B.Tech
I Year I Semester

B. Tech I Year I Semester

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9901	ALGEBRA AND CALCULUS	3	0	0	3

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

CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in optimization.

CO4: Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems

CO5: Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

UNIT I :

MATRIX OPERATIONS AND SOLVING SYSTEMS OF LINEAR EQUATIONS

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem,

UNIT II :

QUADRATIC FORMS AND MEAN VALUE THEOREMS

Diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation. Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof);

UNIT III:

MULTIVARIABLE CALCULUS

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT IV:

MULTIPLE INTEGRALS

Double integrals, change of order of integration, double integration in polar coordinates, change of Variables in double integration (Cartesian to polar), areas enclosed by plane curves. Evaluation of triple integrals.

UNIT V:

SPECIAL FUNCTIONS

Beta and Gamma functions and their properties, relation between beta and gamma functions, Bessel functions, Bessel's equation, Recurrence formulae or $J_n(x)$, Generating function- Orthoganality of Bessels functions.

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

References:

1. Dr.T.K.V Iyengar, B.Krishna Gandhi, S. Ranganatham amd M.V.S.S.N Prasad, Mathematics – 1, S.Chand publications.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. B.V.Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
4. N.Bali, M.Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity Science Press.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO2	PO1:Apply the knowledge of mathematics	1.1	1.1.1
CO3	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO4	PO2 : analyse complex engineering problems	2.1	2.1.3
CO5	PO2 : analyse complex engineering problems	2.1	2.1.3

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9902	**APPLIED PHYSICS**	**3**	**0**	**0**	**3**

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

CO1: Analyze the wave properties of light and the interaction of energy with the matter.

CO2: Apply electromagnetic wave propagation in different guided media.

CO3: Asses the electromagnetic wave propagation and its power in different media.

CO4: Analyze the conductivity of semiconductors

CO5: Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

UNIT I : OPTICS AND EM THEORY

Interference of light -principle of superposition-Conditions for sustained Interference-Interference in thin films (reflected light) - Newton's Rings -Determination of Wavelength. Diffraction-Fraunhofer diffraction- Single slit and double slit- Diffraction Grating.

Divergence and Curl of Electric and Magnetic Fields - Gauss' theorem for divergence and Stokes' theorem for curl - Maxwell's Equations (Quantitative) – Electromagnetic wave - propagation in non-conducting medium - Poynting's Theorem.

UNIT II :
LASERS AND FIBER OPTICS

Lasers – Introduction – Characteristics – Spontaneous and Stimulated Emission – Einstein Coefficients – Population Inversion – Excitation Mechanism and Optical Resonator - He-Ne Laser -Nd:YAG Laser – Semiconductor Diode Laser – Applications of Lasers and Holography. Introduction to Optical Fibers – Total Internal Reflection – Critical angle of propagation –Acceptance angle – Numerical Aperture – Classification of fibers based on Refractive index profile – Propagation of electromagnetic wave through optical fiber – modes – importance of V-number-Attenuation, Block Diagram of Fiber optic Communication – Industrial Applications –Fiber optic Sensors.

UNIT III :
DIELECTRIC AND MAGNETIC MATERIALS

Introduction—Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations : Electronic and Ionic,(Quantitative), Orientation Polarizations (Qualitative) - Frequency dependence of polarization-Lorentz (internal) field-Claussius-Mosotti equation-Applications of Dielectrics: Ferroelectricity. Introduction-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 – Magnetic memory device applications .

UNIT IV:
SEMICONDUCTORS

Origin of Energy bands (Qualitative)-Intrinsic and Extrinsic semiconductors –Direct and indirect band gap semiconductors- Density of charge carriers – Fermi energy–-Dependence of Fermi energy on carrier concentration and temperature – Electrical conductivity – Drift and Diffusion currents – Continuity equation - Hall effect - Applications of Hall effect and Semiconductors.

UNIT V:
SUPERCONDUCTORS AND NANOMATERIALS

Superconductors-Properties-Meissner'seffect-BCSTheory(Qualitative) - Josephson effect (AC&DC)-Types of Superconductors-Applications of superconductors. Nanomaterials–Significance of nanoscale–:

Physical, Mechanical, Magnetic, Optical properties of nanomaterials – Synthesis of nanomaterials:Top-down-Ball Milling, Bottom-up-Chemical vapour deposition–Characterization of nanomaterials : X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM)-Applications of Nanomaterials.

Textbooks:
1. M. N. Avadhanulu, P. G. Kshirsagar &TVS Arun Murthy‖ A Text book of Engineering Physics‖-S. Chand Publications,11th Edition2019.
2. B.K.Pandey and S.Chaturvedi, Engineering Physics, Cengage Learning,2012.

References:
1. K Thyagarajan ‒Engineering Physics‖,-Mc Graw Hill Publishing Company Ltd, 2016
2. Shatendra Sharma, Jyotsna Sharma, ― Engineering Physics‖, Pearson Education,2018
3. David J.Griffiths,―Introduction to Electrodynamics‖-4/e, Pearson Education, 2014
4. T Pradeep, ‒A Text book of NanoScience and NanoTechnology‖-Tata Mc Graw Hill 2013.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO1 : Apply the knowledge of science	1.2	1.2.1
CO: 2	PO1: Apply the knowledge of science	1.2	1.2.1
CO: 3	PO1: Apply the knowledge of science	1.2	1.2.1
CO: 4	PO1: Apply the knowledge of science	1.2	1.2.1
CO: 5	PO1: Apply the knowledge of science	1.2	1.2.1

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9901	COMMUNICATIVE ENGLISH	3	0	0	3

Course Outcomes: At the end of the course, the learners will be able to
CO1: Identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
CO2: Formulate sentences using proper grammatical structures and correct word forms.
CO3: Speak clearly on a specific topic using suitable discourse markers in informal discussions.
CO4: Write summaries based on global comprehension of reading/listening texts
CO5: Produce a coherent paragraph interpreting a figure/graph/chart/table.
CO6: Take notes while listening to a talk/lecture to answer questions.

UNIT 1 :
EXPLORATION
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: A Proposal to Girdle the Earth, Nellie Bly - 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: countable and un countable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

UNIT 2:
ON CAMPUS
Listening: Answering a series of questions about 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: The District School As It Was by One who Went to it, Warren Burton - 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.

UNIT 3:
THE FUTURE OF WORK
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: The Future of Work - 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.

UNIT 4:
FABRIC OF CHANGE
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

Reading: H.G.Wells and the Uncertainties of Progress, Peter J.Bowler - 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.

UNIT 5:
TOOLS FOR LIFE
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: Leaves from the Mental Portfolio of a Eurasian, Sui Sin Far - Reading for comprehension.

Writing: Writing structured essays on specific topics using suitable claims and evidences.

Grammar and Vocabulary: Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject- verb agreement)
Suggested books:

Text Book:
1. English all round: Communication Skills for Under graduation Learners Vol. I, Orient BlackSwan Publisers, First Edition 2019.

Reference Books
1. 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.
2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
3. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

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/
Listening
https://learningenglish.voanews.com/z/3613, http://www.englishmediaLaboratory.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

List of COs	PO no. and keyword	Competency Indicator: Description	Performance Indicator: Description
CO1.	PO6-Apply contextual knowledge to assess societal, health, safety, legal, and cultural issues.	6.1	6.1.1
CO2.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.1	10.1.1
CO3.	PO9-Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2	9.2.1
CO4.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.1 .	10.1.1
CO5	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.3	10.3.1
CO6.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0304	ENGINEERING WORKSHOP PRACTICE	1	0	4	3

Course Outcomes: At the end of the course, the learners 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: Demonstrate soldering and brazing.

WOOD WORKING:
Familiarity with different types of woods and tools used in wood working and make following joints
  a) Half – Lap joint
  b) Mortise and Tenon joint
  c) Corner Dovetail joint or Bridle joint

SHEET METAL WORKING:
Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets
  a) Tapered tray
  b) Conical funnel
  c) Elbow pipe
  d) Brazing

FITTING:
Study the difference types of fits and tolerances, surface finishing materials.
Familiarity with different types of tools used in fitting and do the following fitting exercises
  a) V-fit
  b) Dovetail fit
  c) Semi-circular fit
  d) Bicycle tyre puncture and change of two wheeler tyre

ELECTRICAL WIRING:
Study the different types of circuits and connections,
Familiarities with different types of basic electrical circuits and make the following connections
  a) Parallel and series
  b) Two-way switch
  c) Godown lighting
  d) Tube light
  e) Three phase motor
  f) Soldering of wires

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Engineering knowledge	1.3	1.3.1
CO: 2	PO 3: Design/Development of Solutions	3.2	3.2.1
CO: 3	PO 1: Engineering knowledge	1.3	1.3.1
CO: 4	PO 3: Design/Development of Solutions	3.2	3.2.2
CO: 5	PO 2: Problem analysis	2.3	2.3.2

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0501	PROBLEM SOLVING AND PROGRAMMING	3	0	0	3

Course Outcomes: At the end of the course, the learners will be able to
CO1: Introduce the internal parts of a computer, and peripherals.
CO2: Introduce the Concept of Algorithm and use it to solve computational problems.
CO3: Identify the computational and non-computational problems.
CO4: Teach the syntax and semantics of a C Programming language
CO5: Demonstrate the use of Control structures of C Programming language.
CO6: Illustrate the methodology for solving Computational problems

UNIT 1:
Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.
Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

UNIT 2:
Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.
Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

UNIT 3:
Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.
Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.
Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Do- while, break and continue, Goto and Laboratoryels.
Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

UNIT 4:
Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.
Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions, complicated declarations.
Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the kth smallest element

UNIT 5:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

Some other Features: Variable-length argument lists, formatted input-Scanf, file access, Error handling-stderr and exit, Line Input and Output, Miscellaneous Functions.

Text Books:
1. Pradip Dey, and Manas Ghosh, ‒Programming in C‖, 2018, Oxford University Press.
2. R.G. Dromey, ―How to Solve it by Computer‖. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, ‒The C Programming Language‖, 2ⁿᵈ Edition, PearsonReference Books:
4. RS Bichkar ―Programming with C‖, 2012, Universities Press.
5. Pelin Aksoy, and Laura Denardis, ‒Information Technology in Theory‖ 2017, Cengage Learning.
6. Byron Gottfried and Jitender Kumar Chhabra, ‒Programming with C‖ 4ᵗʰ Edition, 2019, McGraw Hill Education.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering Knowledge	1.3	1.3.1
CO2	PO2: Problem analysis	2.1	2.1.1
CO3	PO2: Problem analysis	2..2	2.2.2
CO4	PO2: Problem analysis	2.1	2.1.1
CO5	PO2: Problem analysis	2.3	2.3.1
CO6	PO2: Problem analysis	2.2	2.2.3

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9902	**COMMUNICATIVE ENGLISH - LABORATORY**	**0**	**0**	**3**	**1.5**

Course Outcomes: At the end of the course, the learners will be able to
CO1: Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2: Apply communication skills through various language learning activities.
CO3: Analyze the English speech sounds, stress, rhythm, intonation and sylLaboratoryle division for better listening and speaking comprehension.
CO4: Evaluate and exhibit acceptable etiquette essential in social and professional settings
CO5: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

UNIT 1
1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

UNIT 2
1. JAM
2. Small talks on general topics
3. Debates

UNIT 3
1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

UNIT4
1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

UNIT 5
1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Software Source:
K-Van Solutions Software

Reference:
Teaching English - British Council

List of COs	PO No. and keyword	Competency Indicator: Description	Performance Indicator: Description
CO1	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.1.1
CO2	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.3	10.3.1
CO3	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1
CO4	PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2	9.2.1
CO5	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9907	**APPLIED PHYSICS LABORATORY**	**0**	**0**	**3**	**1.5**

Course Outcomes: At the end of the course, the learners will be able to
CO1: Analyze the wave properties of light and the interaction of energy with the matter.
CO2: Apply electromagnetic wave propagation in different guided media.
CO3: Asses the electromagnetic wave propagation and its power in different media.
CO4: Analyze the conductivity of semiconductors
CO5: Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

List of Experiments:

1. Determination of the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method
3. Determination of wavelength by plane diffraction grating method
4. Dispersive power of a diffraction grating
5. Study of the Magnetic field along the axis of a circular coil carrying current.
6. Study the variation of B versus H of the magnetic material (B-H curve)
7. Determination of the numerical aperture of a given optical fiber and angle of acceptance.
8. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
9. Determination of the energy gap of a semiconductor
10. Determination of crystallite size using X-Ray diffraction spectra.
11. Determination of Wavelength of LASER using diffraction grating.
12. Determination of particle size using LASER.
13. Determination of the resistivity of semiconductor by Four probe method.
14. Determination of dielectric constant by charging and discharging method.
15. Study the temperature dependence of resistance of a thermister.

References:

1. S. Balasubramanian, M.N.Srinivasan, ─A Text book of Practical Physics‖-S Chand Publishers, 2017.
2. http://vLaboratory.amrita.edu/index.php-VirtualLaboratorys, Amrita University.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 4: Analysis and interpretation of data	4.3	4.3.3
CO: 2	PO 4: Analysis and interpretation of data	4.3	4.3.1
CO: 3	PO 4: Analysis and interpretation of data	4.3	4.3.1
CO: 4	PO 4: Analysis and interpretation of data	4.3	4.3.2
CO: 5	PO 4: Analysis and interpretation of data	4.3	4.3.2

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0503	PROBLEM SOLVING AND PROGRAMMING LABORATORY	0	0	3	1.5

Course Outcomes: At the end of the course, the learners will be able to
CO1: Analyze the wave properties of light and the interaction of energy with the matter.
CO2: Apply electromagnetic wave propagation in different guided media.
CO3: Asses the electromagnetic wave propagation and its power in different media.
CO4: Analyze the conductivity of semiconductors
CO5: Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

Laboratoryoratory Experiments:

1. Assemble and disassemble parts of a Computer
2. Design a C program which reverses the number
3. Design a C program which finds the second maximum number among the given list of numbers.
4. Construct a program which finds the kth smallest number among the given list of numbers.
5. Design an algorithm and implement using C language the following exchanges a ← b ← c ← d ← a
6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
7. Implement the C program which computes the sum of the first n terms of the series Sum = 1 – 3 + 5 - 7 + 9
8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
9. Design an algorithm and implement using a C program which finds the sum of the infinite series $1 – x^2/2! + x^4/4! – x^6/6! + ...$
10. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
12. Develop an algorithm which computes the all the factors between 1and100 for a given number and implement it using C.
13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
14. Design a C program which reverses the elements of the array.
15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.
16. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort d. Partitioning sort.
17. Illustrate the use of auto, static, register and external variables.
18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.
19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
20. Design a C program which sorts the strings using array of pointers.

Instructors may add some experiments to the above list. Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

References:
1. B. Govindarajulu, ―IBM PC and Clones Hardware Trouble shooting and Maintenance‖, Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, ―How to Solve it by Computer‖. 2014, Pearson.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2: Problem analysis	2.1	2.1.1
CO2	PO2: Problem analysis	2..2	2.2.2
CO3	PO2: Problem analysis	2.1	2.1.1
CO4	PO2: Problem analysis	2.3	2.3.1
CO5	PO2: Problem analysis	2.2	2.2.3