PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

REGULATIONS 2019

(CHOICE BASED CREDIT SYSTEM)

B.E – COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(Applicable to the candidates admitted during the academic year 2020-2021 onwards)

SEMESTER III

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory							
1.	HS	GE20301	Tamils and Technology	1	0	0	1
2.	BS	MA20303	Discrete Mathematics	3	1	0	4
3.	ES	EC20306	Analog and Digital Electronics	3	0	0	3
4.	PC	CS20301	Object Oriented Programming	3	0	0	3
5.	PC	CS20302	Design and Analysis of Algorithms	3	0	0	3
6.	PC	CS20303	Database management Systems	3	0	0	3
7.	MC	MC20301	Value Education	2	0	0	0
Practical							
8.	ES	EC20307	Analog and Digital Electronics Laboratory	0	0	4	2
9.	PC	CS20304	Object Oriented Programming Laboratory	0	0	4	2
10.	PC	CS20305	Database management Systems Laboratory	0	0	4	2
			TOTAL	**18**	**1**	**12**	**23**

SEMESTER IV

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory							
1.	BS	MA20403	Probability and Statistics	3	1	0	4
2.	ES	EC20409	Computer Architecture, Microprocessors and Microcontrollers	3	0	0	3
3.	PC	CS20401	Software Engineering	3	0	0	3
4.	PC	CS20402	Computer Networks	3	0	0	3
5.	PC	CS20403	Python Programming	3	0	0	3
6.	PC	CS20404	Formal Languages and Automata	3	0	0	3
Practical							
7.	PC	CS20405	Computer Networks Laboratory	0	0	4	2
8.	PC	CS20406	Python Programming Laboratory	0	0	4	2
9.	EE	EN20401	English Proficiency Course Laboratory	0	0	2	1
			TOTAL	**18**	**1**	**10**	**24**

GE20301 **தமிழரும் தொழில்நுட்பமும்** L T P C 1 0 0 1

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம் 3

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடுவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் 3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் &சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை வடிவமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும் கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டி நாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக்கலை

அலகு III உற்பத்தி தொழில் நுட்பம் 3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பு உருக்குதல், எஃகு - வரலாற்றுச் சின்னங்களாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் -எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம் 3

அணை - ஏரிகுளங்கள், மதகு - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு -அறிவுசார் சமூகம்

அலகு V *அறிவியல் தமிழ் மற்றும் கணித்தமிழ்* 3

அறிவியல் தமிழின் வளர்ச்சி -கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத் திட்டம்

TOTAL PERIODS: 15

TEXT CUM REFERENCE BOOKS:

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை. (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr.K.K.Pillay) A Joint publication of TNTB & ESC and RMRL – (in print).
6. Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by International institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subramanian, Dr.K.D.Thirunavukkarasu)
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by International institute of Tamil Studies)
9. Keeladi – 'Sangam City Civilzation on the vanks of river vaigai' (Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by the author)
11. Porunai Civilization (Jointly Published by Department of Arcaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to vaigai (R.Balakrishnan) (Published by RMRL) – Reference Book

GE20301	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel -Copper and goldCoins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project

TOTAL PERIODS: 15

TEXT CUM REFERENCE BOOKS:

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை. (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு).

5. Social Life of Tamils (Dr.K.K.Pillay) A Joint publication of TNTB & ESC and RMRL – (in print).
6. Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by International institute of Tamil Studies.
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8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by International institute of Tamil Studies)
9. Keeladi – 'Sangam City Civilzation on the vanks of river vaigai' (Jointly Published by Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by the author)
11. Porunai Civilization (Jointly Published by Department of Arcaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to vaigai (R.Balakrishnan) (Published by RMRL) – Reference Book

SEMESTER-III

MA20303 **DISCRETE MATHEMATICS** **3 1 0 4**

COURSE OBJECTIVES

To enable the students to

- interpret the introductory concepts of Logic, which will enable them to model and analyze physical phenomena involving arguments.
- implement the definitions of relevant vocabulary from quantifiers and inference and be able to perform related calculations.
- summarize and apply the methodologies involved in solving problems related to fundamental principles of sets and Implement the mathematical ideas for relations.
- solve problems using recurrence relations and recursion to analyze algorithms.
- acquire knowledge and understand the concepts of lattices.

UNIT I PROPOSITIONAL CALCULUS **12**

Propositions - Logical connectives, Compound propositions, Conditional and biconditional propositions, Truth tables; Tautologies and contradictions; Contrapositive; Logical equivalences and implications - DeMorgan's Laws Normal forms, Principal conjunctive and disjunctive normal forms; Rules of inference; Arguments - Validity of arguments.

UNIT II PREDICATE CALCULUS **12**

Predicates - Statement function, Variables, Free and bound variables; Quantifiers; Universe of discourse; Logical equivalences and implications for quantified statements; Theory of inference - The rules of universal specification and generalization; Validity of arguments.

UNIT III SET THEORY **12**

Basic concepts - Notations, Subset, Algebra of sets, the power set; Ordered pairs and Cartesian product; Relations on sets - Types of relations and their properties, Relational matrix and the graph of relation; Partitions; Equivalence relations.

UNIT IV FUNCTIONS **12**

Definitions of functions, Classification of functions, Type of functions, Examples, Composition of functions, Inverse functions; Binary and n-ary operations; Characteristic function of a set; Hashing functions; Recursive functions; Permutation functions.

UNIT V LATTICE THEORY **12**

Partial ordering - Posets , Lattices as Posets , Properties of lattices , Lattices as Algebraic systems , Sub lattices ; Direct product and Homomorphism ; Some Special lattices.

TOTAL PERIODS: 60

COURSE OUTCOMES

Upon completion of this course, the students will be able to

- interpret the concepts of direct proof, indirect proof and proof by contradiction and verify the validity of an argument using propositional and predicate logic.
- have substantial experience to comprehend formal logical arguments.
- understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
- use effectively algebraic techniques to analyze basic discrete structures and algorithms.
- perform operations on discrete structures such as sets, functions, relations, and sequences.

TEXT BOOKS

1. Koshy, "Discrete Mathematics with Applications", Elsevier Publications, 2010.
2. Kenneth H.Rosen, "Discrete Mathematics and its Applications (with Combinatorics and Graph Theory)", 6th Edition, Tata McGraw-Hill, 5th Reprint 2008.
3. Trembly J.P and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill, 35 th Reprint 2008.

REFERENCES

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction ", 4th Edition, Pearson Education, 2002.
2. A. Tamilarasi, A. M. Natarajan, "Discrete Mathematics and its Applications", 3rd Edition, Khanna Publishers, 2008.
3. T. Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", Tata McGraw – Hill, 2007.

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome
(1,2,3 indicates the strength of correleation)(1-LOW; 2-MEDIUM; 3-HIGH)

CO	Programme Outcome (POs)												Programme Specific Outcome (PSO)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	3	-	-	-	-	-	-	-	-	3	3	3
CO4	2	2	3	3	-	-	-	-	-	-	-	2	3	3
CO5	3	3	3	-	-	-	-	-	-	-	-	3	3	3

EC20306 **ANALOG AND DIGITAL ELECTRONICS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the basic concepts of diode, rectifiers, filters and power supplies
- know the concept of various types of transistor amplifier circuits.
- acquire the knowledge about the fundamentals and simplification of digital logic circuits.
- design the various combinational circuits using logic gates.
- verify synchronous sequential circuits using flip-flops and VHDL.

UNIT I DIODE AND APPLICATIONS **9**

Diode - Static and Dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances, Diode Applications: Switch-Switching times. Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Linear Mode Power Supply, SMPS

UNIT II BIPOLAR JUNCTION TRANSISTOR **9**

Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC and AC load lines, Transistor Hybrid parameter model, Determination of h Parameters from transistor characteristics, Conversion of h-parameters.

UNIT III BOOLEAN ALGEBRA AND LOGIC GATES **9**

Number systems, Complements of Numbers, Codes- Weighted and Non-weighted codes Boolean postulates and laws - De-Morgan's Theorem, Principle of Duality; SOP- Minterm; POS- Maxterm; Boolean functions - Minimization - K-Map, Don't care conditions, Quine-McCluskey Method; Logic gates - Implementation of NAND and NOR.

UNIT IV COMBINATIONAL CIRCUITS **9**

Design procedure of Combinational circuits - Adders, Subtractors, 4-bit Parallel adder and Subtractor,4-bit Parallel Adder/Subtractor, Carry-lookahead adder, BCD adder, Multiplexer, Demultiplexer, Encoder, Decoder; Code converters. Introduction to VHDL - VHDL description of combinational circuits, VHDL Models for multiplexers, VHDL Modules.

UNIT V SEQUENTIAL CIRCUITS **9**

Flip flops - Triggering of Flip-flops, Realization of flip flop using other flip flops; Counters - Types, Design of Synchronous counters, Modulo-N counter; Classification of sequential circuits - Moore and Mealy; Shift registers.

TOTAL PERIODS **45**

COURSE OUTCOMES

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

- design power supplies using diodes.
- demonstrate the basic concepts of biasing.
- use Boolean functions in digital design various techniques
- implement the combinational circuits using logic gates.
- design different synchronous sequential circuits for real time applications.

TEXT BOOKS

1. Salivahanan.S, Sureshkumar.N, "Electronic Devices and Circuits", 3rd edition, McGraw Hill, 2014.
2. M. Morris Mano, "Digital Design", 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.

REFERENCES

1. Donald.A.Neamen, "Electronic Circuit Analysis and Design", 2nd edition, Tata McGraw Hill, 2007.
2. Adel.S.Sedra, Kenneth C.Smith, "Micro Electronic Circuits", 5th edition, Oxford University Press, 2004.
3. S. Salivahanan and S. Arivazhagan, "Digital Circuits and Design", 3rd Edition, Vikas Publishing House Pvt.Ltd, New Delhi, 2007.
4. John .M Yarbrough, "Digital Logic Applications and Design", Thomson Publications, New Delhi,2007.

CO-PO MAPPING :

Mapping of Course Outcomes with Programme Outcomes : (1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	3	3	-	-	-	3	-	-	3	3	3
CO2	3	3	3	3	3	-	-	-	3	-	-	3	3	3
CO3	2	2	2	2	2	-	-	-	2	-	-	2	2	2
CO4	3	3	3	3	3	-	-	-	3	-	-	3	3	3
CO5	2	2	2	2	2	-	-	-	2	-	-	2	2	2

PAAVAI ENGINEERING COLLEGE, NAMAKKAL
APPROVED
BOARD OF STUDIES
Electronics & Communication Engineering
24/7/21
AUTONOMOUS

CS20301 **OBJECT ORIENTED PROGRAMMING** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand Object Oriented Programming concepts.
- study the concept of constructor and operator overloading.
- compile of basic concepts of inheritance and the utilization.
- know the concepts of Java using Packages and Arrays.
- use of Interface and I/O streams.

UNIT I INTRODUCTION 9

Object Oriented Paradigm, Elements of Object Oriented Programming, Merits and Demerits of OO Methodology; C++ fundamentals - Classes and Objects; Function- Function overloading, Static data and member functions, inline function.

UNIT II CONSTRUCTOR AND OPERATOR OVERLOADING 9

Constructor - Copy Constructors, Default Arguments ;Array of Objects ;Pointer to Object member; Friend Function; Operator Overloading - binary and Unary operator overloading.

UNIT III TEMPLATE AND INHERITENCE 9

Templates - Function Template, Class Template; Inheritance - Derived class, Abstract class, Types of Inheritance; Virtual Functions; Exception Handling.

UNIT IV INTRODUCTION TO JAVA 9

Introduction to JAVA -bytecode, virtual machines, objects, classes, Javadoc; packages; Arrays; Strings.

UNIT V INHERITANCE, THREADING AND I/O 9

Inheritance - interfaces and inner classes - exception handling - threads - Streams and I/O.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end this course, students will be able to

- understand the principles of Object Oriented Programming
- create a program using Constructor
- re-write solutions to a given problems using inheritance and polymorphism concepts
- develop simple Java program using class, methods and objects
- perform the concepts of concurrent programming

TEXT BOOKS

1. Herbert Schildt "C++: The Complete Reference", Tata McGraw Hill, 4th Edition, 2003.
2. Herbert Schildt, "JAVA, The Complete Reference" Tata Mcgraw Hill, 8th edition, 2011.

REFERENCES

1. BjarneStroustrup, "The C++ Programming Language", Addison Wesley, 2014.
2. K.R. Venugopal, RajkumarBuyya, T.Ravishankar, "Mastering C++", TMH, 2009.
3. Bruce Eckel, " Thinking in JAVA", Prentice Hall,2006 6. Kathy Sierra, Bert Bates," Head First JAVA",O"Rielly,2005
4. Kathy Sierra, Bert Bates," Head First JAVA",O"Rielly,2005

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correleation)(1-LOW; 2-MEDIUM; 3-HIGH)														
CO	Programme Outcome (POs)												Programme Specific Outcome (PSO)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	2	-	-	-	-	-	-	1	1	-	-	2	-
CO3	3	2	-	-	-	-	-	-	1	1	-	-	2	-
CO4	3	2	-	-	-	-	-	-	1	1	-	-	2	-
CO5	3	2	-	-	-	-	-	-	1	1	-	-	2	-

CS20302 **DESIGN AND ANALYSIS OF ALGORITHMS** 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know the fundamental concepts and techniques for problem solving and algorithm design.
- analyze the importance of computational complexity of the algorithm.
- familiarize the important algorithm design techniques.
- design various techniques to solve the problem.
- understand the limitations of algorithmic power.

UNIT I INTRODUCTION 9

Notion of Algorithm - Fundamentals of Algorithmic Problem Solving - Important Problem Types - Fundamentals of the Analysis of Algorithm Efficiency - Analysis Framework, Asymptotic Notations and its Properties; Mathematical Analysis of Recursive and Non - Recursive Relations (Insertion sort, bubble sort, Selection sort, Towers of Hanoi).

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER 9

Brute Force - Closest-Pair and Convex-Hull Problems, Exhaustive Search, Travelling Salesman Problem, Knapsack Problem, Assignment Problem; Divide and Conquer methodology - Merge sort, Quick sort, Binary Search, Multiplication of Large Integers, Strassen's Matrix Multiplication, Closest Pair Problem and Convex Hull Problem.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9

Dynamic Programming – Principle of optimality - Computing a Binomial Coefficient - Floyd's algorithm – Multistage graph - Optimal Binary Search Trees - 0/1 Knapsack Problem and Memory functions; Greedy Technique - Prim's algorithm - Kruskal's algorithm - Dijikstra's algorithm - Huffman trees.

UNIT IV ITERATIVE IMPROVEMENT 9

The Simplex Method - The Maximum-Flow Problem - Maximum Matching in Bipartite Graphs - The Stable marriage Problem.

UNIT V ALGORITHM DESIGN TECHNIQUE AND ITS LIMITATIONS 9

Backtracking - n-Queen problem, Hamiltonian Circuit Problem, Subset Sum Problem; Branch and Bound - Assignment problem, Knapsack problem, Travelling Salesman Problem; Limitation of Algorithm Power - P, NP, NP Complete Problems, Approximation Algorithms for NP-hard Problems.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end this course, students will be able to

- design algorithms for various computing problems.
- analyze the time and space complexity of algorithms.
- identify various algorithms design techniques for different problems.
- analyze the different algorithm design techniques for a given problem.
- differentiate algorithm design techniques of NP complete and NP hard problems.

TEXT BOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

REFERENCES

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
2. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.
3. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.
4. Harsh Bhasin, "Algorithms Design and Analysis", Oxford University Press, 2015.

CO/PO MAPPING

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correleation)(1-LOW; 2-MEDIUM; 3-HIGH)														
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CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

CS20303 **DATABASE MANAGEMENT SYSTEMS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- teach the basic database concepts, applications, data models, schemas and instances.
- familiarize Entity Relationship model for a database
- emphasize the importance of normalization in databases.
- demonstrate the basic concepts of transaction processing and concurrency control.
- familiarize the concepts of database storage structures and identify the access techniques.

UNIT I INTRODUCTION **9**

Purpose of Database System -Views of data, data models; Database Languages; Database System Architecture; Database users and Administrator; Entity-Relationship model (E-R model), E-R diagrams, mapping from ER model to relational model; Introduction to relational databases.

UNIT II RELATIONAL MODEL **9**

Introduction to Relational Algebra; Domain Relational Calculus; Tuple Relational Calculus Fundamental operations; Additional l/O operations; SQL fundamentals- Views, integrity, triggers, security; Advanced SQL features-Embedded SQL, dynamic SQL; Introduction to Distribute Databases and Client/Server Databases.

UNIT III DATABASE DESIGN **9**

Functional Dependencies- non-loss decomposition; Normal Forms- first, second, third normal forms, dependency preservation, boycecodd normal form, multi-valued dependencies and fourth normal form, join dependencies and fifth normal form.

UNIT IV TRANSACTIONS **9**

Transaction Concepts - transaction recovery, ACID properties, system recovery, media recovery; two phase commit- save points; SQL Facilities for Recovery; Concurrency Need for Concurrency; Locking Protocols-two phase locking; Deadlock; Serializability; Recovery; Isolation Levels; ISQL Facilities for Concurrency.

UNIT V IMPLEMENTATION TECHNIQUES **9**

Overview of Physical Storage Media; Indexing and Hashing; Ordered Indices; B+ tree Index Files, B tree-Index Files; Static Hashing, Dynamic Hashing. Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption

TOTAL PERIODS: 45

COURSE OUTCOMES

Upon the completion of the course, the students will be able to

- use the basic concepts of Database Systems in Database design
- apply SQL queries to interact with Database
- design a Database using ER Modelling
- apply normalization on database design to eliminate anomalies
- optimize data storage with various techniques and implement query optimization.

TEXT BOOKS

1. Silberschatz, H.Korth and Sudarshan S., "Database System Concepts", 6th Edition, McGraw-Hill International, 2010.
2. Elmasri R. and Shamakant B. Navathe, "Fundamentals of Database Systems", 6th Edition, AddisionWesley ,2011.

REFERENCES

1. AtulKahate, "Introduction to Database Management Systems", Pearson Education, New Delhi, 2006.
2. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata McGraw Hill, 2010.
3. G.K.Gupta, "Database Management Systems", Tata McGraw Hill, 2011.
4. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2005), Database System Concepts, 5th edition, McGraw-Hill, New Delhi,India.

CO/PO MAPPING

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CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

MC20301 **VALUE EDUCATION** **2 0 0 0**

COURSE OBJECTIVES

To enable the students to

- develop the individual multi-dimensionally in physical, intellectual, emotional and spiritual dimensions.
- facilitate individuals think about and reflect on different values.
- understand their responsibility in making choices and the practical implications of expressing them.
- instigate to choose their personal, social, moral and spiritual values.
- design and chisel the overall personality of an individual.

UNIT I PERSONAL VALUES **6**

Value Education – Definition, Types of values; Human values - Respect, Acceptance, Consideration, Appreciation, Listening, Openness, Affection, Patience, Honesty, Forgiveness, Sacrifice, Authenticity, Self Control, Altruism, Tolerance and Understanding, Wisdom, Decision making, Self –actualization, Character formation towards positive Personality, Contentment; Religious Values -Humility, Sympathy and Compassion, Gratitude. Peace, Justice, Freedom, Equality..

UNIT II COMMUNAL VALUES **6**

Social Values - Pity and probity - Self-control - Respect to - Age, Experience, Maturity, Family members, Neighbors- Universal Brotherhood - Flexibility -Peer pressure - Sensitization towards Gender Equality, Physically challenged, Intellectually challenged - Reliability - Unity - Modern Challenges of Adolescent Emotions and behavior - Comparison and Competition- Positive and Negative thoughts- Arrogance, Anger and Selfishness.

UNIT III ENGINEERING ETHIC 6

Professional Values -Knowledge thirst - Sincerity in profession- Regularity, Responsibility, Punctuality and Faith - Perseverance - Courage - Competence - Co-operation- Curbing unethical practices - Integrity, Social Consciousness and Responsibility. Global Values - Computer Ethics – Moral Leadership - Code of Conduct - Corporate Social Responsibility.

UNIT IV SPIRITUAL VALUES **6**

Developing Spirituality - Thinking process, Moralization of Desires - Health benefits- Physical exercises - Mental peace - Meditation - Objectives, Types, Effects on body, mind and soul- Yoga - Objectives, Types, Asanas. Family values- Family's structure, function, roles, beliefs, attitudes and ideals, Family Work Ethic, Family Time, Family Traditions.

UNIT V HUMAN RIGHTS 6

Classification of Human Rights - Right to Life, Liberty and Dignity- Right to Equality - Right against Exploitation - Cultural and Educational Rights- Physical assault and Sexual harassment - Domestic violence.

TOTAL PERIODS: 30

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- cultivate the values needed for peaceful living in the existing society.
- comprehend humanistic values to develop peace in the world.
- foster ethics in profession and usage of Technology.
- orient with the importance of value education towards personal, group and spiritual attributes.
- nurture physical, mental, spiritual growth to face the competitive world.

TEXT BOOKS

1. Sharma, S.P. Moral and Value Education; Principles and Practices, Kanishka publishers, 2013.
2. Little, William, An introduction of Ethics. Allied publisher, Indian Reprint 1955.

REFERENCES

1. Values (Collection of Essays). Sri Ramakrishna Math. Chennai. 1996.

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)

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CO2	-	-	-	2	-	2	-	1	3	2	1	3	-	2
CO3	-	-	3	2	2	3	2	3	3	1	3	3	2	3
CO4	-	-	3	1	-	2	-	-	1	-	-	3	2	-
CO5	-	-	-	-	-	1	-	-	-	-	-	3	-	-

EC20307 ANALOG AND DIGITAL ELECTRONICS LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand the characteristics of diode and its applications.
- gain the knowledge about the types of transistor amplifiers.
- acquire the concept of Boolean laws and theorems.
- design and implement the sequential logic circuits and also simulate combinational and sequential logic circuits using VHDL/Verilog.

LIST OF EXPERIMENTS

1. Biasing characteristics of PN diode
2. Determination of ripple factor for Half wave rectifier/ Full wave rectifier.
3. Analyze input and output CB characteristics.
4. Analyze input and output CE characteristics.
5. Verification of Boolean laws and theorems using logic gates.
6. Design and verification of adders and subtractors using basic gates.
7. Design and implementation of code converters (Binary to Gray code and Gray to Binary code).
8. Design and implementation of Encoder and decoder using basic gates.
9. Design and implementation of Multiplexers and Demultiplexers using basic gates.
10. Design and implementation of 3-bit Synchronous and Asynchronous counters.
11. Design and implementation of 4-bit Shift Registers (SISO/SIPO/PISO/PIPO).
12. Simulation of Combinational and Sequential circuits using Verilog HDL.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- realize diode circuits.
- implement various transistor configurations.
- evaluate the basic laws and theorems.
- implement and simulate different combinational and sequential circuits.

CO-PO MAPPING :

Mapping of Course Outcomes with Programme Outcomes : (1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	3	-	-	-	-	-	-	3	3	3

CS20304 **OBJECT ORIENTED PROGRAMMING LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable students to

- understand Object Oriented Programming concepts
- learn the various features of OOP in C++.
- illustrate the concepts of reusability, platform independence in java.
- hypothesize thread based concepts of Java

LIST OF EXPERIMENTS

1. Creation of classes and use of different types of functions.
2. Programs using Constructor and Destructor
3. Count the number of objects created for a class using static member function.
4. Write programs using function overloading and operator overloading.
5. Programs using virtual function and friend functions.
6. Implementation of user defined function using exception handling mechanism.
7. Programs using function templates and class templates.
8. Develop Simple program in Java using class, objects and methods.
9. Programs for Method Overloading and Method Overriding
10. Programs using inheritance.
11. Program to implement Inheritance, Interfaces and Packages
12. Create a thread in java using Thread and Runnable Interface.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end this course, students will be able to

- apply class components that protect data integrity and produce classes that are re-usable and maintainable
- test a C++ program for errors and exceptions
- generalize the applications using object oriented concepts
- design simple Java program using class, methods and objects

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: Turbo C++, Jdk

HARDWARE: Standalone desktops 60 Nos.

CO/PO MAPPING

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)														
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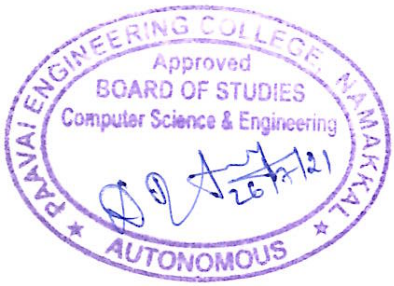
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	3



CS20305 DATABASE MANAGEMENT SYSTEMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- create and use a database with DDL Commands.
- write of DML commands and DCL commands for database manipulation.
- compose advanced SQL queries.
- design applications with query language.

LIST OF EXPERIMENTS

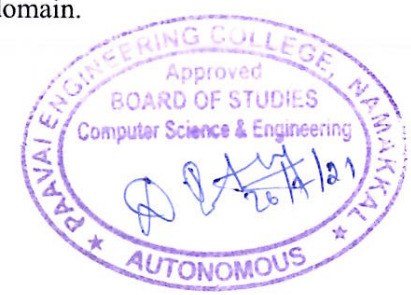
1. Data Definition, Table Creation, Constraints.
2. Insert, Select Commands, Update & Delete Commands.
3. Nested Queries & Join Queries.
4. Views.
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools.
7. Forms.
8. Triggers.
9. Menu Design.
10. Database connectivity

TOTAL PERIODS 60

`COURSE OUTCOMES

Upon completion of this course, the students will be able to

- design and implement a database schema for a given problem-domain.
- populate and query a database.
- create and maintain tables using PL/SQL.
- prepare reports for real time applications.



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CO4	3	3	1	2	3	-	2	-	-	-	2	3	2	1

SEMESTER-IV

MA20403 **PROBABILITY AND STATISTICS** **3 1 0 4**

COURSE OBJECTIVES

To enable the students to

- analyse the concept of Random variables and probability distribution in designing processes.
- know and differentiate the discrete and continuous two dimensional random variables.
- determine the concepts of hypotheses testing, its need and applications.
- equip with statistical techniques for designing experiments, analyzing, interpreting and presenting research data.
- emphasize the aspects of statistical tools in engineering problems.

UNIT I RANDOM VARIABLES **12**

Discrete and continuous random variables - Moments - Moment generating functions - Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions – Functions of random variables.

UNIT II TWO - DIMENSIONAL RANDOM VARIABLES **12**

Joint distributions - Marginal and conditional distributions - Covariance - Correlation and Linear regression - Transformation of random variables –Applications of Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTING OF HYPOTHESIS **12**

Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample test for single mean and difference of means -Small samples: Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT IV DESIGN OF EXPERIMENTS **12**

ANOVA - One way and Two way classifications - Completely randomized design - Randomized block design - Latin square design - 2^2 factorial design.

UNIT V STATISTICAL QUALITY CONTROL **12**

Control charts for measurements (X and R charts) - Control charts for attributes (P, C and NP charts) - Tolerance limits - Acceptance sampling.

TOTAL PERIODS: 60

COURSE OUTCOMES

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

- demonstrate the fundamental concepts of probability and probability distributions of random variables in designing process
- identify the differences in two dimensional random variables
- implement the statistical techniques to hypotheses testing of engineering and management problems
- be aware of the principles to be adopted for designing the experiments.
- compare statistical date using control chart in quality control

TEXT BOOKS

1. Milton. J. S. and Arnold. J.C., "Introduction to Probability and StatistiCS", Tata McGraw Hill, 4th Edition, 2007.
2. Johnson. R.A. and Gupta. C.B., Miller and Freund's Probability and StatistiCS for Engineers", PearsonEducation, Asia, 7th Edition, 2007.
3. Papoulis. A andUnnikrishnapillai. S., "Probability, Random Variables and Stochastic Processes"McGraw Hill Education India,4th Edition, New Delhi, 2010.

REFERENCE BOOKS

1. Devore. J.L., "Probability and StatistiCS for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2012.
2. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and StatistiCS for Engineers and Scientists", Pearson Education, Asia , 8th Edition, 2007.
3. Ross, S.M., "Introduction to Probability and StatistiCS for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum"s Outline of Theory and Problems ofProbability and StatistiCS", Tata McGraw Hill Edition, 2004.

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CO3	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO5	3	3	3	-	-	-	-	-	-	-	-	3	3	3

EC20409 COMPUTER ARCHITECTURE, MICROPROCESSORS AND MICROCONTROLLERS **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- learn the basic structure and operations of a computer
- acquire knowledge about pipelining and parallel processing
- understand the concepts of virtual and cache memory
- know the architecture and programming of 8085 and 8086 microprocessors
- be familiar with the concepts of 8051 and PIC microcontroller

UNIT I COMPUTER MEMORY SYSTEM AND I/O ORGANIZATION **9**

Basic concepts - Semiconductor RAM - ROM - Cache memories - Virtual memory - Memory management requirements - Secondary storage devices. Accessing I/O devices - Standard I/O Interfaces - PCI, SCSI, and USB .

UNIT II PIPELINING AND PARALLEL PROCESSING **9**

Pipelining Basic concepts - Data hazards, Instruction hazards, Structural Hazards; Influence on instruction sets - Data path and control considerations - Performance considerations - Exception handling - Parallel Processing Challenges - Multi-core processors - Flynn's classification - SISD, MIMD, SIMD, SPMD; Hardware multithreading.

UNIT III MICROPROCESSORS **9**

8085 Microprocessor - Architecture, Addressing modes; 8086 Microprocessor - Architecture, Addressing modes, Instruction set, assembler directives; Simple programs in 8085,8086; Interrupts and interrupt service routines.

UNIT IV I/O INTERFACING **9**

Programmable Peripheral Interface; I/O interfacing - Serial communication interface, D/A and A/D Interface, Keyboard and display controller, Interrupt controller; Memory Interfacing - DMA controller.

UNIT V MICROCONTROLLERS **9**

8051 - Architecture, Special Function Registers, I/O Ports, Memory, Interrupts, Addressing Modes, Instruction set, Assembly language programming; Introduction to PIC microcontroller.

TOTAL PERIODS 45

COURSE OUTCOMES

Upon the completion of the course, the students will be able to

- explain the basics structure of computers, operations and instructions.
- categorize pipelining and parallel processing for system performance.
- analyze the concept of microprocessors.
- examine various I/O interfacing devices.
- elucidate the operations of microcontrollers.

TEXT BOOKS

1. David A. Patterson and John L. Hennessey, "Computer organization and design', Morgan Kauffman / Elsevier, Fifth edition, 2014.
2. Krishna Kant, "Microprocessors and Microcontrollers Architecture, programming and System design using 8085, 8086, 8051 and 8096", Prentice Hall of India, 2013.

REFERENCES

1. William Stallings, "Computer Organization and Architecture - Designing for Performance", Eleventh Edition, Pearson Education, 2019.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. Doughlas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", 2012
4. A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals , Architecture, Programming and Interfacing", Tata McGraw Hill, 2006.

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CO3	3	3	1	2	2	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

CS20401 **SOFTWARE ENGINEERING** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- analyze Software life cycle models and system engineering process for developing a system from scratch
- understand fundamental concepts of requirement engineering.
- acquire knowledge about Design levels of software engineering.
- learn various software testing methods.
- study the software project management concepts.

UNIT I SOFTWARE PROCESS **9**

The Evolving role of Software - Software - The changing Nature of Software - Legacy Software - A generic view of process - A layered Technology - A Process Framework - The Capability Maturity Model Integration (CMMI) - Process Assessment - Personal and Team Process Models-Product and Process; Process Models - The Waterfall Model - Incremental Process Models - Incremental Model , The RAD Model - Evolutionary Process Models - Prototyping, The Spiral Model, The Concurrent Development Model - Specialized Process Models - the Unified Process.

UNIT II SOFTWARE REQUIREMENTS AND ANALYSIS **9**

Requirements Engineering- Requirements Engineering tasks - Initiating the requirements Engineering Process - Eliciting Requirements - Developing Use cases - Building the Analysis Models - Elements of the Analysis Model, Analysis pattern - Negotiating Requirements - Validating Requirements; Requirements Analysis- Analysis Modeling approaches - data modeling concepts - Object oriented Analysis - Scenario based modeling - Flow oriented Modeling - Class based modeling - creating a behavior model.

UNIT III SOFTWARE DESIGN **9**

Design Engineering - Design process - Design Quality - Design model - Agile Methods - Extreme Programming - Rapid Application development - Software Prototyping - Software Reuse - Application Frameworks - Application System Reuse - Software Evolution Program Evolution Dynamics - Software Maintenance - Evolution Processes - Legacy system evolution Planning; Verification and Validation- Software Inspections - Automated Static analysis - Verification and Formal -methods.

UNIT IV SOFTWARE TESTING AND IMPLEMENTATION **9**

Software testing fundamentals – Verification and Validation - Internal and external views of Testing - white box testing – basis path testing - control structure testing-black box testing - Regression Testing - Unit Testing - Integration Testing - Validation Testing - System Testing and Debugging – Selenium Basics.

UNIT V SOFTWARE PROJECT MANAGEMENT 9

Software Cost Estimation - Productivity - Estimation Techniques - Algorithmic Cost Modeling - Project Duration and Staffing; Process and Product Quality - Quality Assurance and Standards - Planning - Control - Software Measurement and Metrics - Process Improvement - Process Classification - Measurement - Analysis and Modeling - Change; Configuration Management - Planning Change Management - Version and Release Management - System Building.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end this course, students will be able to

- compare different process models.
- apply the Requirement engineering process with emphasis on elicitation analysis and modelling for any given software requirement
- summarize different methods for the design of a software system
- understand software testing methods.
- maintain documentation for software engineering process.

TEXT BOOKS

1. Rogers. Pressman, "Software Engineering: A Practitioner's Approach", Mc-Graw Hill International, Eighth edition, 2015. (UNIT-I, II, IV)
2. Ian Sommerville, Software Engineering, 9th Edition, Pearson Education,2011. (UNIT-III, V)

REFERENCES

1. Richard E. Fairley, "Principles of Software Engineering", IEEE computer society press, 2010.
2. PankajJalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
3. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd,2007.
4. Shari P fleeger, Joanne Atlee, "Software Engineering: Theory and Practice", Fourth Edition, Pearson Education, 2010.

CO/PO MAPPING

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)														
CO	Programme Outcome (POs)												Programme Specific Outcome (PSO)	
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CO1	3	2	3	-	1	-	-	-	3	2	-	2	2	1
CO2	3	2	3	-	1	-	-	-	2	2	-	3	1	2
CO3	2	3	3	-	3	-	-	-	1	-	1	-	2	1
CO4	2	3	3	-	3	-	-	-	1	-	2	-	2	1
CO5	3	3	-	-	-	-	-	-	3	3	2	3	1	3

CS20402 **COMPUTER NETWORKS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the protocol layering and physical level communication.
- analyze the performance of a network.
- understand the various components required to build different networks.
- learn the functions of network layer and the various routing protocols.
- familiarize the functions and protocols of the transport layer.

UNIT I INTRODUCTION AND PHYSICAL LAYER **9**

Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet Switching.

UNIT II DATA-LINK LAYER & MEDIA ACCESS **9**

Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP – Media Access Control – Wired LANs: Ethernet – Wireless LANs – Introduction – IEEE 802.11, Bluetooth – Connecting Devices

UNITIII NETWORK LAYER **9**

Introduction-forwarding and routing-network services models– IPV4 Addresses – Forwarding of IP Packets – Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.

UNIT IV TRANSPORT LAYER **9**

Introduction – Transport Layer Protocols – Services –multiplexing and demultiplexing– Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.

UNIT V APPLICATION LAYER **9**

WWW and HTTP – FTP – Email –Telnet –SSH – DNS –Peer to peer applications– SNMP.

TOTAL PERIODS 45

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- identify the components required to build different types of networks.
- choose the required functionality at each layer for given application.
- identify solution for each functionality at each layer.
- functions of network layer and the various routing protocols.
- trace the flow of information from one node to another node in the network.

TEXT BOOKS

1. Morris Mano, "Digital Design", 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/PearsonEducation(Singapore) Pvt. Ltd., New Delhi, 2003 .
2. M. Morris Mano, "Digital Design", 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/PearsonEducation(Singapore) Pvt. Ltd., New Delhi, 2003 .

REFERENCES

1. Donald.A.Neamen, "Electronic Circuit Analysis and Design", 2nd edition, Tata McGraw Hill, 2007.
2. Adel.S.Sedra, Kenneth C.Smith, "Micro Electronic Circuits", 5th edition, Oxford University Press, 2004.

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correleation) (1-Weak; 2-Medium; 3-Strong)														
CO	Programme Outcome (POs)												Programme Specific Outcome (PSO)	
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CO2	3	3	3	3	3	-	-	-	3	-	-	3	3	3
CO3	2	2	2	2	2	-	-	-	2	-	-	2	2	2
CO4	3	3	3	3	3	-	-	-	3	-	-	3	3	3
CO5	2	2	2	2	2	-	-	-	2	-	-	2	2	2

CS20403 **PYTHON PROGRAMMING** 3 0 0 3

COURSE OBJECTIVES

To enable students to

- know the basics of algorithmic problem solving.
- read and write python programs.
- develop programs with condition and loops
- understand the concepts of lists, tuple and dictionaries
- acquire knowledge about file and modules.

UNIT I ALGORITHMS AND PROBLEM SOLVING 9

Algorithms -building blocks of algorithms (statements, state, control flow, functions); notation (pseudo code, flow chart, programming language); algorithmic problem solving- simple strategies for developing algorithms (iteration, recursion).

UNIT II EXPRESSION AND STATEMENTS 9

Python interpreter and interactive mode - values and types - int, float, boolean, string and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions - function definition and use, flow of execution, parameters and arguments.

UNIT III CONTROL AND FLOW FUNCTIONS 9

Conditional - Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration - state, while, for, break, continue, pass; Fruitful functions - return values, parameters, local and global scope, function composition, recursion; Strings - string slices, immutability, string functions and methods, string module; Lists as array.

UNIT IV LISTS, TUPLES AND DICTIONARIES 9

Lists - list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples - tuple assignment, tuple as return value; Dictionaries - operations and methods; advanced list processing - list comprehension; Illustrative programs - selection sort, insertion sort, merge sort, histogram.

UNIT V PYTHON CLASSES, FILES AND PACKAGES 9

Python Classes – Thinking about Objects - Class Variables and Methods - Managing Class - Files and exception - text files, reading and writing files, format operator; command line arguments - errors and exceptions - handling exceptions - modules - pygame - packages - Illustrative programs - word count, copy file.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- develop algorithmic solutions to simple computational problems
- read, write, execute simple Python programs
- structure simple Python programs.
- signifies compound data using Python lists, tuples, dictionaries
- modify a Python program into files and Packages

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016. (http://greenteapress.com/wp/think-python/)
2. Martin C. Brown, —PYTHON:The Complete Reference‖, McGraw-Hill, 2001

REFERENCES

1. John V Guttag, —" Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
4. Timothy A. Budd, —Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd., 2015.

CO/PO Mapping

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)														
CO	Programme Outcome (POs)												Programme Specific Outcome (PSO)	
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CO1	3	2	1	-	-	1	-	-	-	-	-	1	2	-
CO2	3	2	1	-	2	1	-	-	-	-	-	1	2	-
CO3	3	2	1	-	2	1	-	-	-	-	-	1	2	-
CO4	3	2	1	-	2	1	-	-	-	-	-	1	2	-
CO5	3	2	1	1	2	1	-	-	-	-	-	1	2	-

CS20404 FORMAL LANGUAGES AND AUTOMATA 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- provide introduction to some of the central ideas of theoretical computer science from the

  Perspective of formal languages and understand deterministic and non-deterministic machines.
- introduce the fundamental concepts of regular expression and finite automata.
- introduce the fundamental concepts of context free grammar.
- employ push down automata to solve problems in computing.
- understand Turing machines and the differences between decidability and undecidability.

UNIT I INTRODUCTION TO FINITE AUTOMATA 9

Introduction to finite automata structural representations; the central concepts of automata theory; alphabets, strings, languages, problems; Nondeterministic finite automata- formal definition, finite automata with epsilon, transitions; Deterministic finite automata- definition of DFA, DFA process strings, language of DFA, conversion of NFA with ε -transitions to NFA without ε transitions; conversion of NFA to DFA.

UNIT II REGULAR EXPRESSIONS 9

Regular expressions; finite automata and regular expressions; applications of regular expressions; algebraic laws for regular expressions; properties of regular languages pumping lemma for regular languages; applications of the pumping lemma; closure properties of regular languages; decision properties of regular languages; equivalence and minimization of automata.

UNIT III CONTEXT FREE GRAMMAR 9

Context-Free Grammars- definition of context-free grammars; derivations using a grammar; leftmost and rightmost derivations; the language of a grammar; sentential forms, parse trees; applications of context-free grammars, ambiguity in grammars and languages; Normal forms for context free grammars- eliminating useless symbols; eliminating -productions; Chomsky normal form griebach normal form; Pumping lemma for context-free languages: statement of pumping lemma, applications Closure properties of CFL's, decision properties of CFL's.

UNIT IV PUSH DOWN AUTOMATA 9

Push Down Automata-definition of the pushdown automaton, languages of a PDA, equivalence of PDA's and CFG's, acceptance by final state, acceptance by empty stack; deterministic pushdown automata; CFG toPDA, PDA to CFG.

UNIT V TURING MACHINES 9

Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine, Turing machines and halting Undecidability, A Language that is Not Recursively Enumerable, AnUndecidable Problem that is RE, Undecidable Problems about Turing Machines, Recursive languages,Properties of recursive languages, Post's Correspondence Problem.

TOTAL PERIODS: 45

COURSE OUTCOMES

Upon the completion of the course, the students will be able to

- understand the concept of finite automata and their power to recognize the languages.
- convert regular expressions to finite automata and minimize DFA.
- design context free grammars for formal languages.
- design PDA.
- gain proficiency with Turing machine and distinguish between decidability and undecidability.

TEXTBOOKS

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, JohnE. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, PearsonEducation.
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.

REFERENCES

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.

CO/PO MAPPING

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CO3	3	2	2	2	2	-	-	-	1	1	1	1	3	2
CO4	3	2	2	2	2	-	-	-	1	1	1	1	3	2
CO5	3	2	2	2	2	-	-	-	1	1	1	1	3	2

CS20405 **COMPUTER NETWORKS LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand the basics and working Networking Protocols using Cisco Packet Tracer
- Implement the various mechanism of supporting protocols of each layer through Packet Tracer.
- Familiar with the various routing algorithms.
- Learn and use simulation tools.

LIST OF EXPERIMENTS

1. There are 20PC's in your network. Five PC's are connected to one Ethernet hub, and five PC's are connected to another hub. Each hub is connected to separate switch and both the switches are connected to a separate router. The routers are connected via an Ethernet bridge. The remaining 10 PC's are connected directly to one of the two switches. How many Ethernet segments are there? Implement this scenario using cisco packet tracer.
2. Write a code to implement bit stuffing and byte stuffing.
3. In CRC error correction scheme, choose pattern 1101 and data 100100. Write a code to encode the givendata.
4. In an IPv4 packet the value of header length is 1000 in binary. Write a code to find, how many
5. Write a code to implement distance vector routing algorithm.
6. Write a code to implement HTTP web client program to download a web page using TCP sockets.
7. Write a code to implement border gateway protocol (BGP).
8. Configure a Web server, DHCP server and a DNS server all together in a single simulation through which IP have to be allocated for the host through DHCP server, Conversion of Canonical Name to IPaddress to be done by DNS server and Access to the webpage has to give by web server using Cisco Packet Tracer.
9. Study of Packet Analyzer using Wireshark Tool.

TOTAL PERIODS 60

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- demonstrate and Configure Networking Protocols using Cisco Packet Tracer.
- analyze the various working mechanism of supporting protocols of each layer through Packet Tracer.
- implement transport and application layer protocols in data networks.
- use simulation tools to analyze the performance of various network protocols.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: C / C++ / Cisco Packet Tracer

HARDWARE: Standalone desktops 30 Nos.

CO/PO MAPPING:

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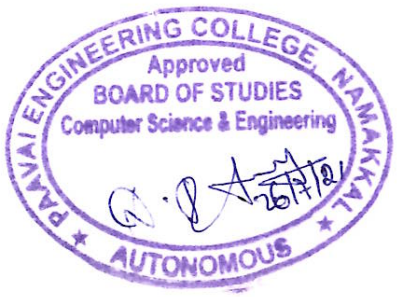
CO3	3	3	2	1	-	-	-	-	-	-	2	-	3	3
CO4	2	3	1	3	-	-	-	-	-	-	-	-	2	1



CS20406 **PYTHON PROGRAMMING LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- acquire programming skills in core python concepts
- study about object oriented skills in python.
- create the skill of designing graphical user interfaces in python.
- implement the ability to write database applications in python.

LIST OF EXPERIMENTS

1. Programs that take command line arguments (word count)
2. Find the most frequent words in a text read from a file
3. Simulate elliptical orbits in Pygam
4. Simulate bouncing ball using Pygame
5. Compute the GCD of two numbers
6. Find the square root of a number (Newtons method)
7. Exponentiation (power of a number)
8. Find the maximum of a list of numbers
9. Linear Search
10. Binary Search
11. Selection Sort
12. Merge Sort
13. Insertion Sort
14. First n prime numbers
15. Multiply matrices

TOTAL PERIODS **60**

COURSE OUTCOMES

At the end this course, students will be able to

- develop solutions to simple computational problems using Python programs.
- solve problems using conditionals and loops in Python.
- create Python programs by defining functions and calling them.
- use Python lists, tuples and dictionaries for representing compound data.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE:

Python 3 interpreter for Windows/Linux

HARDWARE: Standalone desktops 60 Nos.

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)														
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CO2	2	3	-	-	3	-	-	-	1	-	-	-	-	2
CO3	2	3	-	-	3	-	-	-	1	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	3	-	3	-	-	3

EN20401 **ENGLISH PROFICIENCY COURSE LABORATORY** **0 0 2 1**

COURSE OBJECTIVES

To enable students to

- familiarize with the reading skills such as skimming and scanning.
- practice writing tasks to the level expected.
- develop listening strategies such as listening for key words, making inferences, and identifying main ideas.
- speak well without inhibition and to assist the students in improving their vocabulary, pronunciation, and comprehension of grammar.

EXERCISES FOR PRACTICE

1. Listening Exercises from TOEFL
    a. Conversations, Lectures
2. Listening Exercises from IELTS
    a. Places and directions
    b. Actions and processes
3. Reading Exercises from PTE
    a. Re-order paragraphs
4. Reading Exercises from IELTS
    a. Opinions and attitudes
    b. Locating and matching information
5. Reading Exercises from BEC Vantage
    a. Single informational text with lexical gaps
    b. Error identification
6. Writing Exercises from PTE
    a. Summarize written text
7. Writing Exercises from IELTS
    a. Describing maps
    b. Describing diagrams

8. Speaking IELTS format

   a. Talking about familiar Topics

   b. Giving a talk

   c. Discussion on a Topic

TOTAL PERIODS: 30

COURSE OUTCOMES

Upon the completion of this course, the students will be able to

- skim, scan and infer the given texts and attend the tasks successfully.
- write coherently using appropriate vocabulary and grammar.
- listen to speeches and conversations and answer the questions.
- communicate fluently and effectively on any given Topics.

TEXT BOOKS

1. Cambridge IELTS 12 Academic Student's Book with Answers: Authentic Examination Papers (IELTS... by Cambridge University Press . New Delhi.2016
2. TOEFL iBT Prep Plus 2018-2019 4 Practice Tests) Kaplan Publishing. Newyork.2017.

REFERENCES

1. Cambridge University Press India Pvt. Ltd, New Delhi.2016.
2. PTE Academic Test builder. Macmillan Education. London. 2012.

CO/PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (1,2,3 indicates the strength of correlation)(1-LOW; 2-MEDIUM; 3-HIGH)														
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CO2	-	-	2	2	-	-	1	1	3	2	-	2	-	2
CO3	-	-	-	-	-	3	1	2	3	2	2	3	2	-
CO4	-	-	-	-	-	2	2	3	3	2	2	-	2	-