing to Text Files, Random File Access

Learning Outcomes:

Student will be able to

- Analyze the differences between structure, union.(L4)
- Implement different file handling programs using file handling functions.(L3)

Applications: Database and spread sheets, Word Processing, Database files systems, Online Reservation Systems.

Text Books

1. How to Solve It By Computer By R G Dromey
2. C for Programmers with an Introduction to C11 (Deitel Developer Series) 1st Edition, Kindle Edition
3. Programming in ANSI C , McGrawHill, seventh edition by E.Balagurusamy.
4. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education
5. ANSI C Programming, Gary J. Bronson, Cengage Learning.

Reference Books

1. Let us "C" - Yashwant Kanetkar
2. Programming in C, Bl Juneja Anita Seth, Cengage Learning.
3. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
4. Programming in C, Reema Thareja, OXFORD
5. C by Example, Noel Kalicharan, Cambridge
6. https://raptor.martincarlisle.com/(Download and Install Raptor software, Use the tool to draw flowcharts for the problems given).

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-EN1102	Communicative English Lab-I	0	0	3	1.5

Course Objectives:

- Adopt activity-based teaching-learning methods to ensure that learners would be engaged in the use of language both in the classroom and laboratory sessions.
- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role-plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well-organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Course Outcomes:

At the end of the course, the learner will be able to

1. enhance pronunciation with befitting tone for clarity in a speech to communicate language effectively.
2. Participate in short conversations in routine contexts on topics of interest and ask questions and make requests politely.
3. Listen for specific information, gist, note-taking, note-making and comprehension and develop convincing and negotiating skills through debates
4. acquire effective strategies for good writing and demonstrate the same in summarizing and reporting
5. Gain knowledge of grammatical structures and vocabulary for day-to-day successful conversations.

Unit I

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Reading for Writing:** Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learner will be able to

- identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English (L3)
- ask & answer general questions on familiar topics (L2)
- employ suitable strategies for skimming & scanning to get the general idea of a text and specific information (L3)
- recognize paragraph structure with beginnings/endings (L3)
- form sentences using proper grammatical structures and correct word forms (L3)

Unit II

Listening: Answering a series of questions about the main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/ small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learner will be able to

- comprehend short talks on general topics (L2)
- speak clearly on a specific topic using suitable discourse markers in informal discussions (L3)
- understand the use of cohesive devices for better reading comprehension (L2)
- write well-structured paragraphs on specific topics (L3)
- make necessary grammatical corrections in short texts (L3)

Unit III

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. **Writing:** Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. **Grammar and Vocabulary:** Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learner will be able to

- summarize the content with clarity & precision from short talks (L3)
- report what is discussed in informal discussions (L3)
- infer meanings of unfamiliar words using contextual clues (L3)
- write summaries based on global comprehension of reading/listening texts (L3)
- use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing (L3)

Unit IV

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Roleplays for the practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. **Grammar and Vocabulary:** Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Learning Outcomes

At the end of the module, the learner will be able to

- infer & predict about the content of spoken discourse (L4)
- engage in formal/informal conversations understanding verbal & non-verbal features of communication (L3)
- interpret graphic elements used in academic texts (L2)
- produce a coherent paragraph interpreting a figure/graph/chart/table (L4)
- use language appropriate for description and interpretation of graphical elements (L4)

Unit V

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidence **Grammar and Vocabulary:** Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture to answer questions (L3)
- make formal oral presentations using effective strategies (L3)
- produce a well-organized essay with adequate details (L3)
- edit short texts by correcting common errors (L4)

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.

Web Resources

Grammar/Listening/Writing:

1. 1-language.com
2. http://www.5minuteenglish.com/
3. https://www.englishpractice.com/

Grammar/Vocabulary:

1. English Language Learning Online
2. http://www.bbc.co.uk/learningenglish/
3. http://www.better-english.com/
4. http://www.nonstopenglish.com/
5. https://www.vocabulary.com/
6. BBC Vocabulary Games
7. Free Rice Vocabulary Game

Reading:

1. https://www.usingenglish.com/comprehension/
2. https://www.englishclub.com/reading/short-stories.htm
3. https://www.english-online.at/

Listening:

1. https://learningenglish.voanews.com/z/3613
2. http://www.englishmedialab.com/listening.html

Speaking:

1. https://www.talkenglish.com/
2. BBC Learning English – Pronunciation tips
3. Merriam-Webster – Perfect pronunciation Exercises

All Skills:

1. https://www.englishclub.com/
2. http://www.world-english.org/
3. http://learnenglish.britishcouncil.org/
4. Online Dictionaries
5. Cambridge dictionary online
6. MacMillan dictionary
7. Oxford learner's dictionaries

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19CSE-ES1102	Problem Solving and Programming using C Lab	0	0	3	1.5

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.

Course Outcomes:

At the end of the course, the learner will be able to

1. Learn Basic computer Installations and Office Tools, Document and present the algorithms, flowcharts and programs in form of user-manual and also apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment
3. Analyzing the complexity of problems modularize the problems into small modules and then convert them into programs
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.

Exercise -1

Operating Systems and installation of Windows & LINUX Operating System

Exercise -2(Office Tools)

a) Word: Inserting Images, Auto Shapes, Header & Footer, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option,

b) Excel: Formulas & Data AutoFill, Format Cells, auto fill, Formatting Text

c) PowerPoint: PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables in PowerPoint, Costume Animations,

Exercise – 3(Basic)

a) What are the OS Commands, Familiarization of Editors - vi, EMACS

b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man

c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Draw the flow chart for the following problems using Raptor package:

d). Finding maximum of 3 numbers, Unit converters, Interest calculators, multiplication tables, GCD of 2 numbers

e).Fibonacci generation, prime number generation. Minimum, Maximum and average of n numbers, linear search, Binary Search

Exercise – 4(Basic Math)

a) Write a C Program to Simulate 3 Laws at Motion

b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise – 5(Control Flow – I)

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.

b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 6(Control Flow – II)

a) Write a C Program to Find Whether the Given Number is

i) Prime Number ii) Armstrong Number

b) Write a C program to print Floyd Triangle

c) Write a C Program to print Pascal Triangle

Exercise – 7(Functions)

a) Write a C Program demonstrating of parameter passing in Functions and returning values.

b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise –8(Control Flow – III)

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case

b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise –9(Functions – Continued)

Write a C Program to compute the values of sin x and cos x and e^x values using Series expansion.(use factorial function)

Exercise – 10(Arrays)

Demonstration of arrays a) Search-Linear. b) Sorting-Bubble, Selection. c) Operations on Matrix.

Exercises – 11(Structures)

a)Write a C Program to Store Information of a Movie Using Structure

b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise – 12(Arrays and Pointers)

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 13(Dynamic Memory Allocations)

a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs

Exercise – 14(Strings)

a) Implementation of string manipulation operations with library function.

i) copy ii) concatenate iii) length iv) compare

b) Implementation of string manipulation operations without library function.

i) copy ii) concatenate iii) length iv) compare

Exercise -15(Files)

a)Write a C programming code to open a file and to print it contents on screen.

b)Write a C program to copy files

Exercise – 16(Files Continued)

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19EEE-ES1105	Essential of Electrical & Electronics Engineering Lab	0	0	2	1

Course Objectives:

- To verify Kirchhoff's laws and theorems.
- To plot the characteristics of DC Machines.
- To know the performance of a DC shunt motor.
- To plot the V-I Characteristics of a diode.
- To design MOSFET, inverting and non-inverting amplifier using PSPICE.

Course Outcomes:

At the end of Course, the students are able to

1. Prove laws and theorems (L5)
2. Determine the characteristics of DC Machines (L5)
3. Identify the performance of DC shunt motors (L3)
4. Analyze the V-I characteristics of diode (L4)
5. Design MOSFET, Inverting and Non-Inverting Amplifier using PSPICE (L6)

List of Laboratory Experiments:

1. Verification of Kirchhoff's Laws KVL and KCL.
2. Verification of DC Superposition Theorem.
3. Verification of Thevenin's Theorem and Norton's Theorem.
4. OCC and External characteristics of separately excited DC generators.
5. Swinburne's test on a DC shunts motor.
6. OC and SC Tests on single phase transformer.
7. Brake Test on DC shunt motor.
8. Current Voltage Characteristics of a p-n Junction Diode/LED.
9. Diode Rectifier Circuits.
10. Voltage Regulation with Zener Diodes.
11. Design of a MOSTFET amplifier and MOSFET inverter/NOR gate
12. Inverting and Non-inverting Amplifier Design with Op-amps.
13. Simulation experiments using PSPICE
    (a) Diode and Transistor Circuit Analysis.
    (b) MOSFET Amplifier design.
    (c) Inverting and Noninverting Amplifier Design with Op-amps.

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-MC1101	Environmental Science	3	0	0	0

Course Objective:

- To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations.
- Students get awareness on pollution that is caused due to the day to day activities of human life to save earth from the inventions by the engineers.
- To make student get awareness on the social issues, environmental legislation.

Course Outcomes:

At the end of Course, the students are able to

1. Understand about the environment and natural resources.
2. Illustrate about the ecosystem and knows the importance of conservation of biodiversity.
3. Understands about various attributes of different types of pollution and their impacts on the environment and control methods along with waste management practices.
4. Relate the current environmental impacts with the societal problems.
5. Identify the current population growth with their impacts and apply the knowledge how to manage environment issues.

Unit I

Multidisciplinary Nature of Environmental Science: Definition, Multi disciplinary nature of environmental sciences, Scope and Importance, Need for Public Awareness.

Natural Resources: Forest resources – Uses and deforestation-causes, consequences, Water resources – Use and over utilization of surface and ground water, Floods, drought, conflicts over water, dams – benefits and problems, Food resources: World food problems, effects of modern agriculture, fertilizer-pesticide problems, pesticide related problems, water logging, salinity.

Energy Resources: Renewable and non-renewable resources – Natural resources and associated problems, Land Resources: Land degradation, Soil erosion, Desertification.

Learning Outcomes

Students will be able to

- Relate scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.(L1)
- Explain how water resources should be used.(L2)
- Articulate basic understanding of effects of modern agriculture on environment.(L2)
- Explain why renewable and non-renewable energy resources are important.(L2)
- Get awareness about land degradation, soil erosion & desertification.(L2)

Applications: Different conservation methods of different natural resources like afforestation programs, social forestry programs, soil conservation practices.

Unit II

Environmental Pollution and Solid Waste Management:

Environmental Pollution: Definition, Cause, effects and control measures of (a)Air Pollution. (b) Water pollution (c) Marine pollution (d) Noise pollution.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes, e-waste management, Role of an individual in prevention of pollution.

Disaster management: floods, earthquake, cyclone and landslides.

Learning Outcomes

Students will be able to

- Define and explain the various causes, effects and control measures of different types of pollution.(L3)

- Characterize solid waste and e-waste management.(L2)
- Summarize about different natural disasters and how they could be managed.(L1)

Applications: Different treatment methods for different types of pollution cyclone separator, electrostatic precipitators, waste water treatment, solid waste management, e-waste management.

Unit III

Ecosystems, Biodiversity and its Conservation:

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem – Producers, consumers and decomposers, Food chains, food webs, Energy flow in the ecosystem, primary and secondary productivity, ecosystem regulation and development.

Biodiversity And Its Conservation: Definition: levels of biodiversity- genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity- consumptive use, Productive use, social, ethical, aesthetic and option values, ecosystem service value, India as a mega-diversity Nation, Hot-spots of biodiversity- Indo Burma, Eastern Himalayas, Western Ghats, Threats to biodiversity- habitat loss, poaching of wildlife, Global environmental issues, Pollution, Man-wildlife conflicts, Endangered and endemic species of India-Red Data Book, Conservation of biodiversity- In-situ and Ex-situ conservation of biodiversity.

Learning Outcomes

Students will be able to

- Understand the structure and functions of ecosystems.(L2)
- Identify the threats to biodiversity.(L2)
- Conduct basic conservation biology research.(L3)
- Compare endangered and endemic species of India.(L2)

Applications: Different conservation methods like gene bank, seed bank, botanical garden.

Unit IV

Social Issues And The Environment: From Unsustainable to Sustainable development, Water conservation- rain water harvesting and watershed management, Resettlement and rehabilitation issues of people, its problems and concerns, case studies, Climate change- global warming, acid rain, ozone layer depletion, nuclear accidents- their causes, effects and control measures, Environmental legislation- Wildlife Protection Act, Forest Conservation Act, Air (Prevention and Control of Pollution) Act and Water (Prevention and control of Pollution) Act.

Learning Outcomes:

Students will be able to

- Articulate the basic structure, functions, and processes of key social systems affecting the environment.(L3)
- Aware of the reasons for various global environmental challenges.(L2)
- Explain the enforcement of Environmental legislation.(L1)
- Remember the various Acts enforced in India and some of their features.(L1)

Applications:

1. Water conservation practices like rainwater harvesting, soaking pits, and modern agricultural methods to minimize the environmental effects.
2. Energy conservations methods in houses, industrial sector and commercial sector, apply environmental related laws in environmental issues.

Unit V

Human Population and Environmental Management:

Human Population- Population growth, variation among nations, Population explosion, Role of information Technology in Environment.

Environmental management- Environmental Impact Assessment- Methodology, Environmental Impact Statement, Environmental Management Plan, Environmental Audit-process, Significance of EIA.

Learning Outcomes:

Students will be able to

- Understand about the population effects on environment.(L2)
- Be acquainted with role of information technology in environment.(L2)
- Understand about the various environmental management practices. (L2)

Applications:

1. Information Technology in different natural calamities and health aspect of view.
2. Industrial and developmental activities.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Text Books

1. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014.
2. Text Book of Environmental Studies, K. Raghavan Nambiar, Scitech Publications.
3. Environmental Studies by Palaniswamy – Pearson education
4. Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company

References

1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental Studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice hall of India Private limited.

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-MA1201	**Linear Algebra and Multivariable Calculus**	3	0	0	3

Course Objectives:

- This course is designed to equip the students with the necessary Mathematical skills and techniques that are essential for an engineering course.
- To enlighten the learners in the concept of Linear Algebra and partial differentiation.
- To enlighten the learners in the concept of Multivariable Calculus.

Course Outcomes:

At the end of the course, the student will be able to

1. Apply the matrix algebra techniques to engineering applications. (L3)
2. Apply the concepts of eigen values and eigen vectors to free vibration of a two mass system. (L3)
3. Apply partial differentiation to find maxima and minima of functions of several variables. (L3)
4. Evaluate the volume and surface area of solids using multiple integrals. (L3)
5. Estimate the work done against a field, circulation and flux using vector integral theorems. (L3)

Unit I

Matrix Operations and Solving Systems of Linear Equations:

Rank: Rank of a matrix, echelon form and normal form of a matrix, finding the non singular matrices P, Q of a matrix A such that PAQ is in normal form.

Linear Equations: Solving system of homogeneous and non-homogeneous linear equations using-Row-Rank Method, Direct Methods (Gauss elimination method, Gauss Jordan method) and Iterative methods (Jacobi's iteration method, Gauss Seidel method).

Application: Finding the current in an electrical circuit.

Learning Outcomes:

At the end of this unit, the student will be able to

- find the rank of a given matrix. (L2)
- solve the system of linear equations using various matrix techniques. (L3)
- apply the matrix methods to find the current in an electrical circuit at any time. (L3)

Unit II

Eigen values, Eigen vectors and Quadratic forms:

Eigen values and Eigen vectors: Eigen values and Eigen vectors and their properties (without proofs), diagonalisation of a matrix, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by using Cayley-Hamilton theorem.

Quadratic forms: Quadratic forms, reduction of quadratic form to canonical form by orthogonal transformation, rank, index and signature of a quadratic form, Sylvester's law of inertia (without proof), nature of the quadratic forms.

Application: Free vibration of two mass systems.

Learning Outcomes:

At the end of this unit, the student will be able to

- find the eigen values and eigen vectors of the given matrix.(L2)
- find the inverse and powers of the matrix using Cayley- Hamilton theorem.(L2)
- identify special properties of a quadratic form(or corresponding matrix). (L3)

Unit III

Multiple Integrals and Beta, Gamma Functions:

Multiple Integrals: Double integrals, double integration in polar coordinates, change of variables, change of order of integration, evaluation of triple integrals, change of variables in triple integral (Cartesian to cylindrical and spherical polar co-ordinates).

Applications: Area enclosed by plane curves, volume of solids.
Beta and Gamma functions: Beta and Gamma functions and their properties, relation between beta and gamma functions.
Applications: Evaluation of improper integrals.

Learning Outcomes:

At the end of this unit, the student will be able to

- evaluate double integral of functions of several variables in two dimensions using cartesian and polar coordinates. (L3)
- evaluate triple integrals in cartesian, cylindrical and spherical geometries. (L3)
- apply double integration techniques in evaluating areas enclosed by plane curves. (L3)
- apply triple integration techniques in evaluating volumes bounded by a region. (L3)
- apply the special functions in engineering problems. (L3)

Unit IV

Functions of Several Variables:

Partial differentiation, Taylor series and Maclaurin's series expansion of two variables, Jacobian, functional dependence, Hessian matrix, stationary points, types of stationary points.
Applications: Errors and approximations, tangent planes and normal lines, maxima and minima of functions of two variables, method of Lagrange's multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- find partial derivatives of a given function. (L2)
- expand a function of two variables using Taylor's and Maclaurin's series expansion. (L2)
- classify the stationary points. (L2)
- apply the concept of Jacobian to test whether the given functions are functionally dependent or not. (L3)
- find the Jacobian matrix and Hessian matrix for given functions. (L2)
- apply the knowledge of partial differentiation to find the maxima and minima of functions of several variables. (L3)
- Use partial differentiation to find tangent planes and normal lines. (L3)

Unit V

Vector Differentiation & Vector Integration(All Theorems without proofs):

Vector Differentiation: Scalar and vector point functions, vector operator del, del applied to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.
Application: Equation of continuity, potential surfaces.
Vector Integration: Line integral, circulation, surface integral, volume integral, Green's theorem in the plane, Stoke's theorem, Divergence theorem.
Application: Work done, flux.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply operator del to scalar and vector point functions. (L3)
- illustrate the physical interpretation of gradient, divergence and curl. (L3)
- find the work done in moving a particle along the path over a force field. (L2)
- evaluate the rates of fluid flow along and across curves. (L3)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals. (L3)

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. James Stewart, Calculus, 7th Edition, Brooks/Cole Cengage Learning (Chapter 14).
3. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
4. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
5. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
6. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
7. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-MA1203	**Mathematical Methods for Computer Science**	3	0	0	3

Course Objectives:

- Use elementary number theory including the divisibility properties of numbers to perform modulo arithmetic and computer arithmetic.
- To familiarize the learners with transform techniques.
- To enlighten the learners in the concept of partial differential equations.

Course Outcomes:

At the end of the course, the student will be able to

1. Apply elementary number theory concepts, including the divisibility properties of numbers to perform modulo arithmetic and use them in cryptographic applications. (L3)
2. Determine the suitable curve equation that fits the given data using method of least squares. (L3)
3. Find the Fourier series of periodic functions and evaluate Fourier integral, Fourier transform and inverse Fourier of a given function. (L3)
4. Apply the Laplace transform for solving differential equations and integral equations. (L3)
5. Solve partial differential equations of first order using analytical methods. (L2)

Unit I

Building Blocks for Cryptography-Number Theory: (All theorems without proofs)

Number Theory: Properties of integers, divisibility, Division theorem, Greatest Common Divisor (GCD), Euclidean algorithm, Least Common Multiple (LCM), testing for prime numbers, The Fundamental theorem of arithmetic, floor, ceiling functions.

Modular Arithmetic: Congruences, congruence equations, Fermat's Theorem, Euler's Totient function, Euler's theorem, Chinese Remainder theorem.

Cryptographic Applications: Plaintext, ciphertext, shift and affine ciphers, secret sharing, RSA.

Learning Outcomes:

At the end of this unit, the student will be able to

- find quotients and remainders from integer division. (L2)
- find GCD and LCM of integers. (L2)
- understand the definitions of congruences, residue classes and least residues (L2)
- perform different operations on integers modulo n. (L3)
- solve linear congruences using different theorems in number theory. (L3)
- apply number theory concepts to cryptographic applications. (L3)

Unit II

Curve Fitting: Method of Least square Method- Linear curve fitting: Straight line fit for two or more dependent variables.Nonlinear curve fitting: Parabolic fit, fit the curve $y=a\ e^{bx}$, $y=ax^b$, $xy^n=b$.

Learning Outcomes:

At the end of this unit, the student will be able to

- determine the suitable curve equation that fits the given data using method of least squares. (L3)

Unit III

Fourier Series and Fourier transforms: Fourier series: Fourier series, determination of Fourier coefficients, Dirichlet's conditions, Fourier series of even and odd functions, Fourier series of even and odd periodic functions in an arbitrary interval, Half-range Fourier sine and cosine expansions, Parseval's formula.

Applications: Practical harmonic analysis

Fourier transforms: Fourier integrals, Fourier cosine and sine integrals, Fourier transform, sine and cosine transform, properties, convolution theorem.

Learning Outcomes:

At the end of this unit, the student will be able to

- evaluate the Fourier series expansion for different periodic functions. (L3)
- understand the nature of the Fourier series that represent even and odd functions.(L3)
- examine the properties of Fourier transformation. (L2)
- apply Fourier transformation for different functions. (L3)

Unit IV

Laplace transforms:(All Theorems without proofs) : Definition of Laplace transform, existence conditions, properties of Laplace transforms, inverse Laplace transforms, transforms of derivatives, transforms of integrals, multiplication by t^n, division by t, convolution theorem, periodic functions, unit step function, unit impulse function, initial and final value theorems.

Applications: Evaluation of improper integrals, solutions of ordinary differential equations, integral equations.

Learning Outcomes:

At the end of this unit, the student will be able to

- examine the properties of Laplace transforms. (L2)
- apply the Laplace and inverse Laplace transforms for different types of functions. (L3)
- solve ordinary differential equations and integral equations by using Laplace transformation technique. (L3)

Unit V

Partial Differential Equations (PDE): First order partial differential equations, solutions of first order linear and standard forms of non-linear PDE.

Learning Outcomes:

At the end of this unit, the student will be able to

- solve the first order linear PDE. (L2)
- solve the first order non- linear PDE. (L2)

Text Books

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
2. Ivan Niven, S. Zuckerman, An Introduction to Theory of Numbers, Wiley & Sons **(for Unit-I).**
3. James S. Kraft, Lawrence C. Washington, An introduction to Number Theory and Cryptography, CRC Press, Taylor's and Francis group. **(Chapter 5 for Cryptographic Applications of Unit-I)**

References

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. Prakash Om, Theory of Numbers, Golden Series, 2005.
3. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
4. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
5. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19CSE-ES1201	Object Oriented Programming Through C++	3	1	0	4

Course Objectives:

- This course is designed to provide a comprehensive study of the C programming language. It Stresses the strengths of C, which provide students with the means of writing efficient, Maintainable and portable code. The nature of C language is emphasized in the wide variety of Examples and applications.
- To learn and acquire art of computer programming. To know about some popular programming
- Languages and how to choose
- Programming language for solving a problem.

Course Outcomes:

At the end of the course, the student will be able to

1. Understand the basic fundamentals of OOP language and its learning environment.
2. Acquire the knowledge of classes, objects and member functions, constructors, Destructors.
3. Analyze the concepts of Operator overloading, Inheritance
4. Apply the concept of pointers, polymorphism, and virtual functions to solve complex problems.
5. Design generic programs using templates and handle different errors through exceptions and also implement data structures like stack, queue using Standard Template Library (STL).

Unit-I

Introduction to C++: Difference between C and C++- Evolution of C++- The Object Oriented Technology- Disadvantage of Conventional Programming- Key Concepts of Object Oriented Programming- Advantage of OOP- Object Oriented Language.

Learning Outcomes: Student should be able to

- Understanding the object oriented concepts
- Differentiate Procedural and object oriented paradigms

Applications: Operating Systems, Libraries

Unit II

Classes and Objects: Classes and Objects, Constructors and Destructor Classes in C++, Declaring Objects- Access Specifies and their Scope- Defining Member Function Overloading Member Function- Nested class, Constructors and Destructors, Introduction- Constructors and Destructor- Characteristics of Constructor and Destructor-Application with Constructor- Constructor with Arguments (parameterized Constructor-Destructors-Anonymous Objects.

Learning Outcomes:

Student should be able to

- Understand the Concepts of classes, objects and member functions, constructors, Destructors.
- Construct the classes with member functions

Applications: Banking Applications, Data Bases.

Unit III

Operator Overloading and Type Conversion & Inheritance The Keyword Operator- Overloading Unary Operator- Operator Return Type- Overloading Assignment Operator (=)- Rules for Overloading Operators, Inheritance, Reusability- Types of Inheritance- Virtual Base Classes- Object as a Class Member- Abstract Classes- Advantages of Inheritance- Disadvantages of Inheritance.

Learning Outcomes:
Student should be able to

- Analyze the concepts of Operator overloading, Inheritance
- Analysis the different types of inheritances

Applications: Graphics, Telephone Switches.

Unit IV

Pointers & Binding Polymorphisms and Virtual Functions Pointer, Features of Pointers- Pointer Declaration- Pointer to Class- Pointer Object- The this Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Introduction Binding in C++- Virtual Functions- Rules for Virtual Function- Virtual Destructor.

Learning Outcomes:
Student should be able to

- Understanding the pointers in polymorphism.
- Apply the concept of pointers, polymorphism, and virtual functions to solve complex problems

Applications: Embedded Systems, Distributed Systems**.**

Unit V

Generic Programming with Templates & Exception Handling Generic Programming with Templates, Need for Templates- Definition of class Templates- Normal Function Templates- Over Loading of Template Function-Bubble Sort Using Function Templates Difference Between Templates and Macros- Linked Lists with Templates, Exception Handling- Principles of Exception Handling- The Keywords try throw and catch- Multiple Catch Statements – Specifying Exceptions.

Overview of Standard Template Library Overview of Standard Template Library- STL Programming Model- Containers- Sequence Containers- Associative Containers- Algorithms- Iterators- Vectors- Lists- Maps.

Learning Outcomes:
Student should be able to

- Design generic programs using templates and handle different errors through exceptions
- Handle Exceptions and create own exception sub classes.
- Understanding utilization of different ST Library
- Understanding vectors ,lists and maps

Applications: Browsers, Compilers, Operating Systems, Distributed Systems, Online tools.

Text Books

1. A First Book of C++, Gary Bronson, Cengage Learning.
2. The Complete Reference C++, Herbert Schildt, TMH.
3. Programming in C++, Ashok N Kamathane, and Pearson 2nd Edition.

Reference Books

1. The C++ Programming Language, Bjarne Stroustup, 4th Edition.
2. Object oriented Programming in C++, Robert Lafore,4th Edition.
3. Object Oriented Programming C++, Joyce Farrell, Cengage.
4. C++ Programming: From problem analysis to program design, DS Malik, Cengage Learning

URL

1. http://www.doc.ic.ac.uk/~wjk/c++Intro/
2. http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm
3. http://www.cis.upenn.edu/~cis190/fall2014/lectures.html

4. http://www.oualline.com/books.free/teach/intro.html

Reference (Advanced) Material

1. Effective C++: 55 Specific Ways to Improve Your Programs and Designs (Third Edition) by Scott Meyers, 2005
2. More Effective C++ by Scott Meyers, 2002
3. Modern C++ Design by Andrei Alexandrescu, 2004
4. Exceptional C++: 47 Engineering Puzzles, Programming Problems, and Solutions by Herb Sutter, 1999
5. C++ Templates: The Complete Guide by David Vandevoorde and Nicolai M. Josuttis, 2002
6. The C++ Standard Library: A Tutorial and Reference by Nicolai M. Josuttis, 2012
7. Effective STL: 50 Specific Ways to Improve Your Use of the Standard Template Library

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19ECE-ES1201	Digital Logic Design	3	0	0	3

Course Objectives:

- Introduce the concept of different number systems and its complements
- Be able to optimize the Boolean functions using Boolean theorems and Understand the minimization of logic functions using different levels of K- Maps.
- Be able to design and analyze combinational logic circuits using logic gates
- Familiarize the concepts of sequential circuits using flip-flops
- Able to design different types of registers and counters using flip flops.
- Familiarize different Programmable Logic Devices for realization of Boolean expressions.

Course Outcomes:

At the end of the course, the student will be able to

1. Able to define different number systems, arithmetic operation of binary numbers, 2's complement representation and its operations
2. To Familiarize Boolean algebra theorems and simplify the given logic function to the minimum number of literals. Minimization of logic functions by using different levels of K-Map methods and design using logic gates.
3. Develop different combinational logic circuits for the realization of digital logic circuits.
4. Design various synchronous and asynchronous sequential circuits using Flip-Flops.
5. Design various registers and counters using different flip flops and also develop different programmable logic devices using logic circuits

UNIT I

Number Systems: Binary, Octal, Decimal, Hexadecimal Number Systems. Conversion of Numbers from One Radix To Another Radix, r's Complement and (r-1)'s Complement Subtraction of Unsigned Numbers, Signed Binary Numbers, Weighted and Non weighted codes.

Applications: Binary number systems are widely used for electronic gates in electricity circuits and digital encoding .

Learning Outcomes:

After completion of this unit student able to

- Summarize advantages of using different number systems
- Explain usefulness of different coding schemes and Complements

UNIT II

Logic Gates And Boolean Algebra: Basic Gates NOT, AND, OR, Boolean Theorms, Complement and Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, SOP,POS, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates

Gate Level Minimization: Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum upto Four Variables, POS and SOP, Simplifications With Don't Care Conditions Using K-Map.

Applications:

1. Logic Gates are used in arithmetic logic units, microprocessors, computer memory and registers.
2. Gates are used to build square wave oscillators, as temperature heaters, parity generation and checking circuits.
3. Boolean functions are used in designing Integrated circuits.
4. Karnaugh maps are used for easy generation of error correcting codes.

Learning Outcomes:

After completion of this unit student able to

- Apply basic laws & De Morgan's theorems to simplify Boolean expressions
- Explain the functionality of logic gates
- Minimize the logic functions using Karnaugh map method

Unit III

Combinational Logic Circuits: Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, Ripple Adder/Subtractor Using Ones and Two's Complement Method. Design of Decoders, Encoders, Multiplexers, Demultiplexers, Higher Order Demultiplexers and Multiplexers, Priority Encoder, Code Converters, Magnitude Comparator.

Applications:

1. Combination logic is used in circuits to perform Boolean algebra on input signals and on stored data.
2. Combinational circuits are used in ALU's, data transmission, home alarm, car parking slot systems, multiple access techniques.

Learning Outcomes:

After completion of this unit, student able to

- Apply Boolean algebra for describing combinational digital circuits
- Analyze standard combinational circuits such as adders, subtractors, multipliers, comparators etc.
- Design simple combinational logic circuits
- Implement logic functions with decoders and multiplexers

Unit IV

Introduction to Sequential Logic Circuits: Classification of Sequential Circuits, Basic Sequential Logic Circuits: Latch and Flip-Flop, RS- Latch Using NAND and NOR Gates, Truth Tables. RS, JK,T and D Flip Flops , Truth and Excitation Tables, Conversion of Flip Flops. Flip Flops With Asynchronous Inputs (Preset and Clear).

Applications:

1. Flip flops are used in multi vibrators, triggering circuits, frequency divider circuits, data storage and data transfer circuits.
2. Counters are used in Frequency counters, Digital clocks, Time measurement, A to D converters, Digital triangular wave generator.

Learning Outcomes:

After completion of this unit student able to

- Describe behaviour of Flip-Flops and Latches
- Utilize concepts of state and state transition for analysis and design of sequential circuits

Unit V

Registers and Counters: Design of Registers, Buffer Register, Control Buffer Registers, Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Synchronous Counters, variable Modulus Counters, Ring Counter, Johnson Counter.

Introduction to Programmable Logic Devices (PLDs): PLA, PAL, PROM. Realization of Switching Functions Using PROM, PAL and PLA.

Applications:

1. Counters are used in Frequency counters, Digital clocks, Time measurement, A to D converters, Digital triangular wave generator.

2. Programmable Logic devices provide specific functions, including device-to-device interfacing, data communication, signal processing, data display, timing and control operations.

Learning Outcomes:

After completion of this unit student able to

- Construct complex digital systems using components such as registers and counters
- Design different types of synchronous and asynchronous counters
- Define RAM, ROM, PROM, EPROM and PLDs
- Describe functional differences between different types of RAM & ROM
- Design simple digital systems using PLDs

Text Books

1. Digital Design ,4/e, M.Morris Mano, Michael D Ciletti, PEA
2. Fundamentals of Logic Design, 5/e, Roth, Cengage

Reference Books

1. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
2. Digital Logic Design, Leach, Malvino, Saha,TMH
3. Modern Digital Electronics, R.P. Jain, TMH

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-BS1203	Applied Physics	2	0	0	2

Course Objectives:

- To impart knowledge in basic concepts of Wave optics, Lasers and Fiber optics, Electromagnetic fields, Super conductors and physics of nano materials, Quantum Mechanics and Quantum Computing and Semiconductor physics.
- To familiarize the applications of Nano materials Quantum Mechanics and Quantum Computing relevant to Computer Science Engineering

Course Outcomes:

After the completion of this course the student can able to

- Interpret the interaction of optic energy with matter on the basis of interference(L2)
- Explain the principles of diffraction of light by using diffraction grating(L2)
- Apply the principles of polarization and Lasers(L2)
- Enumerate the principles of Fiber Optics and nano materials(L2)
- Identify the principles of Quantum computing based on Quantum Physics(L2)

Unit I

Interference: Principle of superposition of waves- interference of light- Conditions for sustained interference- interference in thin films by Reflection-Newton's Rings-Determination of wavelength

Applications: Interference Filters and Testing of flatness of the surfaces

Learning Outcomes

After the completion of this chapter the student can able to

- Outline the conditions for sustained interference(L2)
- Identify the Engineering applications of interference (L2)
- Outline the conditions for sustained interference(L2)
- Identify the Engineering applications of interference (L2)

Unit II

Diffraction: Introduction- comparison of interference and diffraction-Fraunhofer diffraction-single slit Diffraction, double slit, N-slit, Diffraction Grating-Grating Spectrum-Determination of wavelength, Rayleigh's criterion -Resolving power of Grating.

Applications: Application of diffraction for determination of separation of lines on integrated circuit

Learning Outcomes

After the completion of this chapter the student can able to

- Analyze the differences between interference and diffraction (L3)
- Explainthe theory of single slit and double slit diffractions
- Identify the spectrum of diffraction grating and its resolving power(L2)

Unit III

Polarization and Lasers:

Polarization: Polarization by reflection, refraction and double Refraction-Nichol Prism-Half Wave and Quarter Wave Plate.

Applications: Nicol prism as polarizer and analyzer, Glare reduction due to sunglasses

Lasers: Characteristics- Spontaneous and Stimulated Emissions- Pumping and Population Inversion-Ruby Laser-He-Ne-Laser

Applications: Medical applications and communication applications

Learning Outcomes

After the completion of this chapter the student can able to

- Illustrate the concept of polarization and its applications (L2)
- Explain the Characteristics of Lasers(L2)

- Construct three level and four level laser systems(L3)
- Analyze the applications of lasers(L4)

Unit IV

Fiber Optics and Physics of Nanomaterials:

Fiber Optics: Introduction to optical Fibers-Total Internal Reflection-Critical Angle of Propagation-Acceptance Angle-Numerical Aperture-Classification of fibers based on refractive index Profile-Modes of Propagation of Electromagnetic wave through optical Fiber.

Applications: Block diagram of Fiber Optic communication, Medical Applications-Fiber Optic Sensors

Physics of Nanomaterials: Properties of Nanomaterials- Synthesis-Sol-gel Method, preparation of CNT-pulsed laser deposition techniques –Properties of CNT

Applications: Electrical circuits, Computer applications, CNT gas sensor, Nano batteries, drug delivery systems

Learning Outcomes

After the completion of this chapter the student can able to

- Enumerate the classification of Fibers based on Total Internal Reflection, Critical angle of propagation(L3)
- Classify the modes of propagation of electromagnetic wave through Optical Fiber (L3)
- Demonstrate the Fiber Optic communication through block diagram and applications in various fields(L3)
- Analyze the size dependent properties of Nano materials (L3)
- Enumerate the method for the preparation of CNT's (L2)

Unit V

Quantum Physics: Introduction- Matter Waves- Wave Function-Significance-Schrodinger Time Independent and Schrodinger Time Dependent Wave Equations-Classical and Qubits

Applications: Particle in one dimensional potential box, Quantum Computing.

Learning Outcomes

After the completion of this chapter the student can able to

- Describe the concept of matter waves(L2)
- Derive the equation of matter waves(L2)
- Analyze the matter wave equation to one dimensional potential box(L3)

Text Books

1. M.N. Avadhanulu, P.G. Kshrisagar "A Text book of Engineering Physics" –S.Chand Publications, 2017
2. H.K. Malik &A.K. Singh "Engineering Physics", - McGraw Hill Publishing Company Ltd, 2018
3. Ch. Srinivas, Ch. Seshu Babu, "Engineering Physics", Cengage Learning

Reference Books

1. David J. Griffiths, "Introduction to Electrodynamics" -4/e, Pearson Education,2014
2. Gerd Keiser "Optical Fiber Communications" -4/e, Tata Mc GrawHill,2008
3. S.M. Sze "Semiconductor Devices-Physics and Technology" –Wiley, 2008
4. T Pradeep "A Text Book of Nano "Science and Nano Technology"- Tata Mc GrawHill,2013
5. Sanjay D Jain, Girish G Shastra Buddi, "Engineering Physics" –University Press
6. Vijay Kumar, "Engineering Physics"-Vol II, S.Chand Publications

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19MEC-ES1203	Engineering Drawing	1	0	3	2.5

Course Objectives:

- To enhance the communications of the students using engineering drawing.
- To make the student familiar to the drawing practices and convection.
- To familiarize the techniques of constructing polygons, curves and scales.
- To introduce the orthographic projections, projections of points, lines and planes.
- To make the students understand as to how the industry communicates technical information.
- To enable the student draft simple engineering components and analyze different views of components.

Course Outcomes:

After the completion of this course, the student can able to

1. Apply the basics of engineering drawing to construct the polygons and curves. (L3)
2. Draw the orthographic projections of points and lines. (L3)
3. Draw the projections of planes in various conditions. (L3)
4. Draw the projections of regular solids inclined to one of the planes. (L3)
5. Imagine the isometric views of orthographic views and vice versa. (L6)

Unit I

Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance-Conventions in drawing-lettering - BIS conventions.

Polygons: - Construction of regular polygons using given length of a side;

Ellipse: - Arcs of circles and Oblong methods;

Scales: – Vernier and Diagonal scales.

Applications:

- Elliptical shape - bridges and arches, elliptical trammel.
- Diagonal scale is used in engineering to read lengths with higher accuracy as it represents a unit into three different multiple in metres, centimeters and millimeters.
- Vernier scales are used in Machine Shop Applications, Medical Applications, Research & Laboratory Applications etc.

Learning Outcomes:

- Identify the standards of BIS conventions. (L3)
- Construct the elliptical curve by using different methods. (L3)
- Construct the different types of scales(L3)

Unit II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either two of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT.

Applications:

- Structural plans and elevations.
- Stair casing designs, Structural plans and elevations.

Learning Outcomes:

- Visualize and draw the projections of points in various quadrants. (L3)
- Visualize and draw the projections of lines in various conditions. (L3)
- Draw the projections of lines in various conditions. (L3)
- Construct the traces of a line in various conditions. (L6)

Unit III

Projections of Planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

Applications: Structural plans and elevations, stair casing designs.

Learning Outcomes:

- Visualize and draw the projections of planes in various conditions. (L3)
- Draw the planes inclined to both the reference planes in engineering. (L3)

Unit IV

Projections of Solids: Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

Applications: Machine component drawings, AC ducts, cooling towers , piping layout designs,

Learning Outcomes:

- Draw the different types of solids graphically. (L3)
- To visualize and draw the projections of various solids.(L3)

Unit V

Isometric projections-Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Applications : Structural drawings –industrial components, architectural drawing.

Learning Outcomes:

- Identify the orthographic views and isometric views, able to convert isometric views to orthographic views and orthographic views to isometric views, (L3)
- Draw the isometric Projections by using isometric scale. (L3)

Text Books

1. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.
2. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.
3. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.

Reference Books

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-BS1201	Applied Science Laboratory **(Applied Physics & Chemistry Laboratory)**	0	0	2	1

Course Objectives:

- To impart the practical knowledge in basic concepts of Wave optics, Lasers and Fiber optics.
- To familiarize the handling of basic physical apparatus like Vernier callipers, screw gauge, spectrometers, travelling microscope, laser device, optical fibre, etc.
- To familiarize the students with the basic concepts of Physics &Chemistry lab.
- To demonstrate the digital and instrumental methods of analysis.
- To expose the students in practical aspects of the theoretical concepts.

Course Outcomes:

After the completion of this course, the student can able to

1. Apply the working principles of laboratory experiments in optics, electronics,pH meter, Viscometer, Conductivity meter, volumetric titrationsand perform the experiments using required apparatus. (L3)
2. Compute the required parameter by suitable formula using experimental values (observed values) in optics, electronics,pH meter, Viscometer, Conductivity meter and volumetric titration experiments (L3)
3. Analyze the experimental results through graphical interpretation. (L4)
4. Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory. (L2)
5. Demonstrate the working principles, procedures and applications.

List of Experiments in Physics Laboratory

1. Determine the thickness of fibre (thin paper/piece of hair) using wedge shaped film
2. Determination of the radius of curvature of the lens by Newton's rings method
3. Determination of wavelength of laser light by normal incidence method
4. Determine the Numerical Aperture of a given Optical Fiber and hence find its acceptance angle
5. Determine the temperature coefficient of resistance by Thermistor.

Virtual Physics Lab Experiment

6. Determination of the Brewster's angle.
7. Determine the loop levitation of permanent and ferromagnetic elements by magnetic levitation method.

List of Experiments in Chemistry Laboratory

8. Determination of conductance by conduct metric method
9. Determination of strength of an acid by pH metric method
10. Determination of Zinc by EDTA method.
11. Determination of copper in a copper ore
12. Determination of viscosity of a liquid
13. Introduction to applied chemistry lab
14. Determination of Fe(II) in Mohr's Salt by potentiometric method

Reference Books

1. S.BalaSubrahmanian, M.N.Srinivasan "A TextBook of practical physics" by S.Chand publishers,2017
2. Engineering Physics Lab Manual by Dr.Y. Aparna&Dr.K.Venkateswarao (V.G.S.Book links).
3. Laboratory Experiments in College Physics, C.H. Bernard and C.D. Epp, John Wiley and Sons, Inc., New York, 1995.

4. Mendham J, Denney RC, Barnes JD, Thosmas M and Sivasankar B Vogel's Quantitative
5. Chemical Analysis 6/e, Pearson publishers (2000).
6. N.K Bhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, Dhanpat Rai Publishing Company (2007).

Web Source References

1. http://vlab.co.in/ba_labs_all.php?id=8
2. http://va-iitk.vlabs.ac.in/
3. http://vlab.amrita.edu/?sub=1&brch=282

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-EN1201	Communicative English Lab-II	0	0	3	1.5

Course Objectives

- Adopt activity based teaching-learning methods to ensure that learners would be engaged in use of language both in the classroom and laboratory sessions.
- Facilitate active listening to enable inferential learning through expert lectures and talks
- Impart critical reading strategies for comprehension of complex texts
- Provide training and opportunities to develop fluency in English through participation in formal group discussions and presentations using audio-visual aids
- Demonstrate good writing skills for effective paraphrasing, argumentative essays and formal correspondence
- Encourage use of a wide range of grammatical structures and vocabulary in speech and writing

Course Outcomes:

After the completion of this course, the student can able to

1. Enabling students to use Computer assisted Language Laboratory (CALL) to enhance their pronunciation through stress, intonation and rhythm for routine and spontaneous interaction
2. Attainment of communicative competence for the fulfilment of academic, professional and social purposes.
3. Attainment of language Proficiency through Contextualized, Task Based Activities to realize employment potential at the end of the course.
4. Acquired listening, speaking, reading and writing skills necessary for the survival in the post modern society through task-based and skill-based communication practices with judicious integration of modern tools.
5. Development of fluency and accuracy for effective and professional communication in real-time situations by using appropriate verbiage and contextual knowledge.

Unit I

Listening: Listening for presentation strategies and answering questions on the speaker, audience, and key points. **Speaking:** Formal presentations using PPT slides without graphic elements. **Reading:** Reading for presenting – strategies to select, compile and synthesize information for presentation; reading to recognize academic style. **Writing:** Paraphrasing; using quotations in writing; using academic style - avoiding colloquial words and phrases. **Grammar and Vocabulary:** Formal/academic words and phrases.

Learning Outcomes

At the end of the module, the learners will be able to

- understand the purpose of a presentation & make note of key points (L2)
- make formal structured presentations on general topics using PPT slides without graphical elements (L3)
- prioritize information from reading texts after selecting relevant and useful points (L3)
- paraphrase short academic texts using suitable strategies and conventions (L3)
- cultivate awareness about plagiarized content and academic ethics (L2)

Unit II

Listening: Following an argument/ logical flow of thought; answering questions on key concepts after listening to extended passages of spoken academic discourse. **Speaking:** Formal presentations using PPT slides with graphic elements. **Reading:** Understand formal and informal styles; recognize the difference between facts and opinions. **Writing:** Formal letter writing and email writing (enquiry, complaints, seeking permission, seeking

internship); structure, conventions and etiquette. **Grammar and Vocabulary:** Phrasal prepositions; phrasal verbs.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend academic lectures by taking notes to answer questions (L2)
- make formal structured presentations on academic topics using PPT slides with relevant graphical elements (L3)
- distinguish facts from opinions while reading (L2)
- write formal letters and emails (L3)
- use a range of vocabulary in formal speech and writing (L2)

Unit III

Listening: Identifying views and opinions expressed by different speakers while listening to discussions. **Speaking:** Group discussion on general topics; agreeing and disagreeing, using claims and examples/ evidences for presenting views, opinions and position. **Reading:** Identifying claims, evidences, views, opinions and stance/ position. **Writing:** Writing structured persuasive/argumentative essays on topics of general interest using suitable claims, examples and evidences. **Grammar and Vocabulary:** Language for different functions such as stating a point, expressing opinion, agreeing/ disagreeing, adding information to what someone has stated, and asking for clarification.

Learning Outcomes

At the end of the module, the learners will be able to

- follow a discussion (L2)
- participate in group discussions using appropriate conventions and language strategies (L3)
- comprehend complex texts identifying the author's purpose (L2)
- produce logically coherent argumentative essays (L3)
- use appropriate vocabulary to express ideas and opinions (L2)

Unit IV

Listening: Understanding inferences; processing of information using specific context clues from the text. **Speaking:** Group discussion; reaching consensus in group work (academic context). **Reading:** Reading for inferential comprehension. **Writing:** Applying for internship/ job - Writing one's CV/Resume and cover letter. **Grammar and Vocabulary:** Active and passive voice – use of passive verbs in academic writing.

Learning Outcomes

At the end of the module, the learners will be able to

- draw inferences and conclusions using prior knowledge and verbal cues (L3)
- express thoughts and ideas with acceptable accuracy and fluency (L2)
- develop advanced reading skills for deeper understanding of texts (L3)
- prepare a CV with a cover letter to seek internship/ job (L2)
- understand the use of passive voice in academic writing (L2)

Unit V

Listening: Understanding inferences - processing of explicit information presented in the text and implicit information inferable from the text or from previous/background knowledge. **Speaking:** Formal team presentations on academic/ general topics using PPT slides. **Reading for Writing:** Structure and contents of a Project Report; identifying sections in project reports; understanding the purpose of each section; significance of references. **Grammar and Vocabulary:** Reinforcing learning; editing short texts; correcting common errors in grammar and usage.

Learning Outcomes

At the end of the module, the learners will be able to

- develop advanced listening skills for in-depth understanding of academic texts (L3)
- collaborate with a partner to make presentations (L2)
- understand the structure of Project Reports (L2)
- use grammatically correct structures with a wide range of vocabulary (L3)

Reference Books

- Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
- Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. Cambridge Academic English (B2). CUP, 2012. (Student Book, Teacher Resource Book, CD & DVD)

Sample Web Resources

Grammar/Listening/Writing

1. 1-language.com
2. http://www.5minuteenglish.com/
3. https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

1. http://www.bbc.co.uk/learningenglish/
2. http://www.better-english.com/
3. http://www.nonstopenglish.com/
4. https://www.vocabulary.com/
5. BBC Vocabulary Games
6. Free Rice Vocabulary Game

Reading

1. https://www.usingenglish.com/comprehension/
2. https://www.englishclub.com/reading/short-stories.htm
3. https://www.english-online.at/

Listening

1. https://learningenglish.voanews.com/z/3613
2. http://www.englishmedialab.com/listening.html

Speaking

1. https://www.talkenglish.com/
2. BBC Learning English – Pronunciation tips
3. Merriam-Webster – Perfect pronunciation Exercises

All Skills

1. https://www.englishclub.com/
2. http://www.world-english.org/
3. http://learnenglish.britishcouncil.org/

Online Dictionaries

1. Cambridge dictionary online
2. MacMillan dictionary
3. Oxford learner's dictionaries

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19CSE-ES1202	Object Oriented Programming Through C++ Lab	0	0	3	1.5

COURSE OBJECTIVES:

- To strengthen their problem solving ability by applying the characteristics of an Object oriented Approach.
- To introduce object oriented concepts in C++ and Java Programming.

COURSE OUTCOMES:

1. Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
2. The understanding of computer programming concepts facilitates the better implementation of object oriented programming.
3. Acquires the basic knowledge in C++ programming, parameter passing mechanisms, function overloading, friend functions, exception handling and recursion.
4. Understanding the C++ concepts classes, objects and member functions, constructors, Destructors, variants in them, operator overloading, type conversions.
5. Real time applicability can be accomplished through inheritance and delegation and analyze the templates, function templates for generic programming and understand the Exception handling mechanism for program recovery.

Exercise – 1 (Basics)

Write a Simple Program on printing "Hello World" and "Hello Name" where name is the input from the user

a) Convert any two programs that are written in C into C++
b) Write a description of using g++ (150 Words)

Exercise – 2 (Expressions Control Flow)

a) Write a Program that computes the simple interest and compound interest payable on Principle amount (in Rs.) of loan borrowed by the customer from a bank for a given period of time (in years) at specific rate of interest. Further determine whether the bank will benefit by charging simple interest or compound interest.
b) Write a Program to calculate the fare for the passengers travelling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to the passenger according to following criteria.

Exercise – 3 (Variables, Scope, Allocation)

a) Write a program to implement call by value and call by reference using reference variable.
b) Write a program to illustrate scope resolution, new and delete Operators. (Dynamic Memory Allocation)
c) Write a program to illustrate Storage classes
d) Write a program to illustrate Enumerations

Exercises –4 (Functions)

Write a program illustrating Inline Functions

a) Write a program illustrates function overloading. Write 2 overloading functions for power.
b) Write a program illustrate the use of default arguments for simple interest function.

Exercise -5 (Functions –Exercise Continued)

a) Write a program to illustrate function overloading. Write 2 overloading functions for adding two Numbers.
b) Write a program illustrate function template for power of a number.
c) Write a program to illustrate function template for swapping of two numbers.

Exercise -6 (Classes Objects)

Create a Distance class with:

- Feet and inches as data members
- Member function to input distance
- Member function to output distance
- Member function to add two distance objects

a) Write a main function to create objects of DISTANCE class. Input two distances and output the sum.
b) Write a C++ Program to illustrate the use of Constructors and Destructors (use the above program.)
c) Write a program for illustrating function overloading in adding the distance between objects (use The above problem)
d) Write a C++ program demonstrating a Bank Account with necessary methods and variables

Exercise – 7 (Access)

Write a program for illustrating Access Specifies public, private, protected

a) Write a program implementing Friend Function
b) Write a program to illustrate this pointer
c) Write a Program to illustrate pointer to a class

Exercise -8 (Operator Overloading)

a) Write a program to Overload Unary, and Binary Operators as Member Function, and Non Member Function.
   (i) Unary operator as member function (ii) Binary operator as non-member function
b) Write a c ++ program to implement the overloading assignment = operator
c) Write a case study on Overloading Operators and Overloading Functions (150 Words)

Exercise -9 (Inheritance)

a) Write C++ Programs and incorporating various forms of Inheritance
   (i) Single Inheritance (ii) Hierarchical Inheritance (iii) Multiple Inheritances
   (iv) Multi-level inheritance (v) Hybrid inheritance
b) Write a program to show Virtual Base Class
c) Write a case study on using virtual classes (150 Words)

Exercise-10 (Inheritance –Continued)

a) Write a Program in C++ to illustrate the order of execution of constructors and destructors in inheritance
b) Write a Program to show how constructors are invoked in derived class

Exercise -11 (Polymorphism)

a) Write a program to illustrate runtime polymorphism
b) Write a program to illustrate this pointer
c) Write a program illustrates pure virtual function and calculate the area of different shapes by using abstract class.
d) Write a case study on virtual functions (150 Words)

Exercise -12(Templates)

a) Write a C++ Program to illustrate template class
b) Write a Program to illustrate class templates with multiple parameters
c) Write a Program to illustrate member function templates

Exercise -13 (Exception Handling)

a) Write a Program for Exception Handling Divide by zero
b) Write a Program to re-throw an Exception

Exercise -14 (STL)

a) Write a Program to implement List and List Operations

b) Write a Program to implementVector andVector Operations

Exercise -15 (STLContinued)

a) Write a Program to implement Dequeue and Dequeue Operations
b) Write a Program to implement Map and Map Operations

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-MA1202	**MATLAB for Computational Methods**	0	0	3	1.5

Course Objectives:

- To familiarize the MATLAB Programming for numerical techniques.
- To impart knowledge in basic concepts and few programming techniques using MATLAB in relation to the engineering applications.
- Carry out computational projects within numerical methods using MATLAB.

Course Outcomes:

At the end of the course students will be able to

1. Construct and apply small programs in MATLAB to mathematical problems. (L3)
2. Develop a program to find a real root of an equation using various numerical methods.(L3)
3. Develop programs to find the interpolation values using Lagrange's and Newton's interpolation formulae for a given set of points.(L3)
4. Develop programs to find solutions of ordinary differential equations using various numerical methods. (L3)
5. Develop programs to solve system of linear equations using Gauss elimination and iteration methods. (L3)

1. MATLAB Basics: Input and Output operations, arithmetic operations, recovering from problems, errors in input, aborting calculations, algebraic or symbolic computation, substituting in symbolic expressions, symbolic expressions, variable Precision and exact arithmetic, vectors and matrices, suppressing output, functions, built-in functions, user-defined functions, managing variables. Programs on MATLAB basics.

2. MATLAB Programming: Writing scripts and functions, loops, arrays, conditional statements. Programs using functions, loops, arrays and conditional statements.

3. MATLAB Programming for Numerical Methods: Root finding, interpolation, numerical differentiation, numerical integration, numerical solutions of ordinary differential equations.

List of Programs

1. Find a real root of the given equation using Newton-Raphson Method.
2. Find a real root of the given equation using Regula Falsi Method.
3. Find a real root of the given equation using Bisection Method.
4. Find a real root of the given equation using Iterative methods.
5. Find the unknown values of the given data using Newton forward and backward interpolation formula
6. Find the unknown values of the given data using Lagrange's interpolation formula
7. Find the first order and second order derivatives of the given data.
8. Find the integral of the given data using trapezoidal rule and Simpson's 1/3rd and 3/8 rules.
9. Solve the differential equation using Taylor's series.
10. Solve the differential equation using Euler methods.
11. Solve the differential equation using modified Euler's methods.
12. Solve the differential equation using Runge-Kutta method of fourth order.
13. Solve linear equation systems using Gaussian elimination method.
14. Solve linear equation systems using Gauss-Seidel and Jacobi's iteration method.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. B.S. Grewal, Numerical Methods in Engineering & Science, Khanna Publishers, 2014.

3. Steven Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists-McGraw-Hill Higher Education (2006).

References:

1. Erwin kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2/e, Reprint 2012.
3. Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, A guide to MATLAB for beginners and experienced users, Cambridge University Press (2006).
4. Sastry, S.S, Introductory Methods of Numerical Analysis, 5^{th} edition, Prentice Hall, 2017.
5. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
6. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
7. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
8. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
9. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
10. Misza Kalechman, Practical MATLAB Basics For Engineers, Crc Press (2008).
11. John H. Mathews, Kurtis D. Fink, Numerical methods using MATLAB, Prentice Hall (1998).