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

ELECTRICAL & ELCTRONICS 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	R19EEE-ES1001	Career Counseling	ES	3	0	0	0
3	R19EEE-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	HS	3	0	0	0
8	R19BSH-HM1003	Communication Skills (Listening, Speaking, Reading skills Writing skills)	HS	2	1	2	0
Total				**22**	**1**	**7**	**0**

I Year – I SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA1102	Linear Algebra and Ordinary Differential Equations	BS	3	0	0	3
2	R19BSH- EN1101	English	HM	3	0	0	3
3	R19BSH-CH1101	Engineering Chemistry	BS	3	0	0	3
4	R19CSE-ES1101	Problem Solving and Programming using C	ES	3	0	0	3
5	R19BSH-EN1102	Communicative English Lab -I	HM	0	0	3	1.5
6	R19BSH-CH1102	Engineering Chemistry Lab	BS	0	0	3	1.5
7	R19CSE-ES1102	Problem Solving and Programming using C Lab	ES	0	0	3	1.5
8	R19EEE-ES1103	Electrical Engineering Workshop	ES	0	0	3	1.5
9	R19BSH-MC1101	Environmental Science	MC	3	0	0	0
Total				**15**	**0**	**12**	**18**

I Year – II SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA1206	Transform Techniques and Partial Differential Equations	BS	3	0	0	3
2	R19BSH-MA1204	Numerical Methods and Multi Variable Calculus	BS	3	0	0	3
3	R19MEC-PC1202	Thermal and Hydro Prime Movers	PC	3	0	0	3
4	R19BSH-PH1201	Applied Physics	BS	3	0	0	3
5	R19EEE-ES1203	Electrical Circuit Analysis – I	ES	3	0	0	3
6	R19BSH-PH1204	Applied Physic Lab	BS	0	0	3	1.5
7	R19BSH-EN1201	Communicative English Lab -II	HM	0	0	3	1.5
8	R19MEC-ES1201	Engineering Drawing	ES	1	0	3	2.5
9	R19MEC-ES1205	Engineering Workshop & IT Workshop Lab	ES	0	0	3	1.5
10	R19BSH-MC1201	Constitution of India	MC	2	0	0	0
Total				**18**	**0**	**12**	**22**

II Year – I SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19BSH-MA2103	Complex Variables, Probability and Statistics	BS	3	0	0	3
2	R19EEE-ES2101	Electrical Circuit Analysis – II	ES	3	0	0	3
3	R19EEE-PC2101	Electrical Machines-I	PC	3	0	0	3
4	R19ECE-PC2106	Electronics Devices and Circuits	PC	3	0	0	3
5	R19EEE-PC2102	Electro Magnetic Fields	PC	3	0	0	3
6	R19BSH-HM2101	Managerial Economics & Financial Analysis	HM	3	0	0	3
7	R19MEC-PC2108	Thermal and Hydro Prime Movers Lab	PC	0	0	3	1.5
8	R19EEE-ES2102	Electrical Circuits Laboratory	ES	0	0	3	1.5
9	R19BSH-MC2103	Professional Ethics and Human values	MC	2	0	0	0
10	R19BSH-SDC2101	English for Competitive Exams	SD	2	0	0	0
11	R19EEE-MC2101	MOOCS-1	MC	0	0	0	0
Total				**24**	**0**	**6**	**21**

II Year – II SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19EEE -PC2201	Electrical Measurements and Instrumentation	PC	3	0	0	3
2	R19EEE-PC2202	Electrical Machines-II	PC	3	0	0	3
3	R19ECE-PC2207	Digital Electronics	PC	3	0	0	3
4	R19EEE-PC2203	Control Systems	PC	3	0	0	3
5	R19EEE-PC2204	Power System-I	PC	3	0	0	3
6	R19ECE-PC2208	Signals and Systems	PC	3	0	0	3
7	R19EEE-PC2205	Electrical Machines Lab –I	PC	0	0	3	1.5
8	R19ECE-PC2209	Electronics Devices & Circuits Lab	PC	0	0	3	1.5
9	R19BSH-MC2203	Essence of Indian Traditional Knowledge	MC	3	0	0	0
10	R19BSH-SD2201	English for job seekers	SD	3	0	0	0
12	R19EEE-SI2201	Summer Internship	SI	0	0	0	0
13	R19EEE-MC2201	MOOCS-2	MC	0	0	0	0
Total				**24**	**0**	**6**	**21**

III Year – I SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19EEE-PC3101	Power Systems-II	PC	3	0	0	3
2	R19EEE-PC3102	Power Electronics	PC	3	0	0	3
3	R19ECE-OE3101	**Open Elective-I**					
	R19ECE-OE3101.1	Linear and Digital IC Applications	OE	3	0	0	3
	R19CSE-OE3101.2	Big Data Analysis	OE				
	R19CSE-OE3101.3	Internet of Things	OE				
	R19CSE-OE3101.4	Python Programming	OE				
4	R19EEE-PE3101	**Professional Elective – I**					
	R19EEE-PE3101.1	Digital Control Systems	PE	3	0	0	3
	R19EEE-PE3101.2	Electrical Machine Design	PE				
	R19ECE-PE3101.3	Embedded Systems	PE				
5	R19CSE-ES3101	Data Structures	ES	3	0	0	3
6	R19EEE-PC3103	Electrical Machines-II Lab	PC	0	0	3	1.5
7	R19EEE-PC3104	Control Systems Lab	PC	0	0	3	1.5
8	R19EEE-PC3105	Electrical Measurements and Instrumentation Lab	PC	0	0	3	1.5
9	R19CSE-SD3101	Data Structures Lab	SD	0	0	2	0
10	R19EEE-SD3101	Introduction to Matlab	SD	2	0	0	0
11	R19EEE-PR3101	Engineering Exploration Project Design Thinking	PR	0	0	1	0.5
12	R19EEE-MC3101	MOOCS-3	MC	0	0	0	0
Total				**19**	**0**	**12**	**20**

III Year – II SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19EEE-PC3201	Electric Drives	PC	3	0	0	3
2	R19EEE-PC3202	Power System Analysis	PC	3	0	0	3
3	R19ECE-PC3207	Microprocessors and Microcontrollers	PC	3	0	0	3
4	R19EEE-PC3203	Switchgear and Protection	PC	3	0	0	3
5	R19EEE-PE3201	**Professional Elective – II**					
	R19EEE-PE3201.1	Advanced Control Systems	PE	3	0	0	3
	R19EEE- PE3201.2	HVAC Transmission					
	R19ECE- PE3201.3	Communication Systems					
6	R19EEE- OE3201	**Open Elective-II**					
	R19CSE- OE3201.1	Data Base Management System	OE	3	0	0	3
	R19CSE- OE3201.2	OOPS Through JAVA					
	R19ECE- OE3201.3	Wavelet Transforms					
	R19MEC- OE3201.4	Robotics					
7	R19EEE-PC3204	Power Electronics Lab	PC	0	0	3	1.5
8	R19ECE-PC3208	Microprocessors & Microcontrollers Lab	PC	0	0	3	1.5
9	R19EEE-SD3201	Electrical Virtual Lab	SD	0	0	3	0
10	R19EEE-SD3202	Electrical Installation and Estimation	SD	3	0	0	0
11	R19EEE-SI3201	Summer Internship	SI	0	0	0	0
12	R19EEE-MC3201	MOOCS-4	MC	0	0	0	0
Total				**21**	**0**	**9**	**21**

IV Year – I SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19EEE-PC4101	Power System Operation and Control	PC	3	0	0	3
2	R19EEE-PC4102	Utilization of Electrical Energy	PC	3	0	0	3
3	R19EEE-PC4103	Electrical Distribution Systems	PC	3	0	0	3
4	R19EEE-PE4101	**Professional Elective – III**					
	R19EEE-PE4101.1	Electrical Machine Modeling and Analysis	PE	3	0	0	3
	R19EEE-PE4102.2	Hybrid Electric Vehicles	PE	3	0	0	3
	R19EEE-PE4103.3	Energy Conservation and Auditing	PE	3	0	0	3
	R19ECE- PE4103.4	Digital Signal Processing	PE	3	0	0	3
5	R19EEE-PE4102	**Professional Elective – IV**					
	R19EEE- PE4102.1	High Voltage Engineering	PE	3	0	0	3
	R19EEE- PE4102.2	Special Electrical Machines	PE	3	0	0	3
	R19EEE- PE4102.3	Power Quality	PE	3	0	0	3
	R19CSE- PE4102.4	AI techniques and Applications in Electrical Engineering	PE	3	0	0	3
6	R19EEE-PC4104	Power Systems & Simulation Lab	PC	0	0	2	1
7	R19EEE-PJ4101	Mini Project	PJ	0	0	8	4
8	R19EEE-SD4101	PLC and SCADA	SD	1	0	2	0
9	R19BSH-SD4101	Entrepreneurship and Incubation	SD	2	0	0	0
Total				**18**	**0**	**12**	**20**

IV Year – II SEMESTER							
S. No.	**Course code**	**Subjects**	**Category**	**L**	**T**	**P**	**Credits**
1	R19EEE-PC4201	Renewable Energy Systems	PC	3	0	0	3
2	R19EEE-OE4201	**Open Elective-III**					
	R19CSE- OE4201.1	UNIX and Shell Programming	OE	3	0	0	3
	R19EEE- OE4201.2	Neural network and Fuzzy Logic					
	R19ECE- OE4201.3	VLSI Design					
	R19ME- OE4201.4	Automobile Engineering					
3	R19EEE-PE4201	**Professional Elective – V**					
	R19EEE-PE4201.1	Optimization Techniques	PE	3	0	0	3
	R19EEE- PE4201.2	Power System Reforms					
	R19EEE- PE4201.3	HVDC and FACTS					
	R19EEE- PE4201.4	Smart Grid Technologies					
4	R19EEE- 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-MA1102	Linear Algebra and Ordinary Differential Equations	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 Calculus.
- 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. 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 systems. (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 equations and analyze physical situations. (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

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 using direct elimination method.

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)
- convert second and third order differential equation to a system of linear differential equations. (L2)
- solve the system of linear differential equations with constant coefficients. (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. 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.

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH- 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	Engineering Chemistry	3	0	0	3

Course Objectives:

- To familiarize various properties and applications of polymers.
- To aware on factors influencing rate of corrosion and different methods for control of corrosion.
- To impart knowledge on the basic concepts of battery technology.
- To demonstrate the construction of photovoltaic cells.
- To introduce different types of Nano materials and importance of green chemistry.

Course Outcomes:

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

- Distinguish thermoplastics, thermosetting plastics and elastomers. (L4)
- Design the metallic materials to prevent the corrosion. (L6)
- Discuss the working principle and applications of primary, secondary battery cells, fuel cells and Photo Voltaic Cell. (L6)
- Compare the working principle and materials used in Floppy, CD and pen drive. (L4)
- Illustrate the preparation, properties and applications of Nano materials and importance of green chemistry. (L2)

Unit I

Polymer Chemistry: Introduction to polymers, functionality of monomers, chain growth, step growth polymerization - coordination polymerization and copolymerization- mechanism of polymerisation - Free radical, anionic and cationic. Stereo regular polymers

Plastics: Thermoplastics and Thermosettings, compounding of plastic, 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

Corrosion Technology: Introduction to corrosion, wet/electrochemical theory of corrosion, metal oxide formation by dry/ chemical corrosion, Pilling Bedworth rule, galvanic corrosion, differential aeration cell corrosion - water line corrosion, pitting corrosion, factors affecting corrosion rate, corrosion control methods – corrosion inhibitors, cathodic and anodic protection, metallic coatings (Galvanizing, tinning, electroplating).

Applications:

1. To control corrosion of various machines used in large scale industries.
2. Control of corrosion by using paint in preventing the iron pipes, tables.

3. Control of corrosion used to prevent the underground pipes from leaking which causes environmental pollution.

Learning outcomes:

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

- Apply Pilling Bedworth rule for corrosion and corrosion prevention (L3)
- Explain different types of corrosion (L2)
- Demonstrate the corrosion prevention methods and factors affecting corrosion (L2)

Unit III

Energy Sources And Applications:

Electrochemical Energy: 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.

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. 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.
4. Solar energy is used at residential homes for heating water and for generation of electricity for domestic use.
5. PV cells are used in electrical goods such as cookers, calculators, toys.

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

Unit IV

Superconductivity, Semiconductors, Storage Devices & Applications:

Superconductivity: Preparation, Properties and Engineering 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. Super conductors are used in Maglev trains
2. Semi conductors are used in electronic circuit devices
3. 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

- Explain preparation, properties and applications of super conductors (L2)
- Demonstrate the applications of semiconductors (L2)

- Discuss the materials used in floppy, CD, pen drive. (L2)

Unit- V

Advanced Topics In Chemistry:

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.

Green Chemistry: Principles of Green Chemistry- Methods of Green Synthesis (Super Critical Fluid extraction, aqueous phase Method and Microwave Induction)-Applications of Green chemistry

Applications:

1. Nano materials are used in paints, lubricants and medicine technology.
2. Green synthesis is used to make eco friendly reactions.

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)
- Explain the importance of green synthesis. (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 student 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.

Sample 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/

Online Dictionaries

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

I Year –I Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH- CH1102	Engineering Chemistry Lab	0	0	3	1.5

Course Objectives:

- To familiarize the students with the basic concepts of Engineering Chemistry lab.
- To train the students on how to handle the instruments.
- To demonstrate the digital and instrumental methods of analysis.
- To expose the students in practical aspects of the theoretical concepts.

Course Outcomes:

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

1. Explain the functioning of the instruments such as pH, Viscometer, Conductivity and Potentiometric meters. (L-2)
2. Determine the concentrations of Acid, Zinc, Iron and Copper. (L-5)
3. Compare viscosities of different oils. (L-4)
4. Prepare polymers and nano materials. (L-4)
5. Identify the safety precautions to carry out the experiments in the laboratory using chemicals. (L-3)

List of Experiments

1. Preparation of Phenol-Formaldehyde resin
2. Preparation of Urea-Formaldehyde resin
3. Determination of conductance by conductometric method
4. Determination of strength of an acid by pH metric method
5. Determination of Fe (II) in Mohr's salt by potentiometric method
6. Determination of sulphuric acid in lead-acid storage cell
7. Determination of Zinc by EDTA method.
8. Determination of copper in a copper ore
9. Determination of viscosity of a liquid
10. Determination of surface tension of a liquid
11. Preparation of TiO_2/ZnO nano particles
12. Determination of chromium (VI) in potassium dichromate

Text Books

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

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:

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,
e) GCD of 2 numbers
f) 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-ES1103	Electrical Engineering Workshop	0	0	3	1.5

Course Objectives:

- To demonstrate the usage of measuring equipment
- To identify different protective equipment's and their usage.
- To train the students in setting up simple wiring circuits
- To impart methods in electrical machine wiring
- To explain the starting methods of dc motors
- To explain the starting methods of single phase and three phase induction motors.

Course Outcomes:

At the end of the Course, the student is able to

1. Explain the limitations, tolerances, Safety aspects of electrical systems and wiring. (L2)
2. Select wires/cables and other accessories used in different types of wiring. (L3)
3. Make simple lighting and power circuits. (L3)
4. Measure current, voltage and power in a circuit. (L3)
5. Apply starting methods to AC and DC Machines.(L3)

List of Experiments

1. Study of various electrical tools and symbols.
2. Identify different types of cables/wires and switches, fuses & fuse carriers, MCB and ELCB, MCCB with ratings and usage.
3. Wiring of light /fan circuit using two way/three way control (stair case wiring) Go-down wiring/Tunnel wiring.
4. Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and energy meter.
5. Measurement of voltage, current, resistance in DC circuit.
6. Measurement of voltage, current and power in single phase circuit using voltmeter, ammeter and wattmeter. Calculate the power factor of the circuit.
7. Wiring of backup power supply including inverter, battery and load for domestic Installations.
8. Starting of DC shunt motor using three point starter
9. Starting of DC series motor using two point starter
10. Starting of single phase induction motor
11. Starting of three phase induction motor.

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 the Course, the student is 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:

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-MA1206	Transform Techniques and Partial Differential Equations	3	0	0	3

Course Objectives:

- To familiarize the transform techniques to solve partial differential and difference equations.
- To equip the students to solve application problems in their disciplines.

Course Outcomes:

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

1. Apply the Laplace transform for solving differential equations and integral equations. (L3)
2. Apply partial differentiation to find maxima and minima of functions of several variables. (L3)
3. Find the Fourier series expansions of various functions and apply integral expressions for the forward and inverse Fourier transform. (L3)
4. Solve partial differential equations of first and higher order using analytical methods. (L2)
5. Develop Z transform techniques to solve discrete time systems. (L3)

Unit I

Laplace transforms (All Theorems/Properties 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, Inverse Laplace Transforms, 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 and system of ordinary differential 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 system of ordinary differential equations by using Laplace transformation technique. (L3)

Unit II

Partial Differentiation: Partial derivatives, total derivative, chain rule, Taylor's series and Maclaurin's series of functions of two variables, change of variables, Jacobian, functional dependence.

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, total derivatives and chain rule of functions of several variables. (L2)
- expand a function of two variables using Taylor's and Maclaurin's series expansion. (L2)
- apply the concept of Jacobian to test whether the given functions are functionally dependent or not. (L3)
- apply the knowledge of partial differentiation to find maxima and minima of functions of several variables. (L3)
- use partial differentiation to find tangent planes and normal lines. (L3)

Unit III

Fourier Series & Fourier transforms (without proofs)

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

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

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)
- solve the homogeneous higher order linear PDE with constant coefficients. (L2)

Unit V

Z-Transforms: Definition of Z-transform, elementary properties, linearity property, damping rule, shifting u_n to the right and left, multiplication by n, initial value theorem, final value theorem, inverse Z-transform, convolution theorem.

Applications: Solution of difference equations using Z-transforms.

Learning Outcomes:

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

- apply the properties of Z-transforms. (L2)
- find Z and inverse Z-transformations for different functions. (L3)
- solve difference equations by using Z-transforms. (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. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
3. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
4. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
5. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.

6. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
7. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9/e, Wiley India, 2009.
8. Saber Elaydi, Introduction to Difference Equations, Springer, 3rd Edition.
9. W. G. Kelley, Allen C Peterson, Difference Equations, An Introduction with Applications, 2nd edition, Academic Press.

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19BSH-MA1204	Numerical Methods and Multivariable Calculus	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 Multivariable Calculus.

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. Evaluate the volume and surface area of solids using multiple integrals. (L3)
4. Understand the physical meaning of different operators such as gradient, curl and divergence. (L3)
5. Estimate the work done against a field, circulation and flux using vector integral theorems. (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 & Solutions of Ordinary differential equations:

Interpolation: Finite differences, symbolic relations between operators, interpolation using Newton's forward, backward formulae, Gauss central difference formulae and 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 formulas for equal intervals to find interpolating polynomial/values. (L3)
- apply Lagrange's formulas for unequal intervals to find interpolating polynomial/values. (L3)
- solve ordinary differential equations by using different numerical schemes. (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

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.

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)

Unit V

Vector Integration (All Theorems without proofs): 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

- 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)

Text Books

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. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
3. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018.
4. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
5. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
6. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
7. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2/e, Reprint 2012.
8. Sastry, S.S, Introductory Methods of Numerical Analysis, 5th edition, , Prentice Hall , 2017.

I Year –II Semester

Subject Code	Subject Name	L	T	P	C
R19MEC-PC1202	Thermal and Hydro Prime Movers	3	0	0	3

Course Objectives:

- Apply to train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts
- Understand about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles
- Understand gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines To know the different kinds of power plants.

Course Outcomes:

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

1. Understand the basic working principle for IC engines(L2)
2. Understand the basic Airstandard cycles.(L2)
3. Understand the basic concept gas turbine and cycles(L2)
4. Explain the basic principle of jet and pumps(L2)
5. Analyse different loads on turbine of hydro electric power plant(L4)

Unit I

Objectives: To make the student learn about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines. Further, the student shall be able to calculate the performance of different types of internal combustion engines.

I.C Engines: Classification, working principles – valve and port timing diagrams – air standard cycles – Engine systems line fuel injection, carburetion, ignition, cooling and lubrication – Engine performance evaluation.

Application: Automobile vehicles

Learning outcomes:

After completion of this unit, student will be able to

- Explain classification of IC engines(L2)
- Construct valve and port timing diagram(L3)
- Explain airstandard cycles(L2)
- Explain working of various fuel injection systems(L2)
- Understand engine performance evaluation(L2)

Unit II

Objectives: To train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts. To make the student correlate between the air standard cycles and the actual cycles that govern the steam turbines. To train the student to calculate the performance of steam turbines using velocity diagrams.

Properties of Steam and use of Steam Tables- T-S and H-S Diagrams..

Vapor Power Cycles:Rankine Cycle- Efficiency and output of Rankine Cycle-Re-generative cycle Steam

Steam Turbines: Schematic layout of steam power plant Classification of Steam Turbines Impulse Turbine and Reaction Turbine- Compounding in Turbines- Velocity Diagrams for simple Impulse and Reaction Turbines- Work done & efficiency

Application: Steam power plants

Learning outcomes:
After completion of this unit, student will be able to

- Understand the usage of steam tables(L2)
- Understand T-S and H-S Diagrams(L2)
- Explain various thermodynamic cycles(L2)
- Understand concept of rankine cycle(L2)
- Understand P-V and T-S diagrams (L2)
- Explain layout of steam turbine power plant(L2)
- Understand compounding in Turbines(L2)
- Understand velocity triangles for steam turbines(L2)

Unit III

Objectives: To impart the knowledge of gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines.
Gas Turbines: Simple gas turbine plant-ideal cycle, closed cycle -open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle.
Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating and Regeneration
Application: Gas turbine power plants
Learning outcomes:
After completion of this unit, student will be able to

- Explain basic idea about gas turbine cycle(L2)
- Understand P-V and T-S diagrams(L2)
- Evaluate Efficiency, Work ratio and optimum pressure ratio(L5)
- Explain basic idea about inter cooling, reheating and Regeneration(L2)

Unit IV

Objectives: To teach the student about the fundamental of fluid dynamic equations and its applications fluid jets. To impart the knowledge of various types of pumps, their constructional features, working and performance.
Impact of Jets and Pumps: Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved).
Pumps: Types of pumps, Centrifugal pumps: Main components, Working principle, Multi stage pumps, Performance and characteristic curves
Application: Bore wells, Water servicing for automobile vehicles, Industries etc.
Learning outcomes:
After completion of this unit, student will be able to

- Evaluate impulse momentum equation(L5)
- Explain impact of jet on flat and curved vanes(L2)
- Explain the working for centrifugal pump(L2)
- Understand characteristic curves

Unit V

Objectives: To make the student learn about the constructional features, operational details of various types of hydraulic turbines. Further, the student shall be able to calculate the performance of hydraulic turbines.
Hydraulic Turbines: Classification of turbines; Working principle of Pelton wheel,Francis and Kaplan turbines, Efficiency, Performance and characteristic curves.

Hydro Electric Power: Components of Hydro electric power plant: pumped storage systems, Estimation of water power potential; Estimation of load on turbines: load curve, load factor, capacity factor, utilization factor, diversity factor

Application: hydraulic turbine power plant, Dams, Industries etc.

Learning outcomes:

After completion of this unit, student will be able to

- Explain basic working principle of hydraulic turbine (L2)
- Derive efficiencies of different turbines(L3)
- Understand characteristic curves (L2)
- Explain basic components of hydropower plant(L2)
- Evaluate loads on turbines(L5)
- Understand load curve(L2)

Text Books

1. Thermodynamics by P K NAG
2. Internal combustion engines by Ganesan
3. Thermal Engineering / RK Rajput
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal

References

1. Fluid mechanics and fluid machines by Rajput, S. Chand & Co.
2. Thermal Engineering-R.S Khurmi, &J S Gupta/S.Chand.
3. Thermal Engineering / RK Rajput/ Lakshmi Publications

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-PH1201	Applied Physics	3	0	0	3

Course Objectives:

- To impart knowledge in basic concepts of Wave optics, Lasers and Fiber optics, Electromagnetic fields, Super conductors and physics of nano materials, Semiconductor physics and digital electronics
- To familiarize the applications of Nano materials and digital electronics relevant to Electrical and Electronics Engineering

Course Outcomes:

After the completion of this course the student can able to

1. Interpret the interaction of optic energy with matter(L2)
2. Explain the properties of polarization and Lasers(L2)
3. Classify the given dielectric and semiconductor materials (L3)
4. Analyze Electromagnetic wave propagation in non-conducting medium(L3)
5. Apply the principles of nano materials and digital electronics to electrical engineering(L3)

Unit I

Wave optics:

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

Applications: Colours of thin films, Determination of wavelength of given light source and refractive index of given unknown liquid

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

Applications: Determination of wavelength of monochromatic source of light and 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

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

Unit II

Polarizationand Lasers:

Polarization: Polarization by reflection, refraction and double Refraction-Nicol 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

- Explain the Characteristics of Lasers(L2)
- Construct three level and four level laser systems(L3)
- Analyze the applications of lasers(L4)
- Analyze the differences between interference and diffraction (L3)
- Illustrate the concept of polarization and its applications (L2)

Unit III

Dielectric Materials and Semiconductor Physics:

Dielectric Materials: Introduction to Dielectrics- Electric Polarization- Dielectric Polarizability- Susceptibility and Dielectric Constant- Types of Polarization-Electronic, ionic, orientation (without proof) and space charge (without proof) – Frequency dependence on polarization- Lorentz (Internal) field – Claussius- Mosotti equation

Applications: Ferroelectrics and Pizoelectrics

Semiconductor Physics: Origin of Energy Bands- Classification of Solids based on Energy Bands- intrinsic and extrinsic (P-N) semiconductors- Fermi Energy- Direct and Indirect Band Gap Semiconductors- Hall Effect-Hall coefficient.

Applications: Thermistor and applications of Hall Effect.

Learning Outcomes

The student can able to

- Compare the types of dielectric polarizations(L2)
- Analyze the frequency dependence on polarizations (L4)
- Demonstrate the applications of Dielectrics(L3)
- Classify the solids into conductors, semiconductors and insulators based on band theory(L3)
- Outline the properties of n-type and p-type semiconductors(L2)
- Differentiate the direct and indirect band gap in semiconductors(L2)
- Identify the type of semiconductor using Hall effect(L2)
- List the applications of semiconductors in electronic manufacturing(L2)

Unit IV

Electromagnetic Fields: Introduction-scalar and vector field-gradient-divergence-curl of a vector Field-statements of Gauss divergence theorem and stokes theorem (without proofs)-Gauss law in Electrostatics & Magnetism-Faraday's laws - Ampere's circuit Law-Maxwell's Equations-differential form and integral Form-Propagation of electromagnetic fields through non conducting medium

Applications: Wave guides and single propagation coaxial cable

Learning Outcomes

After the completion of this chapter the student can able to

- Evaluate basic laws of electromagnetism(L3)
- Verify the velocity of Electromagnetic wave in isotropic medium(L3)
- Assess the Electromagnetic wave propagation in non-conducting medium(L2)

Unit V

Physics of Nanomaterials and Digital Electronics:

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

Digital Electronics: Introduction to digital Electronics-Logic Gates-Basic Gates-Universal gates-Realization of other gates using universal gates-Demorgan's theorem

Learning Outcomes

After the completion of this chapter the student can able to

- Analyze the size dependent properties of Nano materials (L3)
- Enumerate the methods for the preparation and characterization of CNT's (L2)

- Logic symbols and truth tables of basic logic gates(L2)
- Apply the basic logic gates to realize the universal gates(L3)
- Demonstrate the Demorgan's theorem(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. S.L.Gupta and Sanjeev Gupta, "Unified Physics",Vol.3, Jai Prakash Nath & co.
3. Shatendra Sharma, Jyotsna Sharma, "Engineering Physics", Pearson Publications.
4. S.M. Sze "Semiconductor Devices-Physics and Technology" –Wiley, 2008
5. T Pradeep "A Text Book of Nano Science and Nano Technology"- Tata Mc GrawHill,2013
6. Sanjay D Jain, Girish G Shastra Buddi, "Engineering Physics" –University Press
7. Dr.K. Vijaya Kumar, Engineering Physics-S.Chand publications

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19EEE-ES1203	Electrical Circuit Analysis – I	3	0	0	3

Course Objectives:

- To study the concepts of passive elements, types of sources and various network reduction techniques.
- To understand the applications of network topology to electrical circuits.
- To understand the difference between electric and magnetic circuit.
- To study the behavior of RLC networks for sinusoidal excitations.
- To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
- To study the applications of network theorems for analysis of electrical networks.

Course Outcomes:

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

1. Understands V-I relationships of basic circuit elements and network reduction techniques. (L2)
2. Determine of co-efficient of coupling for a given magnetic circuit. (L5)
3. Analyzes single phase ac circuits and understands concepts of phase and power factor. (L4)
4. Extends knowledge of dc analysis to ac circuits and determines selectivity of a RLC resonant circuit. (L2)
5. Simplify complex electrical networks by using various network theorems. (L4)

Unit I

Introduction to Electrical Circuits & Network Topology: Passive components and their V-I relations. Sources (dependent and independent) -Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation). Source transformation technique, nodal analysis and mesh analysis.

Network topology:Definitions of Graph and Tree, Basic cut-set and tie-set matrices for planar networks, Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

Learning Outcomes:

The students are able to

- Determines mesh currents and node voltages. (L5)
- Understand V-I relationships of Passive elements. (L2)
- Study and understand the concept of duality. (L2)
- Develop tie-set, cut-set matrix for a given network. (L3)

Unit II

Magnetic Circuit: Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits. Faraday's laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling and composite magnetic circuit. Analysis of series and parallel magnetic circuits.

Learning Outcomes:

The students are able to

- Design the magnetic circuit. (L6)
- Understand the concept of self and mutual inductance. (L2)
- Analyze series and parallel magnetic circuits. (L4)

Unit III

Single Phase A.C Systems: Periodic waveforms (determination of rms, average value and form factor).Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance real, reactive power and apparent power, waveform of instantaneous power triangle and complex power

Learning Outcomes:

The students are able to

- Analyze single phase ac circuits. (L4)
- Determine average and complex power. (L5)
- Analyze series and parallel R, L, C circuits. (L4)

Unit IV

Analysis of AC Networks: Extension of node and mesh analysis to AC networks, Numerical problems on sinusoidal steady state analysis, Series and parallel resonance, Selectively band width and Quasi factor, Introduction to locus diagram.

Unit Outcomes:

The students are able to

- Estimate resonance frequency, bandwidth and selectivity of series and parallel resonant circuits. (L5)
- Analyze single phase AC circuits by using mesh and nodal analysis. (L4)

Unit V

Network theorems (DC & AC Excitations): Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem.

Learning Outcomes:

The students are able to

- Apply network theorems to complex electrical networks. (L3)

Text Books

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6th edition.
2. Network synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd.

Reference Books

1. Introduction to circuit analysis and design by TildonGlisson. Jr, Springer Publications.
2. Circuits by A.BruceCarlson ,Cengage Learning Publications.
3. Network Theory Analysis and Synthesis by SmarajitGhosh, PHI publications.
4. Networks and Systems by D. Roy Choudhury, New Age International publishers.
5. Electric Circuits by David A. Bell, Oxford publications.
6. Circuit Theory (Analysis and Synthesis) by A.chakrabarthi, DhanpatRai&co.

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-PH1204	Applied Physics Laboratory	0	0	3	1.5

Course Objectives:

- To impart the practical knowledge in basic concepts of Wave optics, Lasers and Fiber optics and Semiconductor physics
- To familiarize the handling of basic physical apparatus like Vernier callipers, screw gauge, spectrometers, travelling microscope, laser device, optical fibre,etc.

Course Outcomes:

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

1. Apply the working principles of laboratory experiments in optics, mechanics, electromagnetic and electronics and perform the experiments using required apparatus. (L3)
2. Compute the required parameter by suitable formula using experimental values (observed values) in mechanics, optics, electromagnetic and electronic 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. (L3)

List of Experiments

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 the wavelength of mercury light by plane diffraction grating
4. Determination of wavelength of laser light by normal incidence method
5. Determine the Numerical Aperture of a given Optical Fiber and hence find its acceptance angle
6. Determine the energy band gap of a given semi-conductor
7. Determine the temperature co-efficient of resistance of a given Thermistor
8. Determine the resolving power of grating.

Virtual Lab Experiments

1. Determination of the Brewster's angle.
2. Determine the Hall coefficient & the carrier concentration of charge carriers in the given sample materialby Hall Effect.

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. Laboratory Experiments in College Physics, C.H. Bernard and C.D. Epp, John Wiley and Sons, Inc., New York, 1995.
5. "Great Experiments in Physics", M.H.Shamos, Holt, Rinehart and Winston Inc., 1959.
6. "Engineering physics Lab Manual; by Narendra Kolla, amigobookssales@gmail.com.

Web Source References

1. http://vlab.co.in/ba_labs_all.php?id=8
2. http://va-iitk.vlabs.ac.in/
3. http://ml-iitb.vlabs.ac.in/

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 Syllabus

Subject Code	Subject Name	L	T	P	C
R19MEC-ES1201	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 completing the course, the student will be 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
R19MEC-ES1205	Engineering Workshop & IT Workshop (EEE)	0	0	3	1.5

Course Objective:

- Familiarize different wood working operation in carpentry.
- Understand to build different parts with sheet metal.
- Familiarize various fitting operations.
- Understand the smithy and black smithy operations for real world applications.
- Compare black smith and Tin smith.
- Understand the basic components and peripherals of a computer. • To become familiar in configuring a system.

Course Outcomes:

After completion of this lab, the student will be able to

1. Apply wood working skills in real world applications. (L3)
2. Build different parts with fitting in engineering applications. (L3)
3. Apply forging operations for different black smith applications. (L3)
4. Understand the basic components, peripherals and basic operations of a computer. (L3)
5. Get hands on experience in trouble shooting a system? (L5)

List of Experiments (Engineering Workshop)

Carpentry (Any Two)

1 T-Lap Joint
2 Cross Lap Joint
3 Dovetail Joint
4 Mortise and Tennon Joint

Fitting (Any ONE)

5 Vee Fit
6 Square Fit
7 Half Round Fit
8 Dovetail Fit

Black Smithy (Any One)

9 Round rod to Square
10 S-Hook
11 Round Rod to Flat Ring
12 Round Rod to Square headed bolt

Tin Smithy (Any Two)

13 Taper Tray
14 Square Box without lid
15 Open Scoop
16 Funnel

List of Experiments (It Workshop)

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. **Operating System Installation**-Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. **MS-Office / Open Office**
   a) **Word** - Formatting, Page Borders, Reviewing, Equations, symbols.
   b) **Spread Sheet** - organize data, usage of formula, graphs, charts.
   c) **Power point** - features of power point, guidelines for preparing an effective presentation.
   d) **Access**- creation of database, validate data.
4. **Network Configuration & Software Installation-**Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. **Internet and World Wide Web**-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. **Trouble Shooting-**Hardware trouble shooting, Software trouble shooting**.**

I Year –II Semester Syllabus

Subject Code	Subject Name	L	T	P	C
R19BSH-MC1201	Constitution of India	3	0	0	0

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state government aspects related to finance and administrative.

Course Outcomes:

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

- Impart knowledge on historical background of the constitution making and its importance for building a democratic India.(L2)
- Analyze the functioning of three wings of the government ie., executive, legislative and judiciary.(L2)
- Explain the value of the fundamental rights and duties for becoming good citizen of India.(L2)
- Analyze the decentralization of power between central, state and local self-government.(L4)
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.(L3)

Unit I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution-Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Learning Outcomes:

After completion of this unit student will be able to

- Understand the concept of Indian constitution (L2)
- Apply the knowledge on directive principle of state policy (L3)
- Analyze the History, features of Indian constitution (L4)
- Evaluate Preamble Fundamental Rights and Duties (L5)

Unit II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions.

Learning Outcomes:-

After completion of this unit student will be able to

- Understand the structure of Indian government (L2)
- Differentiate between the state and central government (L4)
- Explain the role of President and Prime Minister (L2)
- Know the Structure of supreme court and High court (L2)

Unit III

State Government and its Administration: Governor - Role and Position - CM and Council of ministers, State Secretariat: Organization, Structure and Functions.

Learning Outcomes:-

After completion of this unit student will be able to

- Understand the structure of state government (L2)
- Analyze the role Governor and Chief Minister(L4)
- Explain the role of state Secretariat (L2)
- Differentiate between structure and functions of state secretariat (L4)

Unit IV

Local Administration: District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zilla Panchayat, Elected officials and their roles, CEO ZilaPanchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

Learning Outcomes:-

After completion of this unit student will be able to

- Understand the local Administration (L2)
- Compare and contrast district administration role and importance (L4)
- Analyze the role of Myer and elected representatives of Municipalities (L4)
- Evaluate Zilla panchayat block level organization (L5)

Unit V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

Learning Outcomes:-

After completion of this unit student will be able to

- Know the role of Election Commission apply knowledge (L3)
- Contrast and compare the role of Chief Election commissioner and Commissiononerate (L4)
- Analyze role of state election commission (L4)
- Evaluate various commissions of viz SC/ST/OBC and women (L5)

References

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics, SAGE Publications India Pvt Ltd
4. D.C. Gupta, Indian Government and Politics, Vikas publishing house
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans, Novelty & Co.,
7. J. Raj Indian Government and Politics, SAGE Publications India Pvt
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-Resources

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution