E.G.S. PILLAY ENGINEERING COLLEGE,(Autonomous)

Approved by AICTE, New Delhi

Affiliated to Anna University, Chennai | Accredited by NAAC with 'A++' Grade

Accredited by NBA (B.Tech-IT, B.E-CSE and ECE)(Tier-1)

NAGAPATTINAM – 611002

B.TECH – Artificial Intelligence & Data Science

R 2019

Full Time Curriculum and Syllabus

SEMESTER-3

S. No.	Course Code	Course Title	L	T	P	C
1	1901MA304	Engineering Mathematics – III	3	2	0	4
2	1902AS301	Programming using Python	3	0	2	4
3	1902AS302	Data Structures and Algorithms	2	0	2	3
4	1902AS303	Database Management Systems	2	0	2	3
5	1902AS304	Computer Organization and Design	2	0	0	2
6	1902AS305	Big Data Systems	3	0	0	3
7	1902AS306	Digital Principles and Design	2	0	2	3
8	1902MCX02	Constitution of India	2^	0	0	0
9	1904GE351	Life Skills: Verbal Ability	0	0	2	1
		Total Credits				23

1901MA304	ENGINEERING MATHEMATICS - III (For AIDS)	L	T	P	C
		3	1	0	4

PREREQUISITE:

1. Basic Concept of Probability.
2. Optimization.

COURSE OBJECTIVES:

1. To introduce the basic concepts of probability and random variables.
2. To apply mathematical linear programming techniques to solve constrained problems.
3. To appreciate the use of simulation techniques.
4. To impart knowledge of handling random vectors which represent random variables in multi-dimensional.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Use the fundamental concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO2: Apply the basic concepts of one and two dimensional random variables in engineering applications.
CO3: Compute optimal solution in the real life optimizing/allocation/assignment problems involving conditions and resource constraints
CO4: Simulate appropriate application/distribution problems.
CO5: Develop exposure to the principal component analysis of random vectors and matrices.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1									
CO2	3	2	1									
CO3	3	2	1									
CO4	3	2	1									
CO5	3	2	1									

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1	1		
CO2	1		
CO3	1		
CO4	1		
CO5	1		

COURSE CONTENTS:

MODULE I **PROBABILITYANDRANDOMVARIABLES** **9 Hours**

Axioms of probability - Conditional probability – Total probability – Bayes' theorem Random variable – Distribution function – properties – Probability mass function – Probability density function – moments - StandardDistributions-Binomial, PoissonandNormaldistributions

MODULE II **TWODIMENSIONALRANDOMVARIABLESANDESTIMATION** **9 Hours**

Joint distributions – Marginal and conditional distributions – Expected values of functions of two variables–Correlation andregression(fordiscrete dataonly)- Central limittheorem– Statement

MODULE III **LINEARPROGRAMMING** **9 Hours**

Thephases ofORstudy–formationofan L.P model–graphicalsolution–simplexalgorithm–artificial variablestechnique -BigM method.

MODULE IV	**SIMULATION**	**9 Hours**
Definition and steps of simulation, random number, random number generator, Discrete Event System Simulation–clock, event list, Application in Scheduling, Queuing systems and Inventory systems.		
MODULE V	**MULTIVARIATEANALYSIS**	**9 Hours**
Random vectors and matrices – Mean vectors and covariance matrices –Principal components – Populationprincipalcomponents–Principal componentsfromstandardized variables.		
		TOTAL:45 + 15 = 60 HOURS

REFERENCES:

1. Jay L. Devore, "Probability and Statistics for Engineering and the Sciences", Cengage Learning, 9th Edition, Boston, 2016.
2. Johnson, R.A., and Wichern, D.W., "Applied Multivariate Statistical Analysis", Pearson Education, Sixth Edition, New Delhi, 2013.
3. Operations Research and Management Science, Hand Book: Edited By A. Ravi Ravindran.
4. Taha H.A.,, "Operations Research: An Introduction", Prentice Hall of India Pvt. Ltd. 10 Edition, New Delhi, 2017.
5. Winston, W.L., "Operations Research", Thomson – Brooks/Cole, Fourth Edition, Belmont, 2003.
6. https://onlinecourses.nptel.ac.in/noc23_ma24/preview(Link for NPTEL/SWAYAM/MOOC Courses)

1902AS301	Programming using Python	L	T	P	C
		3	0	2	4

PREREQUISITE:

The course assumes no prior skill or background in design, art or engineering. It is open to all undergraduates and graduate students with an interest in learning a programming language. Python is a dynamic, interpreted (bytecode-compiled) language. There are no type declarations of variables, parameters, functions, or methods in source code. This makes the code short and flexible, and you lose the compile-time type checking of the source code.

COURSE OBJECTIVES:

1. Cultivate the mindset and skills of successful entrepreneurs
2. Lead innovative teams
3. Develop and refine your strategy in today's fast-changing, dynamic markets
4. Grow your customer base through inbound and outbound marketing

Module I	Introduction to Python Programming	6 Hours

Program, Debugging, Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The First Program

Variables, Expressions & Statements - Values and Types, Variables, Variable Names and Keywords, Operators and Operands, Expressions and Statements, Interactive Mode and Script Mode, Order of Operations, String Operations, Comments

Module II	Functions & Strings	9 Hours

Functions - Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions. Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Stack Diagrams, Fruitful Functions and Void Functions, Why Functions, Importing with from Interface Design - TurtleWorld, Simple Repetition, Exercises, Encapsulation, Generalization, Interface, Design, Refactoring, A Development Plan, Docstring

Strings - A String Is a Sequence, len, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, Case Study : Reading Word Lists, Exercises, Search, Looping with Indices

Module III	Conditionals, Recursion & Iteration	6 Hours

Conditionals & Recursion - Modulus Operator, Boolean Expressions, Logical Operators, Conditional Execution, Alternative Execution, Chained Conditionals, Nested Conditionals, Recursion, Stack Diagrams for Recursive Functions, Infinite Recursion, Keyboard Input

Fruitful Functions - Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Leap of Faith, Example, Checking Types, Debugging

Iteration - Multiple Assignment, Updating Variables, The while Statement, break, Square Roots, Algorithms

Module IV	Lists, Dictionaries & Files	9 Hours

Lists - A List Is a Sequence, Lists Are Mutable, Traversing a List, List Operations, List Slices, List Methods Map, Filter, and Reduce, Deleting Elements, Lists and Strings, Objects and Values, Aliasing, List Arguments, Dictionaries - Dictionary as a Set of Counters, Looping and Dictionaries, Reverse Lookup, Dictionaries and, Lists, Memos, Global Variables, Long Integers

Files – Persistence, Reading and Writing, Format Operator, Filenames and Paths, Catching Exceptions, Databases, Pickling, Pipes, Writing Modules

Tuples - Tuples Are Immutable, Tuple Assignment, Tuples as Return Values, Variable-Length Argument Tuples, Lists and Tuples, Dictionaries and Tuples, Comparing Tuples, Sequences of Sequences

Case Study : Data Structure Selection - Word Frequency Analysis, Random Numbers, Word Histogram, Most Common Words, Optional Parameters, Dictionary Subtraction, Random Words, Markov Analysis, Data Structures

Module V	**Object Oriented Programming Concepts**	**15 Hours**
Classes & Objects - User-Defined Types, Attributes, Rectangles, Instances as Return Values, Objects Are Mutable, Copying, Functions – Time, Pure Functions, Modifiers, Prototyping Versus Planning, Methods - Object-Oriented Features, Printing Objects, A More Complicated Example, The init Method, The __str__ Method, Operator Overloading, Type-Based Dispatch, Polymorphism, Debugging, Interface and Implementation, Inheritance - Card Objects, Class Attributes, Comparing Cards, Decks, Printing the Deck, Add, Remove, Shuffle, and Sort, Inheritance, Class Diagrams, Debugging, Data Encapsulation, Case Study – GUI, Buttons and Callbacks, Canvas Widgets, Coordinate Sequences, More Widgets, Packing Widgets, Menus and Callables, Binding		
		Total Hours: 45
Mode of Assessment:CAT/Assignment/Quiz/Seminar/Presentation/ESE		
Course Outcomes: 1. Apply the fundamentals of writing Python scripts 2. Discover how to work with lists and sequence data 3. Write Python functions to facilitate code reuse 4. Use Python to read and write files 5. Work with the Python standard library 6. Explore Python's object-oriented features 7. Search text using regular expressions		
FURTHER READING:		
1. Real Python Course, Part 1, Real Python Team (Real Python, 2017) 2. Python Tricks: A Buffet of Awesome Python Features, Dan Bader (dbader.org, 2017) 3. Fluent Python: Clear, Concise, and Effective Programming, Luciano Ramalho (O'Reilly, 2014)		
REFERENCES:		
1.Python Crash Course, Eric Matthes (No Starch Press, 2016)		
2.Head-First Python, 2nd edition, Paul Barry (O'Reilly, 2016)		
3. Invent Your Own Computer Games with Python, 4th edition, Al Sweigart (No Starch, 2017)		
4. Think Python: How to Think Like a Computer Scientist, 2nd edition, Allen B. Downey (O'Reilly, 2015)		
5. Learn Python 3 the Hard Way, Zed A. Shaw (Addison-Wesley, 2016)		
6. Rework Book by David Heinemeier Hansson and Jason Fried, 2010		
7. https://onlinecourses.nptel.ac.in/noc22_cs31/preview, The Joy of Computing using Python, NPTEL		
LIST OF EXPERIMENTS [SUGGESSTED]		
1. Programs on Variable & Expressions		
2. Programs on Functions & Recursion		
3. Programs on String Operations		
4. Programs on Control Statements & Iterations		
5. Programs on Lists, Dictionaries, Tuples & Files		
6. Programs on Regular Expressions		
7. Programs on Object Oriented Programming Concepts		
8. Working with NumPy		
9. Practical introduction to Python packages for Working with Data		
10. Capstone Project on solving a real world problem using a framework		
		Total Hours:30
Mode of Assessment: PAT/Project Presentation		

1902AS302	Data Structures and Algorithms	L	T	P	C
		2	0	2	3

PREREQUISITE:

To introduce the fundamental concept of data structures and to emphasize the importance of choice of correct data structures in developing and implementing efficient algorithms and to introduce simple data structure and algorithms which are the building blocks for more complex data structures used in problem solving using programming. Further the students should be able to decompose bigger problems using abstractions such as object oriented designs and programming and develop effective techniques of software engineering such as decomposition, procedural abstraction, and software reuse

COURSE OBJECTIVES:

- To introduce the fundamental concept of data structures and to emphasize the importance of choice of correct data structures in developing and implementing efficient algorithms and to
- introduce simple data structure and algorithms which are the building blocks for more complex data structures used in problem solving using programming.
- programming and develop effective techniques of software engineering such as decomposition, procedural abstraction, and software reuse

Module I	**LINEAR DATA STRUCTURES – LIST**	**5 Hours**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists –Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).

Module II	**LINEAR DATA STRUCTURES – STACKS, QUEUES**	**6Hours**

Stack ADT – Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression - Queue ADT – Operations - Circular Queue – Priority Queue – de Queue – applications of queues.

Module III	**NON LINEAR DATA STRUCTURES – TREES**	**6 Hours**

Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree - B+ Tree - Heap – Applications of heap.

Module IV	**NON LINEAR DATA STRUCTURES - GRAPHS**	**6 Hours**

Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

Module V	**FILES &TERMINOLOGIES**	**7 Hours**

Definition-File Organization-Sequential file Organization- Direct file Organization- Indexed Sequential-Hashed and accessing schemes-Algorithm specification- Recursion-Performance analysis-Asymptotic Notation

Total Hours: 30

Mode of Assessment:CAT/Assignment/Quiz/Seminar/Presentation/ESE

Course Outcomes:

• Assess how the choice of data structures and algorithm design methods impacts the performance of programs.
• Choose the appropriate data structure and algorithm design method for a specified application.
• Write programs using object-oriented design principles.
• Solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, tournament trees, binary search trees, and graphs and writing programs for these solutions.
• Solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking, and branch and bound and writing programs for these solutions.

FURTHER READING:

1. T. H. Cormen, C. E. Leiserson, R L Rivest and C Stein, “Introduction to Algorithms” 3rd Edition, MIT press, 2009.
2. R.S. Salaria, “Data Structures”, Khanna Publishing House, 2021.
3. Seymour Lipschutz, “Data Structures”, McGraw Hill Education; 1st edition, 2014.

REFERENCES:	
1.R.B. Patel, “Expert Data Structures with C”, Khanna Book Publishing Company, 2020. 2. M. A. Weiss, Data Structures and Problem Solving Using Java, Addison-Wesley, 1997. 3. M. Tannenbaum, Y Langsam and M J Augenstein, Data Structures Using C++, Prentice Hall India, 1996. 4. A. H. Aho, J. E. Hopcroft and J. Ullman, Data Structures and Algorithms, Addison-Wesley, 1987 https://onlinecourses.nptel.ac.in/noc22_cs31/preview, Data structure, NPTEL	
LIST OF EXPERIMENTS [SUGGESSTED]	
1. Array implementation of Stack and Queue ADTs 2. Array implementation of List ADT 3. Linked list implementation of List, Stack and Queue ADTs 4. Applications of List, Stack and Queue ADT 5. Implementation of Binary Trees and operations of Binary Trees 6. Implementation of AVL Trees 7. Graph representation and Traversal algorithms 8. Applications of Graphs Implementation of searching and sorting algorithms	
Mode of Assessment: PAT/Project Presentation	

1902AS303	Database Management Systems	L	T	P	C
		2	0	2	3

PREREQUISITE: NIL

COURSE OBJECTIVES:

1. To understand the concept of DBMS and ER Modeling.
2. To explain the normalization and relational algebra.
3. To apply the concurrency control, recovery, security and indexing for the real time data.

Module I	Introduction to Database systems	6 Hours

Introduction to Database Systems: Overview – Data Models – Database System Architecture – History of Database Systems. Entity-Relationship Model: Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram – Weak Entity Sets – Extended E-R Features – Design of an E-R Database Schema.

Module II	Relational Model	6 Hours

Structure of Relational Databases – Relational Algebra – Extended - Relational Algebra Operations – Modification of Database – Views – Tuple Relational Calculus – Domain Relational Calculus. SQL: Background – Basic Structure – Set - Operations – Aggregate Functions – Null Values – Nested Sub queries – Modification of the database – Joined Relations – Data-Definition Language.

Module III	Integrity Security and File Structures	6 Hours

Domain Constraints – Referential Integrity – Assertions–Security and Authorization – Authorization in SQL-Relational-Database Design: Normalization -first normal form , second normal form, third normal form, Boyce-Codd normal form-Indexing and Hashing: Basic Concepts – Ordered Indices – Static Hashing – Dynamic Hashing.

Module IV	Transaction concept	6 Hours

Two-Phase Locking Techniques for Concurrency Control – Concurrency Control based on timestamp – Recovery Concepts – Recovery based on deferred update – Recovery techniques based on immediate update - Shadow Paging.

Module V	Cloud and NoSQL Databases	6 Hours

Cloud databases- Data Storage Systems on the Cloud, Data Representation, Partitioning and Retrieving Data, Challenges with Cloud-Based Databases- NoSQL Data model: Aggregate Models, Document Data Model, Key-Value Data Model, Columnar Data Model, Graph-Based Data Model

Total Hours: 30

Mode of Assessment:CAT/Assignment/Quiz/Seminar/Presentation/ESE

Course Outcomes:

1. Demonstrate the basic concept and role of DBMS in an organization.
2. Illustrate the design principles for database design, ER model and normalization.
3. Apply Concurrency control and recovery mechanisms for the desirable database problem.
4. Compare the basic database storage structure and access techniques including and hashing.
5. Review the fundamental view on unstructured data and its management.
6. Design and implement the database system with the fundamental concepts of DBMS.

FURTHER READING:

1.Advance database systems
2.Data science
3.SQL,Mysql

REFERENCES:

1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, Modern Database Management, Fifth Edition, Addison Wesley, 2000.

2. Elmasri, Navathe, Fundamentals of database Systems, Third Edition, Addison Wesley, 2000.

3. JefreyD.Ulman, Jenifer Widom, A First Course in Database Systems, Pearson Education Asia, 2001.

4. Bipin C Desai, An Introduction to Database Systems, Galgotia Publications Pvt Limited, 2001.
5. R. Elmasri and S. Navathe, Fundamentals of Database Systems, 7th Edition, AddisonWesley, 2016
6. Abraham Silberschatz, Henry F. Korth, and S. Sudharsan, “Database System Concepts”, 7h Edition, McGraw Hill, 2019.
7. Raghu Ramakrishnan, Database Management Systems,Mcgraw-Hill,4th edition,2015.
8.https://hyperskill.org/tracks/31

LIST OF EXPERIMENTS [SUGGESSTED]

1. Study of Basic SQL Commands.
2. DDL and DML
3. Table creation with constraints.
4. Joins operations with views
5. PL/SQL-Procedures
6. PL/SQL- Cursors
7. PL/SQL- Functions, Triggers

Total Hours:30

Mode of Assessment: PAT/Project Presentation

1902AS304	Computer Organization and Design	L	T	P	C
		2	0	0	2

PREREQUISITE: NIL

and design concepts of a computer. The course also introduced the machine instructions and programming of a computer using its assembly language. It also describes the arithmetic circuits which are used in the model processors to implement the computer arithmetic and introduces the control circuits and execution of instructions on the processor. The course also introduces the memory technology, memory hierarchy, caches to bridge the speed gap between memory and the processor and various I/O techniques and concepts including interrupt and direct memory transfer.

COURSE OBJECTIVES:

The objective of the course is to learn the,

1. Computer system: Major components are processor, memory, I/O.
2. Processor: Major components are control unit, registers, ALU, and instruction execution unit.
3. Control Unit: Provides control signals for the operation and coordination of all processor components. Traditionally, a microprogramming implementation has been used, in which major components are control memory, microinstruction sequencing logic, and registers. More recently, microprogramming has been less prominent but remains an important implementation technique.

Module I	**Fundamental organization of computer system**	**4 Hours**

Functional units of computer, performance, truth tables, number representation, switch from uniprocessor to multiprocessor, fallacies and pitfalls

Module II	**Instruction execution**	**5 Hours**

Representing instruction in the computer, logical operations, instruction for making decisions, parallelism and instructions : synchronization, translating and starting a program

Module III	**Functional units of processor**	**4 Hours**

Building a datapath, overview of pipelining, pipelined datapath and control, data hazards, control hazards, exceptions, parallelism, advanced instruction level parallelism, the C sort example

Module IV	**Addressing modes, instruction formats and control statements**	**4 Hours**

Addressing modes, types, various instruction formats, example instruction set using addressing modes and control statements, control path microprogramming

Module V	**System memory hierarchy**	**4 Hours**

The basics of caches, measuring and improving cache, virtual memory, virtual machines, parallelism and memory hierarchy, Implementing cache controllers

Module VI	**Hardware for basic arithmetic**	**5 Hours**

Addition, subtraction, multiplication and division, floating point , parallelism and computer arithmetic associativity

Module VII	**Interrupts and DMA**	**5 Hours**

I/O techniques, interrupts, polling, DMA

Total Hours: 30

Mode of Assessment:CAT/Assignment/Quiz/Seminar/Presentation/ESE

Course Outcomes:

1. Describe the fundamental organization of a computer system including processor, memory and I/O subsystem.
2. Illustrate the mechanisms of instruction execution including fetch, decode and operate
3. Explain the functional units of a processor including ALU, register files, control path.
4. Explain various components of the machine instructions and addressing modes for operands, instruction formats and program control statements
5. Distinguish the organization of various parts of a system memory hierarchy
6. Relate the instructions to its execution through the understanding of the hardware for basic arithmetic
7. Explain the I/O mechanisms and various modes including polling, interrupt driven and DMA.

FURTHER READING:

1. William Stallings, Computer Organization and Architecture: Designing for Performance, 8/e, Pearson Education India. 2010.
2. D. A. Patterson and J. L. Hennessy, Computer Organization and Design, 4/e, Morgan Kaufmann, 2008.

REFERENCES:

1. A. S. Tanenbaum, Structured Computer Organization, 5/e, Prentice Hall of India, 2009.
2. V. C. Hamacher, Z. G. Vranesic and S. G. Zaky, Computer Organization, 5/e, McGraw Hill, 2002.
3. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 4/e, Morgan Kaufmann, 2006.
4. D. V. Hall, Microprocessors and Interfacing, 2/e, McGraw Hall, 2006.

1902AS305	Big Data Systems	L	T	P	C
		3	0	0	3

PREREQUISITE: NIL

The course assumes no prior skill or background in design, art or engineering. "Big Data" refers to our burgeoning ability to crunch vast collections of information, analyze it instantly, and draw sometimes profoundly surprising conclusions from it. This emerging science can translate myriad phenomena—from the price of airline tickets to the text of millions of books—into searchable form and uses our increasing computing power to unearth epiphanies that we never could have seen before. A revolution on par with the internet or perhaps even the printing press, Big Data will change the way we think about business, health, politics, education, and innovation in the years to come. It also poses fresh threats, from the inevitable end of privacy as we know it to the prospect of being penalized for things we haven't even done yet, based on big data's ability to predict our future behavior.

COURSE OBJECTIVES:

1. To provide an overview of Big Data and its uses cases
2. To understand Big Data better in terms of elements of persuasion
3. To analyze the Big Data using Hadoop
4. To interpret the Big Data analytics and its importance
5. To design NoSQL databases and its usecases

Module I	Introduction to Big Data	9 Hours

Big Data-History, Big Data use cases in Healthcare, Retail, Banking, Media and Telecom industry, Big Data challenges, How Big Data works, Types of data, Structured vs Unstructured data, Semi-structured data, Elements of Big Data

Module II	Elements of Persuasion	9 Hours

Statistical techniques and methods, data visualization, automation, semantics, predictive analytics, limitations of Big Data, Big Data lifecycle, Use of Big Data in social networking, preventing fraudulent activities

Module III	Technologies for handling Big Data	9 Hours

Distributed and Parallel computing for Big Data, Introducing Hadoop, Cloud Computing and Big Data, In-Memory computing technology for Big Data, Hadoop Distributed file system, architecture, concepts, overview of org.apache.hadoop.io. package

Module IV	Big Data foundations and storing data	9 Hours

Exploring the Big Data stack, Virtualization and Big Data, Virtualization approaches, RDBMS and Big Data, Non Relational databases, Integrating Big Data with traditional data warehouses, Big Data analysis and data warehouse, changing deployment models in Big Data era, Designing a Data Model for 'Catch the Pink Flamingo'

Module V	NoSQL Data Management	9 Hours

Introduction to NoSQL, Characteristics and History, Types of data models, schema-less databases, materialized views, distribution models, sharding, BigData& NoSQL Usecases : Aadhar database, Google BigTable, Amazon Dynamo

Total Hours: 45

Mode of Assessment: CAT/Assignment/Quiz/Seminar/Presentation/ESE

Course Outcomes:

1. Relate data and big data in the current data driven world
2. Articulate various elements of persuasion in respect to Big data
3. Correlate technologies related to big data and specific requirements
4. Discover methods and methodologies to store big data and data foundations
5. Criticize NoSQL databases in respect to today and future data driven information processing and appraise its advantages

FURTHER READING:

1. DT Editorial services, "Big Data", Black Book, Dreamtech press, 2015
2. Phil Simon, "Too Big to Ignore", the business case for big data, Wiley Press, 2015
3. Viktor Mayer, "Big Data: A Revolution That Will Transform How We Live, Work, and Think",

REFERENCES:
1. Rob Kitchin, "The data revolution : Big data, Open data, Data infrastructures and their consequences", 2nd edition, 2017
2. T. H. Davenport,"Big Data at Work: Dispelling the Myths, Uncovering the Opportunities", Thomas H.Devanport
3. Nathan Marz And James Warren , "Big Data: Principles and Best Practices of Scalable Real-Time Data Systems", DreamTech Press
4. Bernard Marr, "Big Data in Practice", Wiley, 2017
5. David Stephenson, "Big data demystified", O'Reilly media, 2018
6. Vince Reynolds, " Big Data For Beginners: Understanding SMART Big Data, Data Mining & Data Analytics For improved Business Performance, Life Decisions & More!", Vince Reynolds, 2016

1902AS306	DIGITALPRINCIPLESANDDESIGN	L	T	P	C
		2	0	2	3

AIM: ThisistoprovidetheconceptsofDigital principles,logic,conversionanddesignprocedures

COURSEOBJECTIVES:

Learn how to design digital circuits, by simplifying the Boolean functions. Also, gives an idea about designs using PLDs ,and writing codes for designing larger digital systems.

UNIT I	BOOLEANALGEBRAANDLOGICGATES	6 Hours

ReviewofNumberSystems–ArithmeticOperations–BinaryCodes–BooleanAlgebraandTheorems– BooleanFunctions– Simplification ofBooleanFunctions ,LogicGates

UNIT II	COMBINATIONALLOGIC	6 Hours

CombinationalCircuits–CircuitsforArithmeticOperations,CodeConversion–DecodersandEncoders– MultiplexersandDemultiplexers–IntroductiontoHDL–HDL codingofCombinationalcircuits.

UNIT III	SYNCHRONOUSSEQUENTIALLOGIC	6 Hours

SequentialCircuits–FlipFlops–StateReductionandStateAssignment–ShiftRegisters– Counters– HDL Coding forSequential LogicCircuits.

UNITIV	ASYNCHRONOUSSEQUENTIALLOGIC	6 Hours

DesignofAsynchronousSequentialCircuits–ReductionofStateandFlowTables–Race-freeState Assignment

UNITV	MEMORYANDPROGRAMMABLELOGIC	6 Hours

RAMandROM–MemoryDecoding–ErrorDetectionandCorrection–ProgrammableLogicArray– ProgrammableArrayLogic ,SequentialProgrammableDevices— Field Programmable Gate Arrays(FPGA)

TOTAL: 30HOURS

FURTHERREADING /SEMINAR:

1.Implementation of Layout in industrial tool(TANNER,MAGMA,CADENCE)
2.ASIC Design technique

COURSEOUTCOMES:

After completion of the course, Student will be able to

CO1 Understanddifferentmethodsusedforthesimplificationof Booleanfunctions
CO2 Explain the fundamentals of VHDL/Verilog HDL
CO3 Design and implement combinational circuits
CO4 Design and implement synchronous Sequential circuits
CO5 Design and implement asynchronous sequential circuits

LISTOFEXPERIMENTS:

1. VerificationofBooleanTheoremsusingbasicgates.
2. Designandimplementationofcombinationalcircuitsusingbasicgatesforarbitraryfunctions,codeconverters.
3. Design and implementation of combinational circuits using Trainer kit and FPGA Kit:4 – bit binary adder / subtractor , Divider, Multiplier and Multiplexers
4. Design and implementation of sequential circuits: ALU, Shift –registers and counters using FPGA kit Design and implementation of a simple digital system

Hardware: 1. Digital trainer kits 15 2. Digital ICs required for the experiments in sufficient numbers
Software: 1. HDL simulator-Aritic-7 Kit

TOTAL: 30 HOURS

REFERENCES:

1.MorrisManoM.andMichael D.Ciletti,"Digital Design",PearsonEducation,2015.

2.JohnF.Wakerly,"DigitalDesignPrinciplesandPractices",SeventhEdition,PearsonEducation,2015

3.CharlesH.RothJr,"FundamentalsofLogicDesign",FifthEdition–JaicoPublishingHouse,Mumbai,2013.

4.DonaldD.Givone,"Digital PrinciplesandDesign",TataMcgrawHill,2013.

6.KharateG.K.,"DigitalElectronics",OxfordUniversityPress,2010.

7.http://nptel.ac.in

8. Verilog HDL A guide to Digital Design and Synthesis ,Samir Palnitkar ,SunSoft Press 1996

1902MCX02	CONSTITUTION OF INDIA	L	T	P	C
		2	0	0	0

Course Content

The Constitution of India is the supreme law of India. Parliament of India can not make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries.

The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America. The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement, however, few critics have argued that it does not truly incorporate our ownancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions : National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

	TOTAL:	30 HOURS

1904GE351	LIFE SKILLS: VERBAL ABILITY	L	T	P	C
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Course Objectives:

The students should be made to:

1. To help students comprehend and use vocabulary words in their day to day communication.
2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings.
3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production.
4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice
5. To Apply the principles of effective business writing to hone communication skills

Unit I	VOCABULARY USAGE	6 Hours

Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

Unit II	COMPREHENSION ABILITY	6 Hours

Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages

Unit III	BASIC GRAMMAR AND ERROR DETECTION	6 Hours

Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

Unit IV	REARRANGEMENT AND GENERAL USAGE	6 Hours

Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

Unit V	APPLICATION OF VERBAL ABILITY	6 Hours

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

	TOTAL	30 Hours

COURSE OUTCOMES:

On Completion of the course, the students should be able to

CO1: Use new words in their day to day communication.

CO2: Gather information swiftly while reading passages.

CO3: Students are proficient during their oral and written communication.

CO4: Rearrange the sentences and able to identify the voice of the sentence.

CO5: Students use their knowledge of the best practices to craft effective business documents

REFERENCES:

1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007

ASSESSMENT PATTERN :

1. Two tests will be conducted (25 * 2) - 50 marks
2. Five assignments will be conducted (5*10) - 50 Marks