B.Tech. Programme in
INFORMATION TECHNOLOGY

2019 Regulations

COURSE STRUCTURE AND SYLLABI OF I, II SEMESTERS

COLLEGE OF ENGINEERING
(AUTONOMOUS)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING
(AUTONOMOUS)

MADHURAWADA, VISAKHAPATNAM

AFFILIATED TO JNTU- KAKINADA

Vision
To evolve into and sustain as a Centre of Excellence in Technological Education and Research with a holistic approach.

Mission
To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavor.

To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.

B.TECH. –INFORMATION TECHNOLOGY
(I , II SEMESTERS)

0 SEMESTER – INDUCTION TRAINING					
I SEMESTER					
course code	**Title of the Course**	**L**	**T**	**P**	**C**
19HE1101	Communicative English	3	0	0	3
19BM1101	Calculus and Linear Algebra	3	1	0	4
19BC1101	Engineering Chemistry	3	0	0	3
19EE11D2	Basic Electrical and Electronics Engineering	3	0	0	3
19HE1102	Communicative English Lab	0	0	3	1.5
19BC1102	Engineering Chemistry Lab	0	0	3	1.5
19EE11D4	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5
19IT1101	IT Workshop	0	0	3	1.5
	TOTAL	**12**	**1**	**12**	**19**

II SEMESTER					
course code	**Title of the Course**	**L**	**T**	**P**	**C**
19BM1102	ODE & Vector Calculus	3	1	0	4
19BP1101	Applied Physics	3	0	0	3
19CT1101	Problem Solving using C	3	1	0	4
19EC11D1	Switching Theory and Logic Design	3	0	0	3
19ME1101	Basic Engineering workshop	0	0	3	1.5
19BP1102	Applied Physics Lab	0	0	3	1.5
19CT1102	Problem Solving Lab using C	0	0	3	1.5
19ME1102	Engineering Graphics	1	0	3	2.5
19BC11Z1	Environmental Science	3	0	0	0
	TOTAL	**16**	**2**	**12**	**21**

COMMUNICATIVE ENGLISH

Course Code: 19HE1101   **L   T   P   C**

                                                                               3   0   0   3

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

CO1: acquire skills of understanding and inferred meaning of words
CO2: transfer information from one form to another in texts and authentic materials
CO3: write paragraphs and summarized with clarity, cohesiveness and precision
CO4: produce well organized notes, essays, letters, emails & précis.
CO5: formulate sentences using proper grammatical structures and correct word forms

UNIT-I   **08 Lectures**

Lessons:

1. **What's your job –** from Cambridge Objective PET (Unit – 3)
2. **Wheels and wings –** from Cambridge Objective PET (Unit –5)

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: Nouns - countable and uncountable, pronouns, verb-tenses - present simple, present continuous, state verbs; prepositions of time, basic sentence structures; simple question form - wh-questions.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words, prefixes & suffixes.

Learning Outcomes: At the end of the module, the student will be able to

1. employ suitable strategies for skimming & scanning to get the general idea of a text and specific information (L3)
2. recognize paragraph structure with beginnings/endings (L3)
3. form sentences using proper grammatical structures and correct word forms (L3)

UNIT-II   **10 Lectures**

Lessons:

1. **Around town –** from Cambridge Objective PET (Unit – 7)
2. **How do you feel –** from Cambridge Objective PET (Unit – 9)
3. **I look forward to hearing from you –** from Cambridge Objective PET (Unit – 10)

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 and Précis.

Grammar: Prepositions of place & movement, comparative adjectives, commands; Tenses –perfect & past simple; use of articles and zero article.

Vocabulary: Technical vocabulary from across technical branches (20 words), GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word applications) and confusables.

Learning Outcomes: At the end of the module, the student will be able to

1. understand the use of cohesive devices for better reading comprehension (L2)
2. write well structured paragraphs on specific topics (L3)
3. make necessary grammatical corrections in sentences & in short passages (L3)

UNIT-III   **12 Lectures**

Lessons:

1. **Risk! –** from Cambridge Objective PET (Unit – 15)
2. **Free time –** from Cambridge Objective PET (Unit – 16)
3. **Next week's episode –** from Cambridge Objective PET (Unit – 17)
4. **Shooting a film -** from Cambridge Objective PET (Unit – 18)

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 and email.

Grammar: Tenses–forms of future tense and forms of past continuous, past perfect & past perfect continuous; subject-verb agreement; modal verbs and conjunctions.

Vocabulary: Technical vocabulary from across technical branches (20 words), GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words and idioms & phrases.

Learning Outcomes: At the end of the module, the student will be able to

1. infer meanings of unfamiliar words using contextual clues (L3)
2. write summaries based on global comprehension of reading/listening texts (L3)
3. form sentences using proper grammatical structures and correct word forms (L3)

UNIT-IV   10 Lectures

Lessons:

1. **Happy families –** from Cambridge Objective PET (Unit – 19)
2. **Best friends? –** from Cambridge Objective PET (Unit – 23)
3. **I have got an idea –** from Cambridge Objective PET (Unit – 24)

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: Adjectives and adverbs; degrees of comparison; direct and indirect speech.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications), one-word substitutes.

Learning Outcomes: At the end of the module, the student will be able to

1. produce a coherent paragraph interpreting a figure/graph/chart/table (L4)
2. use language appropriate for description and interpretation of graphical elements (L4)
3. use correct forms of adjectives, adverbs, one-word substitutes and a range of reporting verbs in speech and in writing (L3)

UNIT-V   10 Lectures

Lessons:

1. **Shop till you drop –** from Cambridge Objective PET (Unit – 25)
2. **Travellers' tales –** from Cambridge Objective PET (Unit – 27)
3. **What would you do? –** from Cambridge Objective PET (Unit – 28)

Reading: Reading for comprehension - Intensive and Extensive reading techniques.

Writing: Writing well-structured essays and letters.

Grammar: Conditional sentences; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement)

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications).

Learning Outcomes: At the end of the module, the student will be able to

1. produce well-organized essays and letters (L3)
2. edit short texts by correcting common errors (L4)
3. form sentences using proper grammatical structures and correct word forms (L3)

Textbook: Hashemi, Louise & Thomas, Barbara.Cambridge Objective PET – Student's Book 2nd Ed., Cambridge University Press, 2018.

Suggested Reading:

1. Carson, Rachel. Silent Spring. Boston Houghton Mifflin, 2002.
2. *The Individual and Society*. 1st Edition,Pearson Publications, , 2010

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Rogers. Louis &WilkinJennifer.Skillful Level 2 Reading & Writing Student's Book Pack (B1), Macmillan Educational, 2013.
3. Hewings, Martin.Cambridge Academic English (B2). CUP, 2012.
4. Narayanaswami, V. R. Strengthen Your Writing. Orient BlackSwan, 2005.

Sample Web Resources

Grammar/Listening/Writing
- 1-language.com
- http://www.5minuteenglish.com/
- https://www.englishpractice.com/

Grammar/Vocabulary
- English Language Learning Online
- http://www.bbc.co.uk/learningenglish/
- http://www.better-english.com/
- http://www.nonstopenglish.com/
- https://www.vocabulary.com/
- BBC Vocabulary Games
- Free Rice Vocabulary Game

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

All Skills
- https://www.englishclub.com/
- http://www.world-english.org/
- http://learnenglish.britishcouncil.org/

Online Dictionaries
- Cambridge dictionary online
- MacMillan dictionary
- Oxford learner's dictionaries

CALCULUS AND LINEAR ALGEBRA

Course Code: 19BM1101

L	T	P	C
3	1	0	4

Course Outcomes:

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

CO1: test the convergence of an infinite series and express a function in terms of power series.

CO2: apply the techniques of multivariable differential calculus to determine extrema and series expansions of a function of several variables.

CO3: extend the concept of integration to higher dimensions and use it to solve problems in engineering.

CO4: solve a linear system of equations analytically and compute eigenvalues and eigen vectors of a square matrix.

CO5: diagonalize a matrix and identify the nature of a quadratic form.

UNIT- I: Sequences, Series and Mean value theorems   10 Lectures

Sequence, infinite series, tests for convergence: comparison test, ratio test, root test.

Rolle's theorem, Lagrange's and Cauchy's mean value theorem (without proof); expansions of functions: Taylor's and Maclaurin's series (without proof),

(Sections 4.3, 4.4, 9.1-9.6, 9.8, 9.9, 9.11 of the textbook)

Learning Outcomes:

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

1. apply mean value theorems to find local extrema of a continuous function (L3)
2. discuss Taylor's and Maclaurin's series expansion of a function (L2)
3. determine the convergence of an infinite series (L3)

UNIT- II: Partial differentiation   10 Lectures

Introduction to partial derivatives, total derivatives, change of variables, jacobians, Taylor's theorem for functions of two variables, maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers.

(Sections 5.5, 5.6, 5.7, 5.9, 5.11, 5.12 of the textbook)

Learning Outcomes:

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

1. calculate partial derivatives and use them to analyze a function (L3)
2. discuss the maxima and minima of a function of several variables (L2)
3. examine the dependency of functions using jacobian (L3)

UNIT- III: Multiple integrals   10 Lectures

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves, triple integrals and change of variables.
(Sections 7.1 - 7.5, 7.7 of the textbook)

Learning Outcomes:

At the end of this unit, the student will be able to
1. discuss multiple integral of a function of several variables (L2)
2. determine areas and volumes using multiple integrals (L3)
3. describe the concept of change of order of integration in double integrals (L2)

UNIT- IV: Matrix operations and solving systems of linear equations

10 Lectures

Rank of a matrix (echelon form and normal form), consistency of linear system of equations, eigen values and eigen vectors of a matrix, properties of eigen values.
(Sections 2.7, 2.10, 2.13, 2.14 of the textbook)

Learning Outcomes:

At the end of this unit, the student will be able to
1. express the rank of a matrix using elementary operations (L2)
2. discuss the consistency of systems of linear equations (L2)
3. determine eigen values and eigen vectors of a matrix (L3)

UNIT- V: Cayley-Hamilton theorem and Quadratic forms   10 Lectures

Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, reduction to diagonal form, reduction of quadratic form to canonical form, nature of the quadratic form.
(Sections 2.15- 2.18 of the textbook)

Learning Outcomes:

At the end of this unit, the student will be able to
1. determine the inverse and power of a matrix using Cayley-Hamilton theorem (L3)
2. model an orthogonal matrix to obtain the diagonal form (L3)
3. discuss the nature of a quadratic form (L2)

Textbook:

B. S. Grewal, "*Higher Engineering Mathematics*", 44th edition, Khanna Publishers, 2017.

References:

1. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 10th edition, John Wiley & Sons, 2011.

2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th edition, Cengage Learning, 2011.

ENGINEERING CHEMISTRY

Course Code: 19BC1101	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course outcomes: At the end of the Course the student shall be able to:

CO1: recall the principles; explain the working and design of energy storage devices.

CO2: compare different types of cells and explain the merits of fuel cells.

CO3: list various sources of renewable energy and applications of solar energy

CO4: classify the polymers and can apply to specific purposes

CO5: distinguish between nano clusters &nano wires, Molecular Machines & Switches

Unit- I   **10 Lectures**

ELECTROCHEMICAL ENERGY SYSTEMS- I

Introduction-Electrode potential, origin and measurement, Nernst Equation for a single electrode; Types of Reference Electrodes -Hydrogen and Calomel electrode; Electrochemical Cell, Galvanic Cell vs Electrolytic Cell, Electrochemical conventions, EMF of a cell; Concentration Cells; Types of Ion Selective Electrodes - glass membrane electrode-pH measurement, polymer membrane electrodes (nafion).

Learning outcomes:

After the completion of the Unit, the student will be able to

1. illustrate the construction of concentration cells. (L2)
2. explain the significance of electrode potentials.(L2)
3. compare different types of cells and batteries. (L2)
4. classify ion selective electrodes. (L2)

Unit-II   **10 Lectures**

ELECTROCHEMICAL ENERGY SYSTEMS - II

Batteries- primary cells- Dry/Leclanche cell, Alkaline cells (Zn-HgO cell, Zn-AgO cell) Secondary cells– Lead acid battery, Ni-Cd battery, Lithium-ion battery, metal air battery; Fuel cells- Introduction, merits of fuel cells, hydrogen - oxygen fuel cell- Alkaline fuel cell, phosphoric acid fuel cell, propane and oxygen fuel cell .

Learning outcomes:

After the completion of the Unit, the student will be able to

1. classify different types of batteries. (L2)
2. explain the concepts involved in the construction of lithium cells. (L2)
3. compare the merits of different fuel cells. (L2)
4. apply redox principles for construction of batteries and fuel cells. (L3)

Unit- III   10 Lectures
ENERGY SOURCES AND APPLICATIONS

Introduction- fossil and renewable energy; Sources of renewable energy, Solar energy- Silicon Photovoltaic cells - manufacture by chemical vapour deposition method and applications; Band theory of solids, Doping of Silicon- p and n type semiconductors; p-n junction.

Learning outcomes
After the completion of the Unit, the student will be able to
1. list different renewable sources of energy. (L1)
2. explain how photovoltaic cells convert light into energy. (L2)
3. compare p and n type semiconductors. (L2)
4. illustrate the construction of PV cell. (L2)

Unit-IV   10 Lectures
POLYMER CHEMISTRY

Introduction to polymers - functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereo specific polymerization).

Plastics - Thermoplastic and Thermosetting, preparation, properties and applications of – Bakelite, urea-formaldehyde polymer, Nylon-66.

Elastomers-preparation, properties and applications of Buna-S, Buna-N.

Conducting polymers – Preparation, properties and applications of polyacetylene, polyaniline, polypyrroles.

Learning Outcomes:
At the end of this Unit, the students will be able to
1. explain different types of polymers and their applications (L2)
2. explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres (L2)
3. describe the mechanism of conduction in conducting polymers (L2)
4. discuss Buna-S and Buna-N elastomers and their applications (L2)

Unit – V   10 Lectures
NANOMATERIALS AND MOLECULAR MACHINES

Nanomaterials: Introduction to nanomaterials - nanoparticles, nanoclusters, fullerenes, carbon nanotubes (CNT) and nanowires; Synthesis of nanomaterials - Sol-gel method, Reverse micellar method; Variation of colour of gold nanoparticles – quantum confinement – qualitative picture based on band diagram; Applications of nanomaterials in wastewater treatment, lubricants and engines.

Molecular machines-Introduction, types.

Learning outcomes:

After the completion of the Unit, the students will be able to

1. classify nano materials. (L2)
2. explain the synthesis and characterization methods of nano materials. (L2)
3. apply the concepts of artificial molecular machines (L3)
4. use nano materials in wastewater treatment other applications (L3)

Text Books
1. P.C. Jain and M. Jain, *Engineering Chemistry*, 15th edition, Dhanapat Rai & Sons, Delhi , 2014.
2. B.S Murthy and P. Shankar, *A Text Book of Nano Science and Nano Technology*, University Press , 2013.

Reference Books
1. O.G.Palanna, *Engineering Chemistry,* Tata McGraw Hill Education Pvt Ltd, 2009.
2. SashiChawla, *A Textbook of Engineering Chemistry,* DhanapathRai and sons, 2003.
3. S.S. Dara, *A Textbook of Engineering Chemistry*, S.Chand& Co , 2010

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code: 19EE11D2   **L   T   P   C**

                                                             3   0   0   3

Course Outcomes: At the end of the Course the student shall be able to

CO1: Analyze the behavior of an electrical circuit.

CO2: Measure the performance quantities such as losses, efficiency of DC machines

CO3: Measure the performance quantities such as losses, efficiency of AC machines

CO4: Understand the importance and application of p-n junction diode

CO5: Evaluate the configurations and applications of Op-Amps.

UNIT-I   10 Lectures

BASIC LAWS AND THEOREMS

Ohm's law, Kirchoff's Laws, series and parallel circuits, source transformations, delta-wye conversion. Mesh analysis, nodal analysis. Linearity and superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem with basic problems.

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

1. apply Ohms and Kirchhoff's Laws (L3)
2. analyze theorems such as Linearity & superposition theorem, Thevenin's& Norton's theorem and maximum power transfer theorem. (L4)
3. determine the current, voltage and power in a given electrical circuit (L3)

UNIT-II   10 Lectures

DC MACHINES

Constructional features induced EMF and torque expressions with simple problems, different types of excitation, performance characteristics of different types of dc machines, 3-point starter, losses and efficiency, efficiency by direct loading with basic problems

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

1. understand the constructional features of DC machines. (L2)
2. analyze EMF, torque and performance characteristics of DC machines. (L4)
3. estimate losses and efficiency of electrical machines. (L3)

UNIT-III   10 Lectures

AC MACHINES

Transformers: Constructional details, EMF equation, voltage regulation, losses and efficiency, open/short- circuit tests and determination of efficiency with basic problems.

Three Phase Induction Motors: Construction, working principle, Torque and Torque-Slip characteristics, efficiency with basic problems.

Synchronous Motor: Construction, EMF Equation, working principle.

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

1. outline the constructional details and principle of transformers. (L2)
2. analyze the efficiency and voltage regulation of a transformer. (L4)
3. explain the principle of three phase induction motor and synchronous motor. (L2)

UNIT-IV   10 Lectures

SEMICONDUCTOR DEVICES

p-n Junction diode - Basic operating principle, current-voltage characteristics, rectifier circuits (half-wave, full-wave, rectifier with filter capacitor), Zener diode as Voltage Regulator; Metal oxide semiconductor field effect transistors (MOSFET): Operation of NMOS and PMOS FETs, MOSFET as an amplifier and switch

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

1. analyze the device structure, operation and characteristics of a p-n junction diode. (L4)
2. apply p-n diodes for various applications. (L3)
3. explain the construction, operation and applications of MOSFETs (L2)

UNIT-V   10 Lectures

OPERATIONAL AMPLIFIERS

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

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

1. illustrate the operation of Op Amps. (L2)
2. explain different modes of operation of Op Amps. (L2)
3. make use of Op Amp in different applications. (L2)

TEXT BOOKS:

1. V. K. Mehta, Rohit Mehta, *Principle of electrical Engineering and electronics*, 3rd edition, S. Chand Publishing, New Delhi, 2016.(Unit-1, 2 and 3)
2. Adel S. Sedra and Kenneth C. Smith, *Microelectronic Circuits,* 6th edition, Oxford University Press, 2014. (Unit-4 & 5)

REFERENCES:

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

COMMUNICATIVE ENGLISH LAB

Course Code: 19HE1102   **L   T   P   C**

                                                    0   0   3   1.5

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

CO1: summarize formal, semi-formal and informal speeches by native
   speakers
CO2: use appropriate dialogues in formal and informal contexts
CO3: demonstrate oral skills in group discussions and debates
CO4: use stress and intonation in connected speech in tune with IELTS,
   & TOEFL
CO5: demonstrate formal oral presentation and PPT skills

List of Activities

1. **Listening for formal introductions/self introductions** –students should listen to videos on formal self introductions and learn to introduce themselves; they also practise grammar and vocabulary exercises on computers.

2. **Listening to TED talks and answering short questions** - Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions; they also practise grammar and vocabulary exercises on computers.

3. **Listening to inspiring speeches** - Answering a series of questions about main idea and supporting ideas after listening to audio texts; they also practise grammar and vocabulary exercises on computers.

4. **Role Play** – students need toimagine a situation, assume different roles and enact them in pairs.

5. **Group Discussions on specific topics** – students have to form into groups and learn about DOs and Don'ts of GD and discuss on specific topics.

6. **Introduction to the Sounds of English: Vowels** – students should listen to the vowel sounds on computers and familiar themselves with them.

7. **Introduction to the Sounds of English: Consonants** – students are required to listen to the consonant sounds on computers and familiar themselves with them.

8. **Narrating short stories –** students have to write a short story and narrate it individually or in pairs; they also practise grammar and vocabulary exercises on computers.

9. **Narrating one's experiences -** students should recall some unforgettable experiences individually or in pairs; they also practise grammar and vocabulary exercises on computers.

10. **Pronunciation: Word stress** – students have to listen to the videos by native and non-native speakers and articulate words following appropriate rules of word stress.

11. **Pronunciation: Sentence stress** - students listen to the videos by native and non-native speakers and articulate words following appropriate rules of sentence stress.

12. **Debates –** students participate in debates after watching model debates; they also practise grammar and vocabulary exercises on computers.

13. **Oral presentations –** students prepare for presentations on the lives of remarkable engineers and perform individually; they also practise grammar and vocabulary exercises on computers.

14. **PPT presentations –** students make Power Point Presentations and present them in teams

15. **Listening for rhythm –** students listen to speeches by native speakers, familiarize themselves with rhythm; they also practise grammar and vocabulary exercises on computers.

16. **Listening for intonation -** students listen to speeches by native speakers familiarize themselves with intonation; they also practise grammar and vocabulary exercises on computers.

Textbook:
Hashemi, Louise & Thomas, Barbara.Cambridge Objective PET – Student's Book 2nd Ed., Cambridge University Press, 2018.

Reference Books:
1. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.

2. Hancock, Mark. English Pronunciation in Use. 10th Ed, CUP. 2003.

3. James, Ioan. Remarkable Engineers. Cambridge University Press, 2010.

Sample Web references:

Listening

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

Speaking

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

All Skills

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

Online Dictionaries

- Cambridge dictionary online
- MacMillan dictionary
- Oxford learner's dictionaries

ENGINEERING CHEMISTRY LAB

Course Code: 19BC1102	**L**	**T**	**P**	**C**
	0	**0**	**3**	**1.5**

Course outcomes: At the end of the Course the student shall be able to
CO1: determinethe metal ions by titrimetry
CO2: determine the strength of acids, bases and water quality parameters
CO3: explainthe functioning of the instruments such as pH meters, Conductometer and
      Potentiometer.
CO4: determine the physical properties like surface tension and viscosity
CO5:prepare polymeric resins and nanoparticles

LIST OF EXPERIMENTS
1. Determination of Zinc by potassium Ferrocyanide.
2. Determination of Total hardness of a groundwater sample
3. Determination of copper in brass
4. Determination of active chlorine content in Bleaching powder
5. Determination of sodium carbonate and sodium bicarbonate in a mixture
6. Determination of chromium (VI) by hypo
7. Determination of sulphuric acid in lead-acid storage cell.
8. Determination of strength of an acid by pH metric method.
9. Determination of Fe(II) in Mohr's salt by potentiometric method.
10. Determination of citric acid in a citrus fruit by conductometric method.
11. Determination of viscosity of a liquid.
12. Determination of surface tension of a liquid**.**
13. Preparation of gold nanoparticles.
14. Construction of Galvanic cell.
15. Determination of Fe(III) by spectrophotometry.
16. Preparation of Nylon polymer.

Note: Any **TWELVE** of the aboveexperiments to be conducted

Text Books
1. N.K Bhasin and Sudha Rani, *Laboratory Manual on Engineering Chemistry* 3rd edition, DhanpatRai Publishing Company , 2007.

Reference Books
1. A.I.Vogel, "*A Text book of quantitative chemical analysis*", 6th edition, Pearson Education Pvt. Ltd., 2002

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course Code: 19EE11D4   **L   T   P   C**

                                                        0   0   3   1.5

Course Outcomes: At the end of the Course the student shall be able to
CO1: Analyze the DC Theorems
CO2: Obtain the performance characteristics of DC machines and AC Machines
CO3: Obtain the characteristics of Diode and LED
CO4: Apply the devices such as Diode, MOSFET, OPAMP as a Rectifier, Amplifier and inverter Gate
CO5: Simulate Diode, Transistor, MOSFET , OPAMP circuits using suitable software

List of Experiments:

1. Verification of Kirchhoff's Laws.
2. Verification of Superposition Theorem.
3. Verification of Thevenin's Theorem.
4. Speed Control of DC shunt motor.
5. OC and SC Tests on a single phase transformer.
6.   Brake Test on DC shunt motor.
7. Current Voltage Characteristics of a p-n Junction Diode/LED.
8. Diode Rectifier Circuit- Half wave rectifier
9. Diode Rectifier circuit- Full wave bridge rectifier
10. Voltage Regulation with Zener Diodes.
11. Observe output waveform of Inverting amplifier with Op-Amps
12. Observe output waveform of Non-inverting Amplifier with Op-amps.

In addition to the above experiments, at least any one or two of the experiments from the following list are required to be performed

13. Open Circuit characteristics of separately excited DC generator.
14. Design of a MOSFET amplifier.
15. Operate MOSFET as inverter/NOR gate.
16. Simulation experiments using PSPICE

    (a) Diode and Transistor Circuit Analysis.

    (b) MOSFET Amplifier design.

17. Inverting and Noninverting Amplifier Design with Op-amps.
18. Swinburn's test on DC Shunt Machine.

References:

1. D. P. Kothari and I. J. Nagrath, *Basic Electrical Engineering*, Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, *Basic Electrical Engineering*, McGraw Hill, 2009.
3. Adel S. Sedra and Kenneth C. Smith, *Microelectronic Circuits*, 6th edition, Oxford University Press, 2014.

IT WORKSHOP

Course Code: 19IT1101

L	T	P	C
0	0	3	1.5

Course Outcomes:

At the end of the Course the student shall be able to

CO1: demonstrate the installation of Operating Systems and troubleshooting.

CO2: apply basic LINUX commands to perform various operations.

CO3: make use of office tools in crafting word documents, spreadsheets and power point presentations using Microsoft office tools and LaTeX.

CO4: demonstrate the connection of the Local Area Network and access the Internet

CO5: utilize Cloud based productivity enhancement and collaboration tools.

LIST OF EXPERIMENTS

1. Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

2. Every student should individually install operating systems like Linux and MS windows on the personal computer. The system should be configured as a dual boot with both windows and Linux

3. Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

4. Using MS word perform the following

   Formatting Fonts in word, Drop Cap in word, Columns, Tables, Borders and Colors, Inserting Header and Footer, Newspaper columns, clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs, Hyper linking.

5. Using MS Excel perform the following

   Cell Referencing, Formulae in spreadsheet – average, standard deviation, Charts, Renaming and Inserting worksheets, Count function, Sorting, Conditional formatting.

6.	Using MS Powerpoint perform the following

	PPT Orientation, Slide Layouts, Auto Shapes, Lines and Arrows, Inserting Images, Tables and Charts.

7.	Practice the following LINUX Commands

	Help commands: whatis, man, info.Filesystem: ls, mkdir, cd, chmod, rm, mv, bc, who, whoami, ps, du, df, cal, date. Filters and Text processing: echo, cat, rev, head, tail, nl, cut, cp, paste, wc, cmp, diff, tr, ln

8.	Practice the following LINUX Commands

	File compression: tar, compress, uncompress., Miscellaneous: apt-get, vi editor. Networking Commands :ping, ssh, ifconfig, netstat, traceroute.

9.	Create a simple document using LaTeX that consists of Document structure, typesetting, tables.

10.	Create a simple document using LaTeX that consists of figures, equations and References

11.	Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP settings, customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash

12.	Using Cloud based collaboration tools perform the following

- Store, sync and share files with ease in the cloud using **Google Drive**

- Document creation and editing text documents in your web browser using **Google docs**

- Handle task lists, create project plans, analyze data with charts and filters using **Google Sheets**

- Manage event registrations, create quizzes, and analyze responses using **Google Forms.**

Additional Experiments:

1. Setup and configure new virtual machine.

2. Compile and run simple C programs in Linux environment using the vi editor.

3. Edit photos/images in various formats using photo editing tools.

4. Keep track of important events, sharing one's schedule using Google Calendar.

Text Books:

1. Peter Norton, *Introduction to Computers*,7th Edition, SIE Publishers, 2010.

2. ITL Education Solutions Limited, *Introduction to Information Technology*, 2nd Edition Pearson Education, 2012.

Web References:
1. *LATEX for Beginners* Workbook Edition 5, March 2014Document Reference: 3722-2014

2. https://explorersposts.grc.nasa.gov/post631/2000/2007/computer_basics/ComputerPorts. .doc

3. https://explorersposts.grc.nasa.gov/post631/2006/2007/bitsnbyte/Digital_Storage_Basics. .doc

4. https://www.thegeekstuff.com/2009/07/linux-ls-command-examples

5. https://www.pcsuggest.com/basic-linux-commands/

6. https://www.linuxtechi.com/25-find-command-examples-for-linux-beginners/

7. https://gsuite.google.com/learning-center/products/#!/

II SEMESTER

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Code: 19BM1102

L	T	P	C
3	1	0	4

Course Outcomes:

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

CO1: solve first order differential equations arising in various engineering fields

CO2:solve linear differential equations of higher order and use the knowledge to study certain problems in engineering.

CO3: compute improper integrals using beta and gamma functions and determine best fit curve for a tabulated data.

CO4: perform the technique of Laplace transform to solve engineering problems.

CO5: extend calculus to vector functions and interpret vector integral theorems.

UNIT I: First order differential equations and applications   10 Lectures

Linear and Bernoulli differential equations, exact differential equations, equations reducible to exact equations, orthogonal trajectories, simple electric circuits, Newton's law of cooling. (Sections 11.9 - 11.12, 12.3, 12.5, 12.6 of the textbook)

Learning Outcomes:

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

1. solve first order differential equations using various techniques (L3)
2. model certain engineering problems (L3)
3. discuss the method of finding orthogonal trajectories of a function (L2)

UNIT II: Higher order Linear differential equations   10 Lectures

Linear differential equations of higher order with constant coefficients, complete solution, operator D, rules for finding the complementary function, inverse operator, rules for finding the particular integral, method of variation of parameters, Cauchy's linear equation, L-C-R circuit problems.

(Sections 13.1 - 13.7, 13.8(i), 13.9(i), 14.5(ii) of the textbook)

Learning Outcomes:

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

1. identify the solution of a linear differential equation of higher order (L1)
2. use the method of variation of parameters to find particular solution of second order differential equations (L3)

3. solve a higher order differential equation by analyzing a physical situation (L3)

UNIT III: Special functions andCurve fitting   **10 Lectures**
Beta and gamma functions, relation between beta and gamma functions. Introduction to method of least squares, fitting a straight line, power curve, exponential curve and parabola. (Sections 7.14 - 7.16,24.1, 24.5, 24.6 of the textbook)

Learning Outcomes:
At the end of this unit, the student will be able to
1. discuss improper integrals by using beta and gamma functions (L2)
2. demonstrate the least squares method (L3)
3. describe several types of curves for a tabulated data (L2)

UNIT IV: Laplace Transforms   **10 Lectures**
Definition of Laplace transform, existence conditions, properties of Laplace transform, periodic functions, transforms of derivatives, transforms of integrals, multiplication by t, division by t, evaluation of integrals by Laplace transforms, inverse Laplace transforms, convolution theorem (without proof), unit step function, unit impulse function, applications to ordinary differential equations.
(Sections 21.1-21.5, 21.7-21.15, 21.17, 21.18 of the textbook)

Learning Outcomes:
At the end of this unit, the student will be able to
1. apply Laplace and inverse Laplace transforms to various functions (L3)
2. discuss improper integrals using Laplace transforms (L2)
3. solve an ordinary differential equation through Laplace transforms (L3)

UNIT V: Vector Calculus   **10 Lectures**
Scalar and vector point functions, gradient, directional derivative, divergence and curl, Line integral - circulation, work done, surface integral-flux, volume integral, Green's theorem in the plane, Stoke's theorem and the Divergence theorem (without proof).
(Sections 8.4-8.7, 8.11- 8.16 of the textbook)

Learning Outcomes:
At the end of this unit, the student will be able to
1. demonstrate the concepts of Gradient, Divergence and Curl (L3)
2. discuss the work done in moving a particle along a path (L2)
3. apply vector integral theorems to multiple integrals (L3)

Textbook:
B. S. Grewal, "*Higher Engineering Mathematics*", 44th edition, Khanna publishers, 2017.

References:
1. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 10th edition, John Wiley & Sons, 2011.

2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

APPLIED PHYSICS

Course Code: 19BP1101   **L   T   P   C**

                                                             3   0   0   3

Course Outcomes:

At the end of the Course the student shall be able to
CO1: realize the principles of optics in designing optical devices
CO2: convert the knowledge of basic principles of dielectrics magnetism to design
electrical and storage devices
CO3: apply electromagnetic wave propagation in different guided media
CO4: calculate conductivity of semiconductors
CO5: interpret the difference between normal conductor and superconductor, demonstrate
the application of nanomaterials

UNIT-I: WAVE OPTICS   10 Lectures

Interference of light-Principle of Superposition-Interference in thin films (reflected light)-
Newton's Rings-Applications of Interference-Determination of Wavelength, Diffraction-
Fraunhofer Diffraction-Single slit Diffraction -Diffraction Grating – Grating Spectrum -
Polarization-Polarization by reflection, refraction and double refraction-Nicol's Prism-Half
wave and Quarter wave plate- applications of Polarization.

Text Book 1:Sec.:8.2, 8.8.1, 8.8.2, 8.11.(1 - 4), 8.12.(1, 4), 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.8.1,
10.2, 10.6.1, 10.6.1.1, 10.6.2, 10.6.5, 11.5, 11.9.1, 11.9.2, 10.10.(i, ii)

Learning Outcomes: At the end of unit the student will be able to

1. apply the phenomena of interference in anti reflection coatings and filters (L3)
2. analyze the differences between interference and diffraction (L4)
3. illustrate the concept of polarization of light and its applications (L2)
4. classify the production and detection of different polarized light (L4)

UNIT-II: DIELECTRICS AND MAGNETICS   10 Lectures

Introduction to Dielectrics-Electric polarization-Dielectric polarizability, Susceptibility and
Dielectric constant- Types of polarizations, mathematical derivation for electronic
polarizability -Frequency dependence of polarization-Lorentz(internal) field- Claussius -
Mossotti equation-Applications of Dielectrics, Introduction to Magnetics-Magnetic dipole
moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent
magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism
(qualitative)-Hysteresis-soft and hard magnetic materials-Ferrites-Magnetic device
applications (transformer core and hard disc).

Text Book 1: Sec : 40.1, 40.2, 40.4, 40.5, 40.9, 40.13, 40.13.1, 40.15, 40.17, 40.18, 40.21(i, ii), 41.1, 41.2, 41.4, 41.8.1, 41.14.1, 41.14.2, 41.12, 41.16 (i, iia) and Table 41.1

Learning Outcomes: At the end of unit the student will be able to

1. explain the concept of dielectric constant and polarization in dielectric materials (L2)
2. interpret Lorentz field and Claussius- Mosotti relation (L2)
3. classify the magnetic materials based on susceptibility and their temperature dependence (L2)
4. explain the applications of dielectric and magnetic materials (L2)

UNIT-III: ELECTROMAGNETIC WAVES & FIBER OPTICS   10 Lectures

Divergence and Curl of Electric and Magnetic Fields -Maxwell's Equations- Electromagnetic wave propagation in free space- Poynting's Theorem. Introduction to Optical Fibers-Total Internal Reflection-Propagation of electromagnetic waves through optical fiber-Critical angle of propagation-Acceptance angle -Numerical Aperture- Classification of fibers based on Refractive index profile, modes-importance of V number- Medical Application (endoscopy) -Fiber optic Sensors- Block Diagram of Fiber optic Communication and its advantages.

Text Book 2: Sec: 11.4, 11.5

Text Book 1: Sec:6.13, 6.14, 7.4, 7.7, 47.1, 47.2, 47.3, 47.4, 47.4.1, 47.4.2, 47.6, 47.10 (i, ii), 47.11 (1, 2, 3), 47.13, 47.19.1, 47.22.(1a, 2), 47.20, 47.21

Learning Outcomes: At the end of unit the student will be able to

1. apply the Gauss Theorem for divergence and Stokes Theorem for curl (L3)
2. assess the electromagnetic wave propagation in free space and its power (L3)
3. explain the working principle of optical fibers and its classification based on refractive index profile and mode of propagation (L2)
4. identify the applications of optical fibers in medical, communication and other fields (L2)

UNIT-IV: SEMICONDUCTORS   10 Lectures

Classification of solids based on energy bands – Intrinsic semiconductors –Electrical conductivity- derivation of density of charge carriers (electron) -Fermi energy - extrinsic semiconductors - N-type & P-type - Density of charge carriers (Qualitative)- Dependence of Fermi energy on temperature and carrier concentration -Hall effect- Hall coefficient - Applications of Hall effect - Applications of Semiconductor.

Text Book 1:Sec: 36.7, 36.8, 37.3, 37.7, 37.8.1, 37.11, 37.15, 37.16.2, 37.17.1, 37.23, 37.24, 37.28.(1 - 4), 37.28.13

Learning Outcomes:
The students will be able to
1. classify the energy bands of semiconductors (L2)
2. outline the properties of n-type and p-type semiconductors (L2)
3. identify the type of semiconductor using Hall effect (L2)
4. list the applications of semiconductors in electronic manufacturing (L2)

UNIT-V: SUPERCONDUCTORS AND NANOMATERIALS   10 Lectures

Superconductors-Properties: Zero resistance, Critical temperature, Critical magnetic field, Critical current density, Meissner effect- Type-I and type-II Superconductors -BCS Theory- Josephson effect (AC & DC)-High T Superconductors- Applications of superconductors: transformers and electrical machines, magLev trains, SQUID.
Basics of Nanomaterials – Top-down and bottom-up approaches, Preparation (sol-gel & ball milling) – Carbon Nanotubes- Applications of Nano materials (better insulating materials, elimination of pollutants, high energy density batteries, nanomachines and nanodevices).

Text Book 1:Sec: : 42.2, 42.4.1, 42.4.3, 42.4.4, 42.4.5, 42.4.6, 42.6, 42.7, 42.8, 42.10 (ii, vii, viii), 49.3, 49.5.1(iii), 49.5.2 (iv), 49.9, 49.17(ii, v, vii, xiv)

Learning Outcomes:

The students will be able to
1. explain electrical resistivity of solids with temperature (L2)
2. classify superconductors based on Meissner effect (L2)
3. explain BCS theory, Josephson effect and high T_c materials (L2)
4. understand the basics and preparation methods of nanomaterials (L2)
5. identify the applications of nanomaterials in various fields (L3)

Text Books:
1. M. N. Avadhanulu, P. G. Khirsagar, and T. V. S. Arun Murthy, *A textbook of Engineering Physics*, Revised edition (11e), S. Chand and Company Ltd., 2019.
2. H. K. Malik and A. K. Singh, *Engineering Physics*, 2nd Edition, McGraw Hill Education Pvt Ltd., 2018.

Reference Books:

1. D. J.Griffiths, *Introduction to Electrodynamics*, 4th Edition, Pearson Education, 2014.
2. G. Keiser, *Optical Fiber Communications*, 4th Edition, Tata McGrawHill, 2008.
3. C. Kittel, *Introduction to Solid State Physics*, Wiley Publications, 2011.
4. S. M. Sze, *Semiconductor devices-Physics and Technology*, Wiley Publications, 2008.
5. T. Pradeep, *A Textbook of NanoScience and NanoTechnology*, Tata McGrawHill, 2013.

PROBLEM SOLVING USING C

Course Code: 19CT1101   **L   T   P   C**

                                                              3   1   0   4

Course Outcomes: At the end of the course the student shall be able to

CO1: analyze the problem and choose appropriate algorithm to solve it.

CO2: design modular programs involving input output operations, decision making and looping constructs by choosing the appropriate data types for writing programs in C language.

CO3: apply the concept of arrays and string handling in problem solving.

CO4: apply the concept of pointers for dynamic memory management.

CO5: design programs to store data in structures and files.

UNIT-I   **10 Lectures**

PROBLEM SOLVING: Introduction to computer based problem solving, Program design and implementation issues, Algorithms for problem solving: Simple problems based on number theory, Operations on ordered set of elements, Solving quadratic equations, Operations on matrices.

(Scope: Chapter 2 of text book 2)

Learning Outcomes: At the end of the module the student will be able to

1. identify the requirements to solve a problem (L2)
2. choose appropriate design to solve the problem (L3)
3. classify different programming environments (L2)
4. analyze and solve the problem with suitable algorithms (L4)

 UNIT-II   **10 Lectures**

INTRODUCTION: An Overview of C, Basic Data types, Modifying the Basic Data Types, Identifier Names, Variables, Type Qualifiers, Constants, Operators, Expressions, Selection, Iteration and Jump Statements.

FUNCTIONS: Designing Structured Programs, Functions Basics, Standard Library Functions, User Defined Functions, Categories of Functions, Parameter Passing Techniques, Scope, Scope Rules, Storage Classes and Type Qualifiers, Recursion: Recursive Functions, Preprocessor Directives.

Learning Outcomes: At the end of the module the student will be able to

1. choose appropriate conditional and unconditional control statements in solving a

problem. (L3)
2. demonstrate modular programming approach. (L3)
3. understand the scope and lifetime of a variable. (L2)
4. understand the concepts of preprocessor directives. (L2)
5. demonstrate usage of recursive functions. (L3)

UNIT-III   10 Lectures

ARRAYS: Concepts, Using Arrays in C, Inter-Function Communication using Arrays, Array Applications, Two-Dimensional Arrays, Introduction to Multidimensional Arrays.

STRINGS – Concepts, C Strings, String Input / Output Functions, Arrays of Strings, String Manipulation Functions.
Learning Outcomes: At the end of the module the student will be able to
1. apply the basic concepts of arrays in solving problems. (L3)
2. demonstrate programs of various operations on arrays. (L3)
3. demonstrate programs that mimics string functions in solving problems.(L3)

UNIT-IV   10 Lectures

POINTERS: Introduction, Pointer Arithmetic, Pointers for Inter-Function Communication, Pointers to Pointers, Arrays and Pointers- Array of Pointers, Pointer to Array, Pointers to void, Pointers to Functions, Command Line Arguments. Dynamic Memory Allocation Functions, Programming Applications.
Learning Outcomes: At the end of the module the student will be able to
1. apply the concepts of pointers with respect to arrays and functions. (L3)
2. demonstrate programs that run through command line arguments. (L3)
3. demonstrate the usage of dynamic memory allocation functions to solve problems. (L3)

UNIT-V   10 Lectures

STRUCTURES, UNIONS AND ENUMERATED TYPES - Type Definition (typedef), Enumerated Types. Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions.

FILES: Introduction to Files, Modes of File operations, Text and Binary Files, file I/O Operations
Learning Outcomes: At the end of the module the student will be able to
1. demonstrate programs that use user defined data types to write programs. (L3)
2. demonstrate the usage of pre-defined file I/O functions to perform operations on files. (L3)
3. demonstrate programs that solve real time problems using structures. (L3)

Text Books:
1. Ashok N Kamthane, Amit Ashok Kamthane, *Programming in C*, 3rd Edition, Pearson

Publication 2015.
2. HarshaPriya, R. Ranjeet, *Programming and Problem Solving Through "C" Language*,
New Edition, Fire Wall Media 2015. (For Unit 1)
3. Herbert Schildt, *The Complete Reference*, C 4th Edition, Tata McGraw-Hill 2000.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, 2nd Edition, Prentice-Hall, 2006.
2. Rajaraman V, *The Fundamentals of Computer*, 4thEdition , Prentice-Hall of India 2006.
3. Steve Oualline, *Practical C Programming*, 3rd Edition, O'Reilly Press 2006.
4. Jeri R. Hanly, Elliot B. Koffman, *Problem Solving and Program Design in C*,5th Edition, Pearson Education 2007.
5. Balagurusamy E, *Programming in ANSI C*, 4th Edition, Tata Mcgraw Hill. 82, 2008.
6. Gottfried, *Programming with C*, 3rd Edition , Tata Mcgraw Hill, 2010.
7. R G Dromey, *How to Solve it by Computer*, 1stEdition , Pearson Education 2006.

SWITCHING THEORY AND LOGIC DESIGN

Course Code: 19EC11D1   **L   T   P   C**

                                                     3   0   0   3

Course Outcomes: At the end of the course the student will be able to
CO1: describe the significance of number systems, conversions, binary codes
CO2: discuss different simplification methods for minimizing boolean functions
CO3: outline the concepts of various combinational circuits
CO4: illustrate the knowledge of sequential logic design, analyze the operation of flip-
    flops, registers and counters
CO5: classify Mealy & Moore models and Simplify & Design Sequential machines

UNIT-I   8 Lectures
Number Systems and Codes
Introduction to number systems, representation of negative numbers, binary arithmetic,
binary codes, Error detecting and correcting codes.

Learning outcomes: At the end of this unit, the student will be able to
1. understand the advantages of using different number systems. (L2)
2. describe the usefulness of different binary codes. (L2)
3. summarize the error detection and correction concepts. (L2)

UNIT-II   10 Lectures
Boolean Algebra And Switching Function
Fundamental postulates of Boolean algebra, De-Morgan theorems, switching functions,
Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal
gates, NAND/NOR realizations. K-map method, Prime implicants, don't care combinations,
Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification
rules.

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

1. apply basic laws and De Morgan's theorems to simplify Boolean expressions. (L3)
2. understand concepts of sum-of-products and product-of-sums representations. (L2)
3. examine the efficiency of K- Map & Tabular methods of minimizing logic functions.
   (L3)

UNIT-III   10 Lectures
Combinational Logic Design
Adders, Subtractors, Multiplexer, De-Multiplexer, MUX Realization of switching functions, Encoder, Decoder, Parity bit generator, Code converters, Basic PLD's: ROM, PROM, PLA, PAL Realizations**.**

Learning outcomes: At the end of this unit, the student will be able to
1. apply Boolean algebra for describing combinational digital circuits (L3)
2. analyze standard combinational circuits such as adders, subtractors, comparators. (L4)
3. demonstrate the digital systems using PLDs (L3)

UNIT-IV   12 Lectures
Sequential Circuits
Latches, SR Flip-flops, JK Flip-flops, D Flip-flop, T-Flip-flop, Race around condition, Master-Slave Flip-flop, Shift Registers, Asynchronous and Synchronous Counters, Ring Counter, Jhonson Counter.

Learning outcomes: At the end of this unit, the student will be able to
1. understand the principle of Flip-Flops and Latches (L2)
2. summarize the concepts of Shift Registers. (L2)
3. demonstrate the Counters. (L3)

UNIT-V   10 Lectures
Finite State Machines
Analysis and Design of Synchronous Sequential Circuits: Moore and Mealy machine models, State Equations, State Table, State diagram, State reduction & assignment, Synthesis of synchronous sequential circuits- serial binary adder, sequence detector, and binary counter, Partition technique for completely specified sequential machines.

Learning outcomes: At the end of this unit, the student will be able to
1. understand Moore and Mealy machine models (L2)
2. outline the concepts of State assignment & Reduction (L4)
3. discuss the synthesis of synchronous sequential circuits(L4)

Text Books:
M. Morris Mano and Michael D. Ciletti, *Digital Design*, 4th Edition, Pearson Education, 2013.

References:
1. A. Anand Kumar, *Switching Theory and Logic Design*. PHI Learning Pvt. Ltd., 2014.

2. Z. Kohavi, *Switching and Finite Automata Theory,* Tata McGraw Hill,2009

3. Charles H Roth (Jr), Larry L. Kinney, *Fundamentals of Logic Design*, 5thEdition,Cengage Learning India Edition, 2010.

4. John.M Yarbrough, *Digital Logic Applications and Design*, Thomson Learning, 2006.

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BASIC ENGINEERING WORKSHOP

Course Code: 19ME1101

L	T	P	C
0	0	3	1.5

Course Outcomes:

At the end of the Course the student will be able to

CO1: apply wood working skills in real world applications.

CO2: build different parts with metal sheets in real world applications.

CO3: apply fitting operations in various applications.

CO4: apply different types of basic electric circuit connections.

CO5: assemble and disassemble light engineering assemblies

LIST OF EXPERIMENTS

Wood Working:

Familiarity with different types of woods and tools used in wood working and making of the following joints

1.   Half – Lap joint

2.   Mortise and Tenon joint

3.   Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Development of following sheet metal jobs from GI sheets and soldering of the joints

4.   Tapered tray

5.   Conical funnel

6.   Elbow pipe

Fitting:

Familiarity with different types of tools used in fitting and making of the following fitting joints

7. V-fit

8. Dovetail fit

9. Semi-circular fit

Electrical Wiring:

Familiarity with different types of basic electrical circuits and make the following connections

10. Parallel and series

11. Two-way switch

12. Tube light

13. Residential house wiring using fuse, switch, indicator, lamp and energy meter

Assembling/Disassembling Practice

14. Bicycle

15. Flush tank

16. Wall clock

*Note: Any **TWELVE** of the above experiments to be conducted*

APPLIED PHYSICS LAB

Course Code: 19BP1102   **L   T   P   C**
                                                                                0   0   3   1.5

CO1: interpolate some of the physical parameters based on optical phenomena

CO2: analyze the dielectric behaviour of a material

CO3: identify the characteristics of semiconducting materials

CO4: estimate the strength of magnetic field and asses the losses in magnetization

CO5: demonstrate the mechanical parameters using sensors

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Minimum Deviation method

2. Newton's rings – Radius of Curvature of Plano - Convex Lens.

3. Determination of particle size oflycopodium powder using LASER diffraction.

4. Study of magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.

5. Determination of Energy Band gap of a Semiconductor p - n junction.

6. Determination of wavelength of LASER by using grating.

7. Determination of dielectric constant by charging and discharging method.

8. Determination of resistivity of semiconductor by Four probe method.

9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).

10. Determination of Strain variation using Strain Gauge sensor.

11. Hall effect

12. To determine the energy band of semiconductor by Four probe method.

13. To determine the energy gap of a semiconductor.

14. Measurement of resistance with varying temperature.

*Note: Any **TWELVE** of the above experiments to be conducted*

PROBLEM SOLVING LAB USING C

Course Code: 19CT1102

L	T	P	C
0	0	3	1.5

Course Outcomes:

At the end of the Course the student shall be able to:

CO1: apply the concepts of variables, data types, operators and expressions.
CO2: demonstrate the usage of Conditional and Unconditional statements.
CO3: demonstrate the usage of functions and related functions with respect to arrays and strings.
CO4: implement the concept of pointers and structures.
CO5: demonstrate the usage of files and Command Line Arguments.

List of Programs:

Week 1 (Basic Programs)
1.   C program to display hello world message.
2.   C program to scan all data type variables as input and print it as output.
3.   C program to perform arithmetic operations like +,-,*,/,% on two input variables.
4. C program to perform temperature conversions from Centigrade to Fahrenheit and vice versa.

Week 2 (Programs on Operators)
1. C program to scan an input and perform pre and post increment operation on it and display the result.
2. C program to perform all bit wise operations.
3.   C program to extract the last two digits of a given integer n, where the number of digits should be greater than 2.
4. C program to display the greatest of three numbers using conditional operator.
5. C program to swap two numbers without using third variable.

Week 3 (Programs on Conditional Statements)
1. C program to check whether a given input integer is in between two values x and y.
2. C program to check whether a given character is a vowel or a consonant or a digit or a special symbol.
3. C program to display the nature and roots of a quadratic equation.
4. C program to perform arithmetic operations using switch statement.
5. C program to convert upper case character to lower case and vice versa.

Week 4 (Programs on Loop Statements)
1. C program to print odd numbers between specified ranges.
2. C program to display the factors of a given number and check whether it is a prime or not.
3. C program to display the sum of individual digits of a given integer raised to the power of n. Also check whether the given integer is Armstrong or not.
4. C Program to demonstrate the usage of unconditional control statements.
5. C program to display the following pattern.

<div align="center">

5 4 3 2 1

4 3 2 1

3 2 1

2 1

1

</div>

Week 5 (Programs on Functions)
1. C program to demonstrate the various categories of functions with respect to return type and number of arguments.
2. C program to find the LCM of two numbers using functions.
3. Create a header file which contains the following prototype:
   i.   int factorial (int) ;   // non-recursive function
   ii.   intfactorial_rec(int); //Recursive function
   iii.   int prime (int) ;

   Use the above functions in a C program by including the above header file.
4. C program to display Pascal's triangle using functions.

Week 6 (Programs on Arrays)
1. C program to read n integer values into an array and display them
2. C program to count and display the number of positive, negative, even and odd numbers in a given array of integers and also display their sum.
3. C program to find the smallest and largest numbers in an array of integers.
4. C program to perform addition, multiplication, transpose of given matrices using functions.
5. C program to check whether a given integer exists in a list of numbers and print its index value if it is present, otherwise print "No".

Week 7 (Programs on Strings)
1. C program to convert upper case character to lower case and vice versa in a given string.
2. C program to delete all vowels in a given string and display the remaining string.
3. C program to check whether a given string is palindrome or not.
4. C program that reads two integers as strings and display their sum.

Week 8 (Programs on Strings)
1. C program to demonstrate the usage of at least 10 predefined string handling functions.
2. C program that implements the following user defined string handling functions
   i.   To find the length of the given string
   ii.   To copy the contents of one string to another
   iii.   To reverse the contents of a string
   iv.   To compare two strings
   v.   To concatenate two strings

Week 9 (Programs on Pointers and Dynamic Memory Allocation)
1. C program to demonstrate the usage of pointers.
2. C program that uses dynamic memory allocation functions to add n elements and display their average.
3. C program that performs pointer arithmetic.
4. C program that implements call by reference.

Week 10 (Programs on Pointers)
1. C program to demonstrate the following
   i.   Pointers to Pointers
   ii.   Array of Pointers
   iii.   Pointer to Array
   iv.   Pointers to Functions

Week 11 (Programs on Structures)
1. C program to access and display the members of the structure.
2. C program that demonstrates different ways to access the structure elements using pointers.

Week 12 (Programs on Files)
1. C program to read the contents of a file and display on to output screen.
2. C program to copy the contents of one file to another.
3. C program to count and display the number of characters, words and lines in a file.
4. C program to print last n characters of a file by reading file name and n value from command line.

Programs to be covered beyond syllabus:
1. C program to find the factorial of a given number using recursive and non recursive functions.
2. C program to display the first n terms of the Fibonacci sequence.
Example: If n= 5 it has to print   0   1   1   2   3

3. Write a general-purpose function to convert any given year into its roman equivalent. The following table shows the roman equivalents of decimal numbers:

Decimal	Roman
1	I
5	V
10	X
50	L
100	C
500	D
1000	M

Example:
Roman equivalent of 1988 is MDCCCCLXXXVIII
Roman equivalent of 1525 is MDXXV

4. C program to display upper and lower triangles of a given matrix.
5. C program to add the sum of row wise elements, column wise elements and diagonal elements of a given square matrix and display the result.
6.   C program to check whether the matrix is symmetric or not.
7. Given a positive integer ($<= 1000000$), find the minimum number of bits required to represent it as a binary number.
8.   C program to perform left rotation of the array.
9.   C program to implement binary search
10. C program to sort a given list of values using bubble sort.
11. C program to find the LCM of array of integers
12. C program to find the two's complement of a given binary input.
13. C program to replace all the vowels in a given string with a given character
14. C program to perform arithmetic operations using command line arguments
15. C program that writes the contents to a file and reads the contents from a file using structures.

Text Books:
1. Ashok N Kamthane, Amit Ashok Kamthane, *Programming in C*, 3rd Edition, Pearson Publication 2015.
2. HarshaPriya, R. Ranjeet, *Programming and Problem Solving Through "C" Language*, New Edition, Fire Wall Media 2015.
3. Herbert Schildt, *The Complete Reference*, C 4th Edition, Tata McGraw-Hill 2000.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, 2ndEdition , Prentice-Hall, 2006.
2. Rajaraman V, *The Fundamentals of Computer*, 4thEdition , Prentice-Hall of India 2006.
3. Steve Oualline, *Practical C Programming*, 3rd Edition, O'Reilly Press 2006.
4. Jeri R. Hanly, Elliot B. Koffman, *Problem Solving and Program Design in C*, 5thEdition , Pearson Education 2007.
5. Balagurusamy E, *Programming in ANSI C*, 4th Edition, Tata Mcgraw Hill. 82, 2008.
6. Gottfried, *Programming with C*, 3rd Edition , Tata Mcgraw Hill, 2010.
7. R G Dromey, *How to Solve it by Computer*, 1stEdition , Pearson Education 2006.

ENGINEERING GRAPHICS

Course Code: 19ME1102   **L   T   P   C**

                                                                    1   0   3   2.5

Course Outcomes:

At the end of the Course the student will be able to
CO1:illustrate various curves applied in engineering
CO2: show projections of lines and planes graphically.
CO3: show projections of solids and sections of solids graphically.
CO4:development of surfaces of regular solids using CAD packages.
CO5:use CAD packages to draw isometric and orthographic drawings.

List of Experiments:

LIST OF EXERCISES IN MANUAL DRAWING:

Introduction to engineering graphics and their significance – Conventions in drawing, lettering and BIS conventions.

1. Construction of Conic sections including the rectangular hyperbola- general method only.

2. Cycloid, epicycloids, hypocycloid, involute of the circle.

3. Projections of points in any quadrant.

4. Projections of lines inclined to one plane.

5. Projections of lines inclined to both planes.

6. Projections of planes inclined to one plane.

7. Projections of planes inclined to both the planes.

8. Projections of solids inclined to one plane.

9. Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone

LIST OF EXERCISES IN COMPUTER AIDED DRAFTING (will be considered for internal evaluation only)

Introduction to AutoCAD: Basic drawing and editing commands, Dimensioning principles and conventional representations.

10. Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectionalparts.

11. Orthographic Projections: Systems of projections, conventions and application to orthographicProjections.

12. Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines,planes, figures, simple and compound solids

Text Books:
1. N. D. Bhatt, *Engineering Drawing*, 53rd Edition, Charotar Publishers, 2016.
2. K. L. Narayana and P. Kannaiah, *Engineering Drawing*, 3rd Edition, Scitech Publishers, Chennai, 2012.

Reference Books:
1. Dhanajay A Jolhe, *Engineering Drawing*, 1st Edition, Tata McGraw-Hill, 2007.
2. Venugopal, *Engineering Drawing and Graphics*, 5rd Edition, New Age Publishers, 2004.
3. BasantAgarwal and C. M. Agarwal, *Engineering Drawing*, 2nd Edition TataMcGraw-Hill, 2013.

ENVIRONMENTAL SCIENCE

Course Code: 19BC11Z1

L	T	P	C
3	0	0	0

Course Outcomes: At the end of the Course the student shall be able to

CO1: gain a higher level of personal involvement and interest in understanding and solving environmental problems.
CO2: recognize the interconnectedness of human dependence on the various ecosystems
CO3: demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
CO4: influence the society in water management and environmental acts.
CO5: discuss the management of environmental hazards, disasters and sustainable development practices.

UNIT – I: 10 Lectures
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES
Definition, Scope and Importance – Need for Public Awareness.
Natural resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

Learning outcomes
After the completion of the Unit, students will be able to
1. articulate the basic structure, functions, and processes of key social systems affecting the environment.(L2)
2. use of water resources (L3)
3. articulate basic understanding of the effects of modern agriculture on the environment.(L3)
4. explain how various paradigms or world views and their implicit and explicit assumptions and values shape the viewer's perception of environmental problems and solutions.(L2)

UNIT – II: **10 Lectures**
ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
a.   Forest ecosystem.
b.   Grassland ecosystem
c.   Desert ecosystem
d.   Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning outcomes
After the completion of the Unit, students will be able to
1.   get a clear picture of the structure and functions of ecosystems.(L1)
2. explain why renewable and non-renewable energy resources are important.(L2)
3.   get awareness about land degradation, soil erosion & desertification.(L2)
4. gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.(L3)

UNIT – III: **10 Lectures**
ENVIRONMENTAL POLLUTION AND SOLID WASTE MANAGEMENT
Environmental pollution: Definition, Cause, effects and control measures of :
a.   Air Pollution.
b.   Water pollution
c.   Soil pollution
d.   Marine pollution
e.   Noise pollution
f.   Thermal pollution
g.   Nuclear hazards

Solid waste management: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

Learning outcomes
After the completion of the Unit, students will be able to
1. demonstrate knowledge and understanding of theories in the field of Biodiversity and systematics in the broad sense.(L1)
2. conduct basic conservation biology research.(L2)
3. explain endangered and endemic species of India.(L2)
4. identify the threats to biodiversity (L2)

UNIT – IV: 10 Lectures
SOCIAL ISSUES AND THE ENVIRONMENT
Social issues and the environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Learning outcomes:
After the completion of the Unit, students will be able to
1. illustrate Cause, effects and control measures of air pollution.(L3)
2. describe soil, noise & water pollution.(L2)
3. explain the enforcement of Environmental legislation(L2)
4. demonstrate solid waste management.(L3)

UNIT – V: 10 Lectures
HUMAN POPULATION AND THE ENVIRONMENT
Human population and the environment: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.
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..

Learning outcomes
After the completion of the Unit, students will be able to
1. Describe watershed management and environmental ethics.(L2)
2. explain the reasons for global warming(L2)
3. explain principles and impact of disasters on environment.(L2)
4. demonstrate disaster management cycle in India(L3)

Text Books

1. AnubhaKaushik,.Kaushik C.P, *Environmental Studies*, 3rd edition, New age international publishers, 2011.

Reference Books

1. Bharucha. E., *Textbook of Environmental Studies for Undergraduate Courses,* University Press, 2005.
2. Rajagopalan. R., *Environmental Studies*, Oxford University Press, 2005.
3. AnjiReddy. M., *Textbook of Environmental Sciences and Technology*, BS Publications, 2010.