COURSE ASSESSMENT METHODS (THEORY)

CIE			SEE
TESTS	20	50	50
MID. TERM EXAM	20		
ASSIGNMENT/QUIZ /SURPRISE TEST	10		

COURSE ASSESSMENT METHODS (PRACTICAL)

CIE			SEE
TESTS	20	50	50
DEMONSTRATION/ DOCUMENTATION	30		

PROGRAMMING WITH PYTHON (18CSI302)
COURSE ASSESSMENT METHOD

CIE			SEE
MID. TERM EXAM	20	50	50
PRACTICAL	30		

Syllabus for the Academic Year – 2020 - 2021

Department: Mathematics **Semester: 3**

Subject Name: Integral Transforms and Numerical Techniques

Subject Code: 18MA301 **L-T-P-C: 3-1-0-4**

Course Objectives:

	Course Objectives
1	Introduce the concept of Laplace Transform and problems on periodic function.
2	Introduce the concept of solving Linear Differential Equations by the method of Laplace Transform.
3	Represent a periodic function as a Fourier Series and Compute the Fourier coefficients numerically.
4	To develop the proficiency in Numerical techniques and solving Ordinary Differential Equations arising in engineering applications.

UNIT	**Description**	**Hours**
I	**Laplace Transforms:** Definition, Laplace transforms of elementary functions and problems, periodic functions, unit step functions - problems. **Inverse Laplace transforms:** Inverse Laplace transforms, problems. Solution of linear differential equations by Laplace transform method.	**10**
II	**Fourier Series:** Periodic functions, Dirichlet's conditions. Fourier series of periodic functions with period 2π and with arbitrary period $2l$. Fourier series of even and odd functions. Half range Fourier series. Practical harmonic analysis. Applications- frequency spectrum and examples from engineering field.	**10**
III	**Fourier Transforms :**Infinite Fourier transforms. Fourier Sine and Cosine transforms. Inverse Fourier transforms, and simple problems. **Z-Transforms:** Difference equations, basic definitions, Z-transform-definition, Standard Z-transforms, Damping rule, Shifting rule, Initial value and Final value theorems(without proofs) and problems, Inverse Z-transform, Simple problems. Applications-solutions of difference equations using Z-transforms.	**10**
IV	**Numerical solution of ordinary differential equations of first order and first degree**: Taylor's series method, Modified Euler's method, Runge- Kutta method of fourth order, Milne's and Adams-Bashforth Predictor and Corrector methods (No derivation of formulae).	**11**

V	**Numerical solution of second order ODE:** Runge- Kutta method and Milne's Predictor and Corrector method (No derivation of formulae). **Numerical Integration:** Trapezoidal rule,Simpson's $1/3^{rd}$,$3/8^{th}$ rule, Weddle's rule, Romberg integration, Newton-cotes integration (without proof)-problems.	**11**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Higher Engineering Mathematics	B.S.Grewal	43rdEdition, Khanna Publications,2015, ISBN-13:978-8174091956
2	Advanced Engineering Mathematics	E.Kreyszig	10th Edition,JonWiley&Sons, 2015, ISBN:978-0-470-91361-1

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	A text book ofEngineering Mathematics	N.P.Bali and Manish Goyal	7th Edition ,LakshmiPublishers,2010, ISBN:978-8131808030
2	Higher Engineering Mathematics	B.V.Ramana	1st Edition, TataMcGraw-Hill,2006, ISBN:978-0070634190
3	Higher Engineering Mathematics	H.K.Das and Er.RajnishVerma	1st Edition,Chandpublishing, 2011, ISBN:9788121938907

Course Outcomes

Course outcome	Descriptions
CO1	Understand the basic concepts of Fourier series and Integral transforms.
CO2	Apply Laplace transform and inverse Laplace transform in solving differential equation and integral equation arising in network analysis, control system and others fields of engineering.
CO3	Demonstrate Fourier series and Integral transforms to study behaviour of periodic functions, discrete/continuous functions arising in single and system, field theory and system communication
CO4	Analyze and apply single step and multistep numerical methods in engineering problems.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Programming with Python

Subject Code: 18CSI302 **L-T-P-C: 3-0-2-4**

Course Objectives:

Sl.No	Course Objectives
1	Learn the procedure of Python interpreter installation and its working.
2	Understand the concepts of conditional and loop statements
3	Implement built-in and user defined functions.
4	Build and execute lists, tuples, dictionaries and sets in Python.

UNIT	Description	Hours
I	**The Context of Software Development:** About Python, Installing Python, The Python Interpreter, Python editors and IDEs, Learning Programming with Python, Writing a Python Program, A Longer Python program. **Values and Variables:** Integer Values, Variables and Assignment, Identifiers, Floating-point Numbers, Control Codes within Strings, User Input, Controlling the print Function, String Formatting, Multi line Strings. **Expressions and Arithmetic:** Expressions, Mixed Type Expressions, Operator Precedence and Associativity, Formatting Expressions, Comments, Errors, Syntax Errors, Run-time Errors, Logic Errors, Arithmetic Examples, More Arithmetic Operators, Algorithms. **Demonstrate programs on variables, expression and Arithmetic.**	8
II	**Conditional Execution:** Boolean Expressions, The Simple if Statement The if/else Statement, Compound Boolean Expressions, The pass Statement, Floating-point Equality, Nested Conditionals, Multi-way Decision Statements, Conditional Expressions, Errors in Conditional Statements. **Iteration:** The while Statement, Definite Loops vs. Indefinite Loops, The for Statement, Nested Loops, Abnormal Loop Termination, while/else and for/else, Infinite Loops, Iteration Examples, Computing Square Root, Drawing a Tree, Printing Prime Numbers, Insisting on the Proper Input. **Implement programs using Conditional Execution and Iteration.**	7
III	**Using Functions:** Introduction to Using Functions, Functions and Modules, The Built-in Functions, Standard Mathematical Functions, time Functions, Random Numbers, System-specific Functions. **Writing Functions:** Function Basics, Parameter Passing,	

	Documenting Functions, Function Examples, Better Organized Prime Generator, Command Interpreter ,Restricted Input, Better Die Rolling Simulator, Tree Drawing Function , Floating-point Equality. **More on Functions:** Global Variables, Default Parameters, Recursion, Making Functions Reusable, Functions as Data. **Design programs using Functions.**	**8**
IV	**Lists:** Motivation, List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python, More on Python Lists. **Objects:** Using Objects, String Objects, List Objects. **Demonstrate programs using Lists and objects.**	**8**
V	**Tuples, Dictionaries, and Sets:** Tuples, Arbitrary Argument Lists, Dictionaries, Using Dictionaries, Counting with Dictionaries, Grouping with Dictionaries, Keyword Arguments, Sets, Set Quantification with all and any, Enumerating the Elements of a Data Structure. **Demonstrate programs using Tuples, Dictionaries, and Sets.**	**8**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Fundamentals of Python Programming	Richard L. Halterman	Southern Adventist University, 2019, E-book, ISBN:9781539530268
2	Introduction to Computer Science Using Python: A Computational Problem-Solving	Charles Dierbach	1st Edition, JhonWiley & Sons, Inc. Publications, 2012, ISBN:9780470555156

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Think Python	Allen Downey	2nd Edition, O'Reilly Media, ISBN: 9781491939369
2	Learning Python	B.NageshRao	1st Edition, A cyberplus publication, 2017, ISBN:9788193392300

Course Outcomes

Course outcome	Descriptions
CO1	Explain the Python syntax and be fluent in the use of Python flow control and iterations.
CO2	Explicate the type of operators, built-in libraries and functions.
CO3	Analyze and Design Python programs using List and object concepts.
CO4	Create, run and manipulate the Python programs using core data structures like tuples, dictionaries and sets.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Data Structures

Subject Code: 18CS303 **L-T-P-C: 4-0-0-4**

Course Objectives:

Sl.No	Course Objectives
1	Understand, Practice and Assimilate fundamentals of data structures and their applications essential for programming/problem solving.
2	Describe, Analyze, Design and Evaluate the Linear Data Structures: Stack, Queues, and Lists.
3	Describe, Analyze, Design and Evaluate the Non-Linear Data Structures: Trees, Tries.
4	Assess appropriate data structure during program development/problem solving.

UNIT	Description	Hours
I	**Stacks and Queues:** Structures and Pointers revisited. Stacks: Definition and Examples, Representing Stacks in C. Stack Applications: Reversing Data: Reverse a list and convert decimal to binary, Parsing, Postponement: infix to postfix transformation, evaluating a postfix expression. Recursion. Queues: The Queue and its Sequential Representation, C implementation of Queue.	10
II	**Circular queue, Priority queue and Linked list:** Circular Queue, and The priority queue – Array implementation of priority queue. Queue applications: Queue Simulation and categorizing data. Self-referential structure, linking self –referential structures. List: Inserting and removing nodes from a list, the getnode and free node operations, the linked list as a data structure, examples of list operations, Header nodes. Lists in C. Array implementation of lists, limitations of array implementation.	11
III	**Doubly linked list, Circular list and linear list applications:** Linked implementation of Stack, linked implementation of queues. Doubly linked lists: Inserting and removing nodes from a double linked list. Circular lists: primitive operations on circular list. Circular double linked list. Linear list applications: Append linked lists, Array of linked lists.	11

IV	**Trees:** Basic tree concepts: Terminology, tree representation, Binary trees: properties, binary tree structure. Binary tree traversals: Tree traversal techniques: preorder, inorder and postorder, Expression trees: infix, postfix and prefix traversal. General trees: Changing general tree to binary tree, insertion into general trees, general tree deletions.	**10**
V	**Lexical Search Tree and Graphs:** Tries: Introduction to Tries, Trie structure, Trie search. Graphs:Terminologies, An application of graphs, C representation of graphs, transitive closure, Warshall's algorithm, Graph traversal techniques: Depth – First traversal, Breadth – First traversal.	**10**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Data Structure using C	Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein	1st Edition,Pearson publication, 2019, ISBN-13: 9789332543546.
2	Data Structures: A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzan	2ndEdition,Cengage publication, 2007, ISBN-13: 9788131503140

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Data Structures and Program Design in C	Robert Kruse, C L Tondo, Bruce Leung, ShashiMogalla	2ndEdition, PHI, 2015, ISBN-13: 978-0132883665.
2	Data Structures with C	Seymour Lipschutz	1st Edition, McGraw Hill publications, 2018, ISBN-13: 978-0-07-070198-4

Course Outcomes:

Course outcome	Descriptions
CO1	Define the basic concepts of data structures and their operations.
CO2	Explain the working principle of linear and non-linear data structures.
CO3	Develop a code snippet for the implementation of data structures.
CO4	Apply concepts of linear and non-linear data structures to solve a problem.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Analog and Digital Electronic Circuits

Subject Code: 18CS304 **L-T-P-C: 3-1-0-4**

Course Objectives:

Sl.No	Course Objectives
1	To acquire the basic knowledge of analog and digital electronic circuit principles.
2	To analyze and design simple analog and digital circuits.
3	To simulate digital circuits using Verilog coding.
4	To apply the basic concepts of analog and digital circuits to develop simple engineering applications.

UNIT	Description	Hours
I	**Basics of Semiconductor devices (Diodes and Transistors):** P-N junction diode, Characteristics and Parameters, Diode approximations, Half-wave rectifier, Full-wave rectifier, Bridge rectifier, Zener diode voltage regulators: Bipolar Junction Transistors: BJT operation, Common Base, Common Emitter and Common Collector configurations. Frequency response of CE amplifier.	10
II	**Operational amplifier and its Applications:** Introduction to Operational Amplifiers: Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, adder, subtractor, integrator, differentiator,IC555 timer as Astable multi-vibrator, ADC (counter type) and DAC (binary weighted resistor) circuits. **Sensors and transducers:** Introduction, basic operating principles of sensors and their features. Types of sensors: Temperature sensor (Thermistor), Light sensor(Photodiode and LDR), Moisture/rain sensor, Motion sensors(IR sensors)	10
III	**Boolean laws, basic gates and simplification techniques:** Laws of Boolean Algebra, De Morgan's theorem. Logic gates: NOT, AND, OR, XOR, NAND, NOR and X-NOR Gates. Algebraic Simplification using SOP and POS techniques, Karnaugh's map (4 Variables) and QuineMc-Cluskey methods (Algorithm). Introduction to HDL.	11
IV	**Combinational Circuits:** Half and Full adders, 4 bit adder (IC7483), Multiplexers, De-multiplexers, Decoder, BCD to Decimal Decoders, Seven Segment Decoders, Combinational circuit design using MUX IC 74153 and Decoder IC 74138. Encoders, Magnitude Comparator and ALU IC74181. HDL Implementation of combinational Circuits.	11

V	**Sequential logic circuits:** Introduction to Flip-Flops, Basic RS latch, RS Flip-Flop, Gated Flip-Flops: JK FF, D FF, T FF. Various representations of flip flops and Flip flop conversions. Registers: Types of Registers, Serial In – Serial Out, Serial In – Parallel out, Parallel In – Serial Out, Parallel In – Parallel Out, Universal Shift Register, and Applications of Shift Registers. Counters: Asynchronous Counters, Decoding Gates, Synchronous Counters, Changing the Counter Modulus. HDL implementation of sequential circuits.	**10**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Electronic Devices and Circuit Theory	Robert L. Boylestad, Louis Nashelsky	11th Edition, Prentice Hall, 2015, ISBN: 9789332542600
2	Digital principles and Applications	Donald P Leach, Albert Paul Malvino	8th Edition, Mcgraw Hill, 2014, ISBN:9789339203405
3	Sensors and Transducers	D. Patranabis	2nd Edition ,Prentice Hall India Learning Private Limited, 2003, ISBN-13: 978-81203219

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Op-amp and linear Integrated circuits	Ramakant A. Gaikwad	4th Edition, Pearson Education, 2015, ISBN-13: 978-9332549913
2	Basic Electronics	D.P. Kothari, I. J. Nagrath	2nd Edition, McGraw Hill Education, 2017, ISBN-13: 978-9352606467

Course Outcomes

Course outcome	Descriptions
CO1	Understand the operating principles of basic analog and digital electronic devices
CO2	Design simple analog electronic circuits such as rectifiers, amplifier and clock circuits, ADC and DAC and to design combinational and sequential digital circuits
CO3	Apply the concepts of analog and digital electronic in real time applications
CO4	Simulate simple analog and digital circuits using Verilog code.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Discrete Mathematical Structures

Subject Code: 18CS305 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No	Course Objectives
1	Solve problems using counting techniques and combinatorics.
2	Perform operations on discrete structures such as sets, functions, relations or sequences.
3	Solve problems involving recurrence relations and generating functions.
4	Apply algorithms and use definitions to solve problems.

UNIT	Description	Hours
I	**Introduction to Graph Theory:** Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree: Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Colouring and Chromatic Polynomials. **Trees:** Definitions, Properties and Examples, Rooted Tree.	8
II	**Relations and Functions**: Cartesian products and relations. Functions- plain, One to One and On to functions. Stirling number of second kind. Special functions. Function composition and inverse functions. The Pigeonhole principle. **Properties of Relations:** Computer Recognition – Zero-one matrices and directed graphs, Partial orders and Hasse Diagrams, Equivalence relations and partitions.	8
III	**Fundamental Principles of Counting:** The rules of Sum and product-Permutations and Combinations, Binomial Theorem, Combinations with repetitions. **The principles of Inclusion and Exclusion:** The principles of Inclusion and Exclusion, Generalization of Principle. Derangements-Nothing is in its right place. Rook Polynomials, Arrangements with forbidden positions	7
IV	**Groups and Rings**: Definitions examples and elementary properties. Homomorphism, Isomorphism and Cyclic groups. Cosets and Lagrange's Theorem. **ingstructure-** definitions and examples. Ring property and substructures. Ring integer modulo n.	8
V	**Generating Functions:** Introductory Examples, Definitions and Examples: Calculation Techniques, Partitions of Integers, The Exponential Generating function **Recurrence Relations:** First order linear recurrence relations. Formulation and Examples. Second order linear Homogeneous Recurrence Relations with constant coefficients.	8

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Discrete and Combinatorial Mathematics	Ralph P. Grimaldi	5thEdition, PHI/ Pearson Education, 2004,ISBN-13: 978-0201726343, ISBN-10: 0201726343

Reference Book:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Discrete Mathematics and its applications	Kenneth H Rosen	7thEdition, McGraw Hill,2011, ISBN-13: 9780073383095 ISBN-10: 0073383090
2	Discrete Mathematics	Trembly and Manohar	1st Edition,McGraw Hill Education, 2017,ISBN-13: 978-0074631133

Course Outcomes

Course outcome	Descriptions
CO1	Recall the basics of Discrete Mathematical Structure.
CO2	Formulate and solve abstract mathematical problems.
CO3	Apply the knowledge of mathematics in the field of computer science.
CO4	Develop mathematical model for a given problem.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Computer Organization

Subject Code: 18CS306 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No	Course Objectives
1	Study the basic structure and operation of a digital computer.
2	Understand the instruction formats used in the design of processors.
3	Know the various design philosophy of central processing unit
4	Understand the organization of control unit, I/O unit and memory unit.

UNIT	Description	Hours
I	**Introduction to Computer Organization**: Basic structure of computers, Bus Structures, Performance of a Computer: Processor clock, Basic Performance equation, Pipelining and Superscalar Operation, Clock rate, Instruction set: CISC and RISC, Performance Measurements, Multiprocessors and Multicomputers. **Machine Instructions and Programs:** Memory Locations & Address: Byte addressability, Big-endian & Little-endian assignments, Word Alignment, Accessing Numbers, Characters & Character strings; Memory operations, Instruction & Instruction Sequencing: Register Transfer Notation, Assembly Language Notation. Basic Instruction Types, Instruction execution & Straight-line sequencing, Branching, Condition codes.**Case Study:** Intel 8085 and 8086 Family.	8
II	**Machine Instructions and Programs (Contd...) and Basic Processing Unit:** Addressing Modes: Addressing modes, Assembly language: Assembler Directives, Stacks and Queues, Subroutines: Subroutine nesting & processor stack, Parameter passing, The Stack Frame. **Basic Processing Unit:** Some fundamental concepts: Register Transfers, Performing an Arithmetic or Logic operation, Fetching a word from Memory, storing a word in Memory; Execution of a complete instruction: Branch instruction; Multiple bus organization: Hardwired control, A complete processor; Micro programmed control, Micro instructions. **Case Study:** Pentium Processors, Pentium Dual Core Processor, Intel Core i3Processors, Intel Core i5 Processors, Intel Core i7 Processors.	8
III	**Arithmetic**: Addition & subtractions of signed Numbers: Addition/Subtraction logic UNIT; Multiplication of positive numbers: Signed operand multiplication: Booth algorithm; Fast Multiplication: Bit-pair recording of multipliers; Integer division, IEEE standard for floating-point numbers.	7

IV	**Input/output Organization**: Accessing I/O devices, Interrupts, Interrupt hardware, Enabling & Disabling Interrupts, Handling Multiple devices, Controlling Device Requests, Exceptions; Direct memory access: Bus arbitration; Buses: Synchronous Bus, Asynchronous bus.Interface circuits: Parallel port, Serial port; Standard I/O interfaces: PCI bus, SCSI bus, USB, **Case Study:**SATA,IrDA, Ethernet,AGP,HDMI, Interrupt Controller, DMA Controller.	**8**
V	**The Memory System**: Some Basic concepts: Semiconductor RAM memories: Internal organization of Memory chips, static memories, Asynchronous Drams, Synchronous DRAMs, Memory system considerations, Read-only memories: ROM, PROM, EPROM, EEPROM, Flash memory; Cache memories: Mapping functions; Virtual memories: Address translation. **Case Study:** HD Card, USB Memory. **Note:** Case Studies are for internal evaluation only.	**8**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Computer Organization	Carl Hamacher, Z Vranesic& S Zaky,	5th Edition, McGraw Hill, 2011.ISBN-13:978-1259005275

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Computer Organization and Architecture: Designing for performance	William Stallings	10thedition, Pearson, 2010, ISBN:978-0-13-410161-3
2	Computer System Architecture	Morris Mano	3rdEdition, PHI, 2016 ISBN: 978-9332585607
3	Computer Organization and Design, The Hardware Software interface.	David A Patterson	5th Edition, Elsevier, 2014, ISBN: 978-0-12-407726-3

Course Outcomes

Course outcome	Descriptions
CO1	Acquire the knowledge of basic structures of computers and machine instructions.
CO2	Describe various data representational methods and explain the arithmetic and logical operations performed in computers.
CO3	Discuss the working principles of input/output units and internal organization of computer.
CO4	Analyze the performance issues and design tradeoffs in designing and constructing a computer processor including memory.

Syllabus for the Academic Year – 2020 - 2021

Department: Mathematics **Semester: 3**

Subject Name: Fundamental Mathematics

Subject Code: 18DIP306 **L-T-P-C: 3 – 0 – 0 - 3**

Course Objectives:

Sl.No	Course Objectives
1	The purpose of this course is to make students to develop a basic Mathematical knowledge required for higher semesters
2	Introduce the concept of nth differentiation and polar curves.
3	Introduce the concept of differentiation and integration arising in engineering applications.
4	The concept of probability and their applications in different engineering, science and social science fields.

UNIT	Description	Hours
I	**DifferentialCalculus**: n^{th} derivatives of some standard functions (without proof), Leibnitz's Theorem (statement),Polarcurves–anglebetweenthe radiusvectorand the tangentpedalequation-Problems. Taylor's andMaclaurin'sseries expansions of one variable - Illustrative examples.	8
II	**Partial Differentiation**: Partial derivatives, Euler'stheoremforhomogeneous functionsof twovariables.Totalderivatives, Total differential, and differentiationof composite and implicitfunction, Jacobians.	8
III	**IntegralCalculus**:Statementofreductionformulae for$sin^n x$, $cos^n x$, *and* $sin^m x cos^n x$ andevaluationof thesewithstandardlimits-Examples.Doubleand tripleintegrals-Simpleexamples.	8
IV	**Ordinarydifferentialequations(ODE's):** Introduction-solutionsoffirstorderandfirstdegree differentialequations,exact,linear differentialequations. **HigherorderODE's:**Linear differential equations of second and higher orderequations with constant coefficients. Homogeneous /non-homogeneous equations. Solutions of initial valueproblems.	7
V	**Probability**: Introduction, Sample space and events. Axioms of probability. Addition and multiplication theorems, Conditional probability-illustrative examples. Baye's theorem-problems.	8

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Higher Engineering Mathematics	B.S.Grewal	43rdEdition, Khanna Publications,2015, ISBN-13:978-8174091956
2	Advanced Engineering Mathematics	E.Kreyszig	10th Edition,JonWiley&Sons, 2015, ISBN:978-0-470-91361-1

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	A text book ofEngineering Mathematics	N.P.Bali and Manish Goyal	7thEdition, Lakshmi Publishers,2010, ISBN:978-8131808030
2	Advanced Modern Engineering Mathematics	Glyn James	4thEdition, Pearson, 2011, ISBN:9788131711248
3	Higher Engineering Mathematics	B.V.Ramana	1stEdition, TataMcGraw-Hill, 2006, ISBN:9780070634190

Course Outcomes

Course outcome	Descriptions
CO1	To understand the basic concept of calculus like differentiation and integration.
CO2	To understand the concepts of partial differentiation and differential equations arising in a variety of engineering applications.
CO3	To understand the double and triple integral.
CO4	To apply the concept of probability in problem solving and relate the solutions to the various engineering streams.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Data Structures Lab

Subject Code: 18CS307 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl. No	Course Objectives
1	To develop skills to design and analyze simple linear and nonlinear data structures.
2	To Strengthen the ability to identify and apply suitable data structure for the given real world problem.
3	To gain knowledge in practical applications of data structures.

Design and develop C programs on the following concepts:

LAB CYCLES	Description
I	Structures, Pointers and memory allocation functions.
II	Stacks, Queues and Linked lists
III	Trees

Pattern for practical exam conduction:

- For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
- For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Change of experiment is allowed only once and 20% of the maximum marks to be deducted.

Course Outcomes:

Course outcome	Descriptions
CO1	Understand and use pointers, files, structures and unions in program development.
CO2	Use data structures like stacks and queues to solve problems in Computer field.
CO3	Apply the concept of linked lists in solving problems.
CO4	Design and implement solutions based on advanced data structures.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: Analog and Digital Electronic Circuits Lab

Subject Code: 18CS308 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	To get an exposure to design, test and evaluate the performance of basic electronic devices and circuits.
2	To study, analyse, design, verify and evaluate the performance of combinational and sequential logic circuits

Lab cycles	Description
I	1. To simulate the operation of i) Half wave and full wave rectifier ii) RC coupled CE amplifier and to plot the frequency response 2. To simulate i) Diode clipping and clamping circuit ii) Inverting and non-inverting amplifiers using Op-amp IC 741
II	3. To simulate the operations of i) Op-amp such as: integrator, differentiator ii) A-stable multi-vibrator using IC555 timer for the given Duty cycle 4. To simulate the working of i) ADC and DAC ii) To study the working of sensors such as: LDR and PIR
III	5. To Realize the given Boolean equation (4 variables) using minimum number of gates. i) Using basic gates ii) Using universal gates 6. To Implement 4-bit adder/subtractor using IC 7483. 7. Multiplexers&Demultiplexers To verify the truth tables of 8:1 MUX and 1:8 DEMUX using IC 74151 and IC74149 8. Adders &Subtractors To implement Full Adder and Full Subtractor using IC 74153 (MUX).
IV	9. To realize i) 1-bit comparator using logic gates. ii) 4 bit magnitude comparator using IC 7485. Decoders and Encoders. i) Display the digits from 0 to 9 using BCD-to-7 Segment ii) Decoder (IC 7447). ii) Implement Decimal-to-BCD Encoder using IC 74148.

	10. Flip-Flops. i) Verify the truth tables of SR and D flip flops using NAND gates. ii) Verify the truth table of JK Master-Slave flip flop using IC 7476. 11. To Realize and study Ring and Johnson counters using IC 7495.
V	12. Design a 3-bit asynchronous up counter and down counter (ripple counter) using IC 7476 for the given modulus. 13. Design a 3-bit synchronous counter using IC 7476 for the given modulus. 14.i) Write the verilog/VHDL code for full adder. Simulateand verify its working. ii) Write the verilog/VHDL code for an 8:1 multiplexer. Simulate and verify its working. 15.i) Write the verilog/VHDL code for D flip flop with positive-edge triggering. Simulate and verify its working. ii) Write the verilog/VHDL code for mod-8 up counter. Simulate and verify its working.

Note: In Semester End practical exam Students are allowed to pick one experiment from the lot 1 to 15.

Course Outcomes:

Course outcome	Descriptions
CO1	To identify various electronic components and to test the working of basic electronic circuits such as rectifier, amplifier, timer, ADC, DACs and few sensors
CO2	To simulate and verify the functions of basic electronic circuits using P-spice
CO3	To design and verify the working of simple combinational and sequential logic circuits
CO4	To simulate and verify the working of simple digital circuits

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 3**

Subject Name: SKILL DEVELOPMENT-I

Subject Code: HS-18SK301 **L-T-P-C: 0-0-2-1**

Course Objectives:

SlNo	Course Objectives
1	Unique shortcut techniques for mental ability to improve speed and accuracy
2	Improve logical thinking to solve various questions and puzzles in reasoning.
3	Excellent communication, time management and problem solving
4	Approach oriented training and interactive methodology.
5	Create amicable relationships to meet professional objectives
6	To give better idea on different topics to increase the competency of the students in the subject.

UNIT	Description	Hours
I	Introduction, Training Objective Advantage of learning Aptitude, Importance of Learning Aptitude, how to crack Aptitude Vedic mathematics, squaring, cubing, one to one method, two to one method Shortcuts, Basic Mathematics, Square root method, Multiplication method.	**03**
II	Number system, prime number concept, linear equations, age problems, HCF and LCM, Factorial Concept, Last Digit Concept, Remainders Concept, approximation, and simplifications, in equalities Square root and Cube root, Coding and Decoding-mirror image.	**06**
III	Percentage-percent to decimal fraction conversion, percentage to quantity, inverse case, percentage change ,relative percentage, product constancy, problems based on population, results on depreciation, Ratio and proportion, Inverse Proportion ,blood relation & family tree, Time speed and distance, relative speed and conversions ,train problems, Direction Problems, Downstream and Upstream, direction sense.	**08**
IV	Verbal analogies, Spotting errors, Antonyms, Synonyms, Spellings, Ordering of words, Sentence improvement, Closet test, one-word substitution	**06**
V	Introduction, Soft Skills, Communication Skills, LSRW, Team Building and Leadership Building Skill Training, stress management, Behavioral management	**05**

Question paper Pattern:

50 questions and each question carry one mark each

Reference Book:

Sl. No.	Reference Book title	Author	Volume and Year of Edition
1	Quantitative aptitude for cat	Arun Sharma	2012

2	Fast Track objective Arithmetic		Arihant publications, 2016
3	Quantitative Aptitude quantum cat	Sarvesh K. Verma	2015
4	The power of soft skills	Robert A. Johnson	New edition 2019
5	The 7 habits of highly effective people	Stephen R. Covey	2010

Course Outcomes

Course outcome	**Descriptions**
CO1	Understand the basic concepts of quantitative ability, logical reasoning, verbal reasoning, and also soft skills.
CO2	Inclusive and engaging environment for a dynamic campus community
CO3	Proficient use of qualitative and quantitative methods in problem solving
CO4	Critical and analytical thinking across a range of discipline.

COURSE ASSESSMENT METHODS (THEORY)

CIE			SEE
TESTS	20	50	50
MID. TERM EXAM	20		
ASSIGNMENT/QUIZ /SURPRISE TEST	10		

COURSE ASSESSMENT METHODS (PRACTICAL)

CIE			SEE
TESTS	20	50	50
DEMONSTRATION/ DOCUMENTATION	30		

OBJECT ORIENTED PROGRAMMING (18CSI402)
COURSE ASSESSMENT METHOD

CIE			SEE
MID. TERM EXAM	20	50	50
PRACTICAL	30		

Syllabus for the Academic Year – 2020 - 2021

Common to CSE and ISE

Department: Mathematics **Semester: 4**

Subject Name: Probability and Queuing Theory

Subject Code: 18CS401 **L-T-P-C: 3-1-0-4**

Course Objectives:

Sl.No	Course Objectives
1	Apply least square method to fit a curve for the given data and evaluate the correlation coefficient and regression lines for the data.
2	To develop probability distribution of discrete and continuous random variables.
3	Develop the joint probability distribution occurring in digital signal processing and design engineering.
4	Estimate the parameter of a population, important role of normal distribution as a sampling distribution.

UNIT	Description	Hours
I	**Probability Distributions:** Review of basic probability theory**.** Random variables (Discrete and Continuous), Probability of mass/density functions. Binomial distribution, Poisson's distribution with mean and variance. Exponential distribution and Normal distribution (without derivations), problems.	10
II	**Joint probability distribution:** Joint probability distribution for two discrete random variables, Marginal distributions, Expectation, covariance, problems. **Stochastic Process:** Classification of Stochastic processes, Probability Vector, Stochastic Matrix, Regular Stochastic Matrix, Transition Probabilities and Transition probability Matrix, Higher Transition Probabilities, problems.	11
III	**Statistical Methods:** Correlation and regression- Karl Pearson's coefficient of Correlation, problems. Regression analysis- lines of regression (without proof) problems. **Curve Fitting:** Curve fitting by the method of least square- Fitting of the curves of the form y=ax+b or y=a+bx, $y=ax^2+bx+c$ or $y=a+bx+cx^2$ and $y=ax^b$	11
IV	**Markov chains:** Markov chain, Stationary distribution of regular Markov chains, States of a Markov chain and problems. **Queuing theory**: Introduction, Concepts and M/G/1 and M/M/1 queuing systems with numerical illustration.	10

V	**Sampling Theory:** Introduction to Sampling distributions, Standard error, Type-I and Type-II errors. Test of hypothesis for means, student's t- distributions, and Chi-square distribution as a test of goodness of fit. **Analysis of variance:** Definition and properties, one way classification, verification within and between treatment, shortcut methods for obtaining variations.	**10**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Higher Engineering Mathematics	B.S.Grewal	43rd EditionKhanna Publications, 2015. ISBN:9788174091956
2	Advanced Engineering Mathematics	E.Kreyszig	10th Edition Jon Wiley &Sons,2015. ISBN:9780470913611

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	A text book ofEngineering Mathematics	N.P.Bali and Manish Goyal	7th Edition Lakshmi Publishers, 2010.
2	Higher Engineering Mathematics	B.V.Ramana	1st Edition, Tata McGraw-Hill, 2006.
3	Higher Engineering Mathematics	H.K.Das and Er.RajnishVerma	1st Edition, Chand publishing, 2011. ISBN:9788121938907
4	A First Course in Probability	S. Ross	8th Edition, Pearson, 2010, ISBN:9780136033134
5	An Introduction to Probability Theory and its Applications	W. Feller	3rd Edition, John Wiley & Sons, Inc, 2008, ISBN9788126518050

Course Outcomes:

Course outcome	Descriptions
CO1	Apply probability distributions and Multivariate distribution in analyzing the probability models arising in engineering field.
CO2	Make use of correlation and regression analysis to fit a suitable mathematical model for the statistical data.
CO3	To understand the concepts of the stochastic process of a statistic and estimation of parameters arising in engineering field.
CO4	Acquire skills in analyzing queuing models and sampling distributions.

Syllabus for the Academic Year – 2020 – 2021

Department: Information Science and Engineering **Semester: 4**

Subject Name: Object Oriented Programming

Subject Code: 18CSI402 **L-T-P-C: 3-0-2-4**

Course Objectives:

Sl.No	Course Objectives
1	Understand the fundamentals of object-oriented programming in Java, including defining classes, Objects, invoking methods
2	Understand the principles of inheritance, packages, and interfaces.
3	Understand fundamentals of exception handling mechanisms.
4	Write Object oriented programs.

UNIT	Description	Hours
I	**Introduction to Object oriented programming: Object Oriented Programming:** two paradigms, Abstraction, The Three Object Oriented Programming Principles: Inheritance, Polymorphism and Encapsulation, Working together. First Simple Java program: Entering the Program, Compiling the Program, A Closer Look at the First Sample Program, A Second short program, Java is a Strongly Typed Language. Class Fundamentals: The General Form of a Class, A Simple Class, Declaring Objects: A Closer Look at new, Assigning Object Reference Variables, Introducing Methods: Adding a Method to the Box Class, Returning a Value, Adding a Method That Takes Parameters: Parameterized Constructors, Constructors, The this Keyword: Instance Variable Hiding, Garbage Collection, The finalize() Method; A Stack Class. **Simple Java programs including classes, methods and constructors.**	8
II	**Classes and Methods:Overloading Methods:** Overloading Constructors, Using Object as parameter, A Closer Look at Argument Passing, Returning Object, Introducing Access Control, Understanding Static, Introducing Final, Introducing Nested and Inner Classes. Exploring the String Class, Using Command-Line Arguments. **Programs on overloading, static members, nested and inner classes and strings.**	8
III	**Inheritance: Inheritance Basics:** Member Access and Inheritance, A More Practical Example, A Superclass Variable Can Reference a Subclass Object, Using Super: Using super to Call Superclass Constructors, A Second Use for super, Creating Multi-Level Hierarchy, when Constructors are Executed, Method Overriding, Dynamic Method Dispatch: Why Overridden Methods?, Applying Method Overriding, Using Abstract Classes, Using Final with Inheritance: Using final to Prevent Overriding, Using final to Prevent Inheritance, The Object Class. **Programs on Inheritance.**	7

IV	**Packages and Interface: Packages:** Defining a Package, Finding Packages and CLASSPATH, A Short Package Example, Access protection: An Access Example, Importing Packages, Interfaces: Defining an Interface, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces Can Be Extended, Default Interface Methods: Default Interface Methods, A More Practical Example, Multiple Inheritance Issues, Use Static Methods in an Interface. **Programs on packages- user defined and inbuilt and Interfaces.**	**8**
V	**Exception Handling:** Exception Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch: Displaying a Description of an Exception, Multiple Catch Clauses, Nested try Statements, throw, throws, finally, Java's built-in Exceptions, Creating your own Exception Subclasses. Chained Exceptions. Three Recently Added Exception Features. **Programs on Exception handling- user defined and inbuilt.**	**8**

Text Book:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Java - The Complete Reference	Herbert Schildt	9th Edition, Tata McGraw Hill, 2014, ISBN: 978-0-07-180856-9

Reference Book:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Introduction to JAVA Programming	Y. Daniel Liang	10th Edition, Pearson Education, 2015, ISBN-13: 9780133761313

Course Outcomes

Course outcome	Descriptions
CO1	Describe the fundamentals of object oriented programming.
CO2	Identify classes, objects, members of a class and relationships among them needed for a specific problem.
CO3	Design and implement object oriented solutions involving multiple objects, packages & Interfaces.
CO4	Develop reliable programs by using exception handling mechanisms.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 4**

Subject Name: Design and Analysis of Algorithms

Subject Code: 18CS403 **L-T-P-C: 4-0-0-4**

Course Objectives:

Sl.No	Course Objectives
1	Learn how to design recursive and non-recursive algorithms.
2	Know different Algorithm Design Techniques for effective problem solving.
3	Learn how to analyze the algorithm with respect to space and time complexity.
4	Understand basic efficiency classes and asymptotic notations to express the complexity.

UNIT	Description	Hours
I	**Introduction, Fundamentals of the Analysis of Algorithm Efficiency, Brute Force:** What is an Algorithm?, Fundamentals of algorithmic problem solving, Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Non-Recursive and recursive Algorithms with Examples. **Brute Force:** Selection Sort, String Matching, Exhaustive Search.	10
II	**Divide and Conquer:**Merge Sort, Quick Sort, Finding the Maximum and Minimum. **Decrease and Conquer:**Insertion Sort, Topological Sorting, Binary search.	10
III	**Transform and Conquer:** Binary Search tree, Balanced Search Trees, Heaps and Heap Sort, Red Black Trees. **Space and Time Tradeoffs:** Input Enhancement in String Matching-Horspool's algorithm, Hashing: hash table, hash functions, collision handling by open addressing and chaining.	11
IV	**Greedy Technique:** Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm, Huffman trees and codes. **Dynamic Programming:** Floyd's Algorithms, Knapsack Problem and Memory Functions.	11
V	**Back tracking:** n-Queen's Problem, Subset-Sum Problem, **Branch and Bound:** Assignment Problem, Knapsack Problem, and Traveling Salesman Problem.P and NP problems, NP-Complete problems.	10

Text Books:

Sl No	Title	Author(s)	Edition, publisher, Year, ISBN
1	Introduction to the Design & Analysis of Algorithms	AnanyLevitin	3rdEdition, Pearson Education, 2012, ISBN-13: 978-0-13-231681-1
2	Introduction to Algorithms	Cormen T.H, Leiserson C.E. &Rivest R.L	3rdEdition, PHI, 2009, ISBN-13: 978-0262033848

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Computer Algorithms/C++	Ellis Horowitz, SatrajSahni and Rajasekaran	2nd Edition, 2014, Universities Press, ISBN-13:978-8173716119
2	Fundamental of algorithms	Gilles Brassard & Paul Bratley	2nd Edition, PHI 1999, ISBN-13:978-120311312

Course Outcomes

Course outcome	Descriptions
CO1	Understand the basic concepts of design and analysis of algorithms.
CO2	Demonstrate various techniques for designing and developing algorithms.
CO3	Design an algorithm using algorithm design technique and analyze its complexity to rank order of growth.
CO4	Solve the given problem instance using appropriate algorithm design technique.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science & Engineering **Semester: 4**

Subject Name: Operating Systems

Subject Code: 18CS404 **L-T-P-C: 3-1-0-4**

Course Objectives:

Sl.No	Course Objectives
1	To learn the fundamentals of Operating Systems.
2	To understand what a process is and how processes are synchronized and scheduled using various algorithms.
3	To gain knowledge on system concepts that includes Mutual exclusion algorithms, deadlock detection algorithms.
4	To learn the mechanisms involved in memory management in an OS

UNIT	Description	Hours
I	**Introduction to Operating Systems and System Structures:** What operating systems do? Computer System architecture; Operating System structure; Open source operating system. **Operating System Services:** System calls; Types of system calls; System programs; Operating System structure; Virtual machines.	10
II	**Process Management:** **Process concept:** Overview; Process scheduling; Operations on processes; Inter process communication. Multi Thread Programming: Overview; Multithreading models; Threading issues. **Process Scheduling:** Basic concepts; Scheduling criteria; Scheduling algorithms.	10
III	**Process Synchronization:** **Synchronization:** Background; The Critical section problem; Peterson's solution; Semaphores; Classical problems of synchronization; Monitors. **Deadlocks:** System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock.	10
IV	**Memory Management:** Memory Management Strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation. **Virtual Memory Management:** Background; Demand paging; Copy-on write; Page replacement; Allocation of frames; Thrashing. **File System:** File concept; Access methods; Directory structure; File system mounting; Protection. Implementing File System: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management.	11

V	**Secondary Storage Structures:** Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights. **Case Study:** The Linux System.	**11**

Text Book:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Operating System Principles	Peter Baer Galvin, Greg Gagne	9thEdition, Wiley-India, ISBN:9788126554270, 8126554274.

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Operating systems - A concept based Approach	D.M Dhamdhere	3rd Edition, Tata McGraw-Hill,2008, ISBN:13:9781259005589,10:1259005585
2	Operating Systems	P.C.P. Bhatt	4thEdition, PHI, 2013, ISBN: 9788120348363.
3	Operating systems	Harvey M Deital	3rdEdition, Addison Wesley, 2007, ISBN: 9788131712894, 8131712893

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the structures and functional components of operating systems.
CO2	Apply appropriate process management techniques to solve machine-critical problems in multi-process environment.
CO3	Select suitable techniques for efficient memory management.
CO4	Outline the concepts of file and storage management.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science & Engineering **Semester: 4**

Subject Name: Microprocessor and Embedded System

Subject Code: 18CS405 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No	Course Objectives
1	To understand the architecture of Microprocessor and Microcontroller.
2	To develop the ability to write programs in assembly and in C for microcontroller based system.
3	To learn interfacing the external devices with microcontroller
4	To understand the concepts of embedded system and its components

UNIT	Description	Hours
I	**ARM Embedded Systems:**The RISC design philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, ARM Processor Fundamentals**:** Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts, and the Vector Table, Core Extensions	8
II	**Introduction to the ARM Instruction Set:**Data Processing Instructions, Branch Instructions, Load-Store Instructions, Software Interrupt Instructions, Program Status Register Instructions, Loading Constants, Conditional Execution, Simple programming exercises.	8
III	**LPC2148 ARM based microcontroller, Interfacing LPC2148 with peripherals:**General description, Salient features of LPC 2148, Architectural overview, Memory mapping, Register Description, Functional pin diagram, Features of different blocks. Description of General purpose Input/output ports(GPIO) and pin control block, Simple Application Programming: LEDs , 7 segment display, 4X4 key pad, Stepper motor, DAC and UART interfacing design and their programming using C.	7
IV	**Efficient C Programming for ARM:** Overview of C Compilers and Optimization, Basic C Data Types, C Looping Structures, Register Allocation, Function Calls, Pointer Aliasing, Structure Arrangement, Bit-fields**,** Unaligned Data and Endianness, Division, Floating Point, Inline Functions and Inline Assembly.	8
V	**Embedded System Components:**Embedded v/s General computing system, Classification of Embedded systems, Major applications and purpose of embedded systems. Core of an Embedded System including all types of processor/controller, Memory.	8

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	ARM system developers' guide	Andrew N Sloss, Dominic Symes and Chris Wright, Elsevier,	3rd Edition, Morgan Kaufman publishers, 2008, ISBN-13:978-1558608740.
2	Introduction to Embedded Systems	Shibu K V	2nd Edition, Tata Mc-GrawHill, 2017, ISBN-13:978-9339219680.

Reference Books:

Sl No	Title	Author(s)	Edition, publisher, Year, ISBN
1	The Definitive Guide to the ARM Cortex-M3	Joseph Yiu	2ndEdition ,Newnes, 2009, ISBN: 9781856179645
2	ARM System-on-Chip Architecture	Steve Furber	2ndEdition, Pearson, 2015, ISBN: 8131708403

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the architectures of ARM7 processor and embedded system.
CO2	Write assembly/C programs for a given problem
CO3	Design I/O interfaces with LPC2148 Microcontroller
CO4	Develop efficient C programs for ARM processor

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science & Engineering **Semester: 4**

Subject Name: Data Communication

Subject Code: 18CS406 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No	Course Objectives
1	Explain the basics of data communication and various types of computer networks.
2	Comprehend the types of transmission techniques for exchange of data between two or more networks.
3	Illustrate switching and TCP/IP protocol suite.
4	Learn Medium Access Control protocols for reliable and noisy channels.

UNIT	Description	Hours
I	**Data Communications and Network Models** Introduction: Data communications: Components, Data Representation, Data Flow, Networks: Network Criteria, Physical structure, Network Types, Local Area Network ,Wide Area Network, switching, The Internet, Standards and Administration: Internet Standards, Internet Administration.Network models: Protocol Layering: Scenarios, Principles of layering, Logical Connection, TCP/IP Protocol Suite: Layered architecture, Layers in the TCP/IP Protocol Suite, Description of each layer, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model, OSI versus TCP/IP.	8
II	**Physical Layer and Media** Data and Signals: Analog and digital Data, Analog and Digital Signals, Periodic and Non-periodic, Digital Signals,: Bit rate , Bit Length, Digital Signal as a composite Analog signal, Transmission of Digital Signals. Transmission impairment: Attenuation, Distortion, Noise. Data rate limits: Noiseless Channel-Nyquist Bit Rate, Noisy Channels-Shannon Capacity, Using both limits. Performance: Bandwidth, Throughput, Latency, Bandwidth Delay Product, Jitter. Digital Transmission: Digital-to-Digital conversion; Analog-to-Digital conversion; Transmission modes.	8
III	**Physical Layer and Media Contd...** Analog Transmission: Digital - to - Analog conversion; Analog - to - Analog conversion.Bandwidth Utilization: Multiplexing; Spread spectrum. Transmission media: Guided media, unguided media Switching: Three Methods of Switching, Switching and TCP/IP Layer, Circuit switched networks, Packet Switching: Data gram networks Virtual-circuit networks, Structure of a switch.	8

IV	**Data Link layer** Introduction, Link-Layer Addressing, Error Detection and Correction: Introduction, Block coding; Cyclic Codes: Cyclic Redundancy Check, Polynomials, Cyclic Code Encoder using Polynomials, Cyclic Code Analysis, Advantages of Cyclic Codes, Other Cyclic Codes, Hardware Implementation, Checksum, Forward Error Correction, Data Link Control: DLC Services, Data-Link Layer Protocols, HDLC, Point-to-Point Protocol, Media Access Control: Random Access, Controlled Access, Channelization.	**7**
V	**Data Link layer Contd...** Wired LANs: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet,Gigabit Ethernet. Wireless LAN's: Introduction, IEEE 802.11 Project, Bluetooth. - Architecture, Bluetooth Layers, Connecting Devices and Virtual LANs: Connecting Devices, Virtual LANs, ATM: Design goals, problems, architecture.	**8**

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Data Communications and Networking,	Behrouz A. Forouzan	5thEdition, Tata McGraw Hill, 2006, ISBN: 978-1-25-906475-3

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Communication Network – Fundamental Concepts and Key Architectures	Alberto Leon-Garcia and Indra, Widjaja	2nd Edition, Tata McGraw-Hill, 2004, ISBN: 978-0-07-059501-9
2	Data and Computer Communication,	William Stallings	8th Edition, Pearson Education,2007, ISBN: 978-81-317-1536-9
3	Computer and Communication Networks	Nader F. Mir	Pearson Education, 2007, 978-81-317-1543-7
4	Computer Networks	Andrew S. Tanenbaum	4th Edition, Pearson Education, 2008, ISBN: 978-01-306-6102-9

Course Outcomes

Course outcome	Descriptions
CO1	Explain the structure of layered approach and its standards in computer networks.
CO2	Demonstrate the different data formats, transmission and conversions
CO3	Identify the errors in data communication and apply appropriate methods for correction
CO4	Solve problems to improve the performance of computer networks

Syllabus for the Academic Year – 2020 – 2021

Department: Information Science and Engineering **Semester: 4**

Subject Name: Algorithms Lab

Subject Code: 18CS407 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	To understand different algorithms for searching, sorting and graph problems and analyze the same.
2	To learn how to analyze the performance of algorithms practically.
3	To understand various Algorithm Design Techniques.

Note: Implement the following using C / C++ / Java Language

LAB CYCLES	Description
I	**Brute Force:** 1. String matching. 2. Sort a given set of elements using Selection sort. 3. Solving Travelling salesman problem. **Divide and Conquer:** 4. Sort a given set of elements using Merge sort. 5. Sort a given set of elements using Quick Sort. 6. Finding the Maximum and Minimum element in an array of 'n' integers. **Decrease and Conquer:** 7. Print the vertices of the directed acyclic graph in topological order using: i. Source Removal Method ii. DFS Method
II	**Decrease and Conquer:** Sort a given set of elements using Insertion Sort. **Transform and Conquer:** 9. Create a heap tree for a given list of .n. elements using: i. Top-Down approach. ii. Bottom-up approach. 10. Sort 'N' number of elements using Heap Sort. **Space and Time Tradeoffs:** 11. Implement Horspool algorithm for String Matching. **Greedy Technique:** 12. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm. 13. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm. 14. From a given vertex in a weighted connected graph, find the shortest paths to other vertices using Dijkstra's algorithm.

III	**Dynamic Programming:** 15. Solve Knapsack problem and print the solution vector. 16. Implement single source shortest paths problem using bellman-ford algorithm. 17. Find all pair shortest path using Floyd's Algorithm. **Back Tracking:** 18. Implement N Queen's algorithm. 19. Find a subset of a given set S of N positive integers whose sum is equal to a given positive integer D. **Branch and Bound:** 20. Solve Knapsack problem and print the solution vector 21. Solve Job Assignment Problem and print the solution.

Course Outcomes:

Course outcome	Descriptions
CO1	Identify the problem given and design the algorithm using algorithm design technique.
CO2	Implement various algorithms in a high level language.
CO3	Analyze the performance of various algorithms.
CO4	Compare the performance of different algorithms for same problem.

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 4**

Subject Name: Microprocessor and Microcontroller Lab

Subject Code: 18CS408 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	To provide practical exposure to the students to acquire coding knowledge on ARM assembly.
2	To provide practical exposure on connectivity of interfacing devices like LEDs, 7-segment Displays, DAC/ADC and various other devices using Microcontroller-LPC2148
3	To develop and execute few basic application programs usingAurdino Uno board

Lab cycles	Description
I	**Develop and execute the following using ARM Assembly** 1) To perform arithmetic operations on a set of integers of different sizes. 2) To perform data handling operations using Logical, Shift, Rotate and Compare instructions. 3) To perform block move and block exchange operations. 4) Searching and sorting of a set of elements using different techniques.
II	**Develop and execute the following using C** 5) Program to interface LEDs and to blink the LEDs in a specified fashion. 6) Program to realize decimal up / down counter using 7 segments Display 7) Program to interface and rotate stepper motor in clockwise/anticlockwise direction 8) Program to interface DAC and generate waveforms 9) Program to interface UART to display text messages
III	**Develop and execute the following using the GenuinoAurdino Uno** 10) Build a Motion detector using a PIR sensor and display appropriate messages 11) Controlling the LED with a push button – turn on /turn off LED photo resistors LDR) – switch on the LED when light level goes below a particular threshold. Plot the light intensity in the room at various time intervals 12) Rain Indicator using a Rain sensor and a water source

Note: Semester End practical exam Students are allowed to pick one experiment from the lot 1 to 12.

Course Outcomes

Course outcome	Descriptions
CO1	Learn ARM instruction sets and gain the knowledge of how assembly language works.
CO2	Write and execute assembly programs to manipulate the data in the memory using ARM processor.
CO3	Write and execute interfacing programs in C to control the operation of peripheral circuits using ARM based microcontroller LPC2148
CO4	Develop and execute simple applications programs using Aurdino Uno board and few sensors

Syllabus for the Academic Year – 2020 - 2021

Department: Information Science and Engineering **Semester: 4**

Subject Name: SKILL DEVELOPMENT-II

Subject Code: HS-18SK401 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl .No	Course Objectives
1	Unique shortcut techniques for mental ability to improve speed and accuracy
2	Improve logical thinking to solve various questions and puzzles in reasoning.
3	Excellent communication, time management and problem solving
4	Approach oriented training and interactive methodology.
5	Create amicable relationships to meet professional objectives
6	To give better idea on different topics to increase the competency of the students in the subject

UNIT	Description	Hours
I	Introduction, Training Objective Advantage of learning Aptitude, Importance of Learning Aptitude, how to crack Aptitude Vedic mathematics, squaring, cubing, one to one method, two to one method Shortcuts, Basic Mathematics, Square root method, Multiplication method-.	03
II	Number system, prime number concept, linear equations, age problems, HCF and LCM, Factorial Concept, Last Digit Concept, Remainders Concept, approximation, and simplifications, in equalities Square root and Cube root, Coding and Decoding- mirror image.	06

III	Percentage-percent to decimal fraction conversion, percentage to quantity, inverse case, percentage change ,relative percentage, product constancy, problems based on population, results on depreciation, Ratio and proportion, Inverse Proportion ,blood relation & family tree, Time speed and distance, relative speed and conversions ,train problems, Direction Problems, Downstream and Upstream, direction sense.	**08**
IV	Verbal analogies, Spotting errors, Antonyms, Synonyms, Spellings, Ordering of words, Sentence improvement, Closet test, one-word substitution	**06**
V	Introduction, Soft Skills, Communication Skills, LSRW, Team Building and Leadership Building Skill Training, stress management, Behavioral management	**05**

Question paper Pattern:

50 questions and each question carry one mark each

Course Outcomes

Course outcome	Descriptions
CO1	Understand the basic concepts of quantitative ability, logical reasoning, verbal reasoning and also soft skills.
CO2	Inclusive and engaging environment for a dynamic campus community
CO3	Proficient use of qualitative and quantitative methods in problem solving
CO4	Critical and analytical thinking across a range of discipline.