BOARD OF STUDIES MEETING – 2020-21
K.S.R.M COLLEGE OF ENGINEERING
AUTONOMOUS

Minutes of the Meeting

Date	18.09.2020	Day	Sunday
Time	3PM	Venue	Virtual meeting:https://meet.google.com/wzq-zmru-tuh
Dept./SS	CSE	Convener	Dr. M. Sreenivasulu

MembersPresent:12

MembersAbsent: 01

S.No	Name	Designation	Signature	S.No	Name	Designation
1	Dr. M. Sreenivasulu	Prof., & HOD CSE, KSRMCE		1	Dr. D. Janakiram	Prof., Dept. of CSE, IITM, Chennai
2	Dr. RBV Subramanyam	Prof., & HOD CSE, NITW		2	Dr. G. Varaprasad	Alumni
3	Dr. C. ShobaBindu	Prof., in CSE, JNTUA		3	Sri. CH. Sreedhar	Industry
4	Dr. B.V. Ramana Reddy	Prof., KSRMCE				
5	Dr. V. Lokeswara Reddy	Prof., KSRMCE				
6	Dr. N. Ramanjaneya Reddy	Associate Prof., KSRMCE				
7	Dr. M.V. Rathnamma	Associate Prof., KSRMCE				
8	Smt. B. Manorama Devi	Assistant Prof., KSRMCE				
9	Sri. G. NagendraBabu	Assistant Prof., KSRMCE				
10	Sri. S. KhajaKhizar	Assistant Prof., KSRMCE				

Dr. M. Sreenivasulu , welcomed all the members to the meeting and presented the agenda of the meeting.

The resolutions are:

	To do item	Discussion	Resolution	Coordinator/in-charge
1	To finalize the curriculum and syllabus for Minor degree in Computer Science and Engineering.	The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus	The committee has approved curriculum and syllabus for Minor degree in Computer Science and Engineering without any changes. The approved curriculum and syllabus for Minor degree in CSE was enclosed in Annexure –1 (R18-Minor).	Dr. M. Sreenivasulu
2	To finalize the curriculum and syllabus for Honour degree in Computer Science and Engineering.	The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus	The committee has recommended "Computer Organization and Architecture" subject in place of R Programming. The committee also suggested "Data Science" subject in place of "Introduction to Data Science in Python". The approved curriculum and syllabus for Honours degree in CSE was enclosed in Annexure – 2(R18-Honour).	Dr. B. V. Ramana Reddy
3	Feedback/suggestions from stake holders and action taken report.	The Head of the Department presented Feedback and suggestions from stakeholders and also action taken report by the department.	The committee approved action taken report on suggestions and feedback given by stakeholders.	Smt. B. Manorama Devi

The Head of the Department have proposed the Vote of thanks and concluded the meeting.

Convener
Dr. M. Sreenivasulu,
M. E, Ph D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516003

Kadapa, Andhar Pardesh – 516003

Curriculum and Syllabus for Minor Degree in Computer Science and Engineering

Department of Computer Science and Engineering

Kandula Srinivasa Reddy Memorial College of Engineering
(Autonomous)
Kadapa 516003 AP
(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)

CURRICULUM FOR MINOR DEGREE IN COMPUTER SCIENCE AND ENGINEERING

S.No	Subject Number	Subject Name	Semester	L-T-P	Credits
1*	1805521	Data Structure and algorithms	V Sem	3-0-0	3
2*	1805522	Object Oriented Programming	V Sem	3-0-0	3
3	1805621	Computer Organization	VI Sem	3-0-0	3
4	1805622	Operating Systems	VI Sem	3-0-0	3
5	1805623	Database Management Systems	VI Sem	3-0-0	3
6	1805624	Computer Networks	VI Sem	3-0-0	3
7	1805721	Software Engineering	VII Sem	3-0-0	3
8	1805722	Internet of Things	VII Sem	3-0-0	3
9	1805723	Cloud Computing	VII Sem	3-0-0	3
10	1805724	Web Technologies	VII Sem	3-0-0	3
11*	1805821	Mini Project work	VIII Sem	0-0-2	2

Important Instructions:

1. A total of 7 Courses must be taken
2. The courses marked with * are compulsory.
3. Either course 3 or course 4 has to be taken.
4. Either course 5 or course 6 has to be taken.
5. Either course 7 or course 8 has to be taken.
6. Either course 9 or course 10 has to be taken.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Mully
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

Course Title	DATA STRUCTURES AND ALGORITHMS			B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805521	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To develop skills and analyze linear and nonlinear data structures.
- To understand basic concepts about linked lists, stacks, queues.
- To study algorithms as they apply to trees and graphs.
- To study in detail about sorting and hashing.

Course Outcomes: On successful completion of this course, the students will be able to	
CO 1	Understand the variety of abstract data types and data structures.
CO 2	Analyze data structures such as linked list, Stacks and Queues.
CO 3	Apply and analyze tree traversal algorithms and graph traversal algorithms.
CO 4	Organize data in order using various sorting algorithms.
CO 5	Ability to understand the concept of hashing.

UNIT-I

Introduction: Data structures, Primitive & Non Primitive data structures, Linear & Non Linear data structures,**Linear Lists:**Definition,**Arrays:**Definition, **Linked Lists:** Single Linked List-Definition, Insertion and Deletion operations, Doubly Linked List- Definition, Insertion and Deletion operations.

UNIT-II

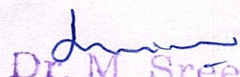**Stacks:** Definition, Array & Linked representations, Operations, Applications,
Queues: Definition, Array & Linked representations, Operations, Circular Queues &Dequeues .

UNIT-III

Trees: Basic terminology, Binary Trees- Definition, Properties, Representation, Complete and Full Binary Tree, **Tree Traversal Algorithm:**Inorder, Preorder andPostorder, **Priority Queues:** Definition,Heaps, Leftist Trees, **Binary Search Tree(BST):** Definition, Operations & Implementations, BST with Duplicates, Indexed BST.

UNIT-IV

Balanced Search Trees: AVL, Red-Black & Splay Trees, Graphs: Terminology, Representations, **Graph Traversal:** Depth First Search (DFS), Breadth First Search(BFS), Minimum Spanning Tree, Prims and Kruskal's algorithm.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. s. s. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

UNIT-V

Sorting: Selection, Insertion, Bubble, Heap, **Searching:** Linear and Binary search **Hashing:** Introduction, Hash Table representation, Hash Functions, **Collisions:** Introduction, Separate Chaining, Open Addressing.
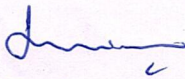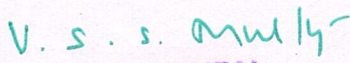
TEXT BOOKS:

1. An Introduction to Data Structures with applications, Jean Paul Trembley and Paul G.Sorenson, McGraw Hill.
2. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, Universities press.
3. Data Structures using C++, VarshaH.Patil, Oxford University Press.

REFERENCE BOOKS:

1. Data Structures, Algorithms and Applications in C++, AnandaRaoAkepogu and Radhika RajuPalagiri, Pearson Education.
2. Data Structures and Algorithms in C++, S.Sahni, University Press (India) Private Limited, Second Edition.
3. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw Hill.
4. Data Structures and Algorithms, G.A.V.Pai, Tata McGraw Hill.
5. Data Structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
6. Data Structures and algorithms in C++, Mark Allen Weiss, Pearson Education Limited, Second Edition.

NPTEL Link: https://nptel.ac.in/courses/106/102/106102064/

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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Course Title	OBJECT ORIENTED PROGRAMMING				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805522	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	.3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:
- Understand Object Oriented Programming and C++ concepts.
- Be able to program using C++ features such as class, object, operator overloading, inheritance and polymorphism.
- Improve problem solving skills.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Articulate the principles of Object Oriented Problem Solving and Programming.
CO 2	Outline the essential features and elements of C++ programming language.
CO 3	Understand the dynamic memory management techniques using constructors, destructors and pointers.
CO 4	Describe the concept of operator overloading, virtual functions and polymorphism.
CO 5	Classify inheritance with the understanding of binding.

UNIT-I

Principles of Object-Oriented Programming: Procedure-Oriented Programming, Object-Oriented Programming paradigm, Basic concepts of Object-oriented Programming, Benefits of OOP, Applications of OOP.
Beginning with C++: What is C++, A simple C++ Program, More C++ statements, Structure of C++ Programming, Creating the source file, Computing and Linking, Tokens, Expressions and Control structures.
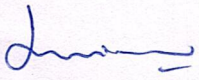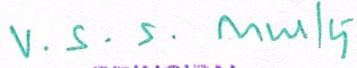
UNIT-II
Functions in C++: The main function, function prototyping, call by reference, return by reference, inline –functions, default arguments, const arguments, recursion, function overloading, friend and virtual functions, classes and objects.

UNIT-III
Constructors and Destructors: Constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructors , destructors.
Operator Overloading and Type Conversions: Defining operator overloading, overloading unary operator, overloading binary operator, rules for overloading operators, type conversion.

Dr. M. Sreenivasulu
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Mouly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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UNIT-IV

Inheritance: Defining derived classes, types of inheritance: single, multilevel, multiple, hierarchical and hybrid inheritance, virtual base classes, abstract classes, constructors in derived classes, Member classes: nesting of classes.
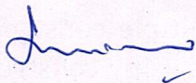
UNIT-V

Pointers, Virtual Functions and Polymorphism: Pointers, pointers to objects, this operator, pointers to derived classes, virtual functions , pure virtual functions, virtual constructors and destructors
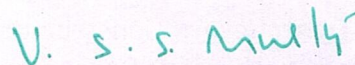
Text Books:

1. "Object Oriented Programming with C++", E. Balagurusqmy, 6e, MC Graw Hill Education.
2. "The Complete Reference C++", Herbert Schildt, TMH 4th Edition.

Reference Text Books:

1. "Learning C++ Programming :From Problem Analysis To Program Design", Malik, Thomson.
2. "Object oriented programming with C++", SauravSahay, Oxford.

3. "Object oriented programming with ANSI and TURBO C++", Ashok N Kamathane, Pearson education.
4. "Object Oriented Programming with C++", ReemaThareja, Revised edition, Oxford UniversityPress.

Course Title	COMPUTER ORGANIZATION				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805621	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To make the students understand the structure of computers and internal organization of different units like memory, I/O devices, registers.

- To study in detail about the various operations of arithmetic logic unit.

- To study in detail about pipelining, I/O organization and multiprocessors.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the organization of the control unit, Arithmetic unit, Logical unit, Memory unit and the I/O unit.
CO 2	Ability to analyze memory and I/O devices effectively and to explore the hardware requirements for cache memory ad virtual memory.
CO 3	Recall arithmetic operations of binary number system.
CO 4	Illustrate the concept of pipelining and multiprocessors.
CO 5	Ability to understand the concept of I/O organization.

UNIT-I
Basic concepts of computers: Computer Types, Functional units, Basic operational concepts, Bus Structures, Performance. **Data Representation-** Fixed Point Representation, Floating Point Representation.

UNIT-II
Register Transfer and Microoperations: Register Transfer, Bus and memory transfers.Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
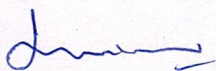
UNIT-III
Basic computer organization and Design: Instruction codes, Computer instructions, Memory reference instructions,Addressing modes.**Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Division Algorithms.

UNIT-IV
Pipeline: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.
Memory: Basic concepts, Memory Hierarchy, Cache memory, Performance considerations, Virtual memory.

V. S. S. Murty

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

5

Professor
K.S.R.M. College of Engineering
KADAPA - 516 003

UNIT-V

Input-Output Organization: Peripheral Devices, Input- Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access (DMA).**Multiprocessors:** Characteristics of Multiprocessors, Interconnection Structures.

TEXT BOOKS:
1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI.
2. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCE BOOKS:
1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, - SivaraamaDandamudi, Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition, Elsevier.
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

NPTEL Link:https://nptel.ac.in/courses/106/103/106103068/

Dr. M. Sreeniv.
M.E.,Pn.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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Course Title	OPERATING SYSTEMS				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805622	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- Have an overview of functions of operating systems.

- Have a thorough knowledge of process management and memory management.

- To have a thorough knowledge of how handle to deadlocks.

- Learn the concepts of files, protection and security.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the basic concepts related to the operating systems.
CO 2	Analyze the various process scheduling algorithms and process synchronization mechanisms.
CO 3	Analyze the various memory management schemes.
CO 4	Understand the ways to deal the deadlocks and the basic concepts related to files in the system.
CO 5	analyze the protection and security mechanisms

UNIT-I

Operating Systems Basics: Operating systems functions, Overview of computer operating systems, distributed systems, operating system services and systems calls, system programs, operating system structure.

UNIT-II

Process Management: Process concepts, scheduling-criteria, algorithms, their evaluation.
Concurrency: Process synchronization, the critical-section problem, Peterson's Solution, semaphores, classic problems of synchronization, monitors.

UNIT-III

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames.

UNIT-IV

Deadlocks: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.
Files: The concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.

V. S. S. Murly

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Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

UNIT-V

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix.

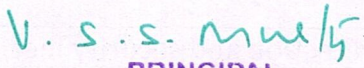**Security**: The Security problem, program threats, user authentication.

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", Eighth edition, John Wiley.

REFERENCE BOOKS:

1. Andrew S Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education

2. William Stallings, "Operating Systems: Internals and Design Principles", Sixth Edition2009, Pearson Education.
3. D.M.Dhamdhere, "Operating Systems, A Concept based Approach", Third Edition, TMH
4. A.S.Godbole, "Operating Systems", Second Edition, TMH.

NPTEL link: https://nptel.ac.in/courses/106/105/106105214/

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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Course Title	DATABASE MANAGEMENT SYSTEMS				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805623	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
- To understand and use data manipulation language to query, update, and manage a database.
- To develop an understanding of essential DBMS concepts such as: database security, integrity, and concurrency.

Course Outcomes: On successful completion of this course, the students will be able to

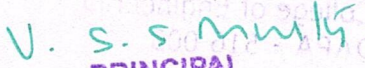| CO 1	To understand the basic concepts and the application of Database Systems.
CO 2	To understand the E R model and Relational Model
CO 3	To understand the basics of SQL and Construct queries using SQL.
CO 4	To design and build a simple database system.
CO 5	Apply various Normalization Techniques
CO 6	Understand the principles of Storage Structure and Recovery management.

UNIT-I

Introduction - Database-System Applications, View of Data, Database languages, Data base architecture, Database Users and Administrators.
E-R Model - The Entity Relationship Model, Constraints, Entity Relationship Diagrams, and Extended E-R features.

UNIT-II

Relational Model - Structure of Relational Databases, Database Schema, Keys, Query Languages, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of Database.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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UNIT-III

Introduction to SQL - Data Definition, Basic Structure of SQL Queries, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Complex queries, views, Modification of the Database.
Advanced SQL - Integrity Constraints, Dynamic SQL, Functions and Procedures.
Other Relational Query Languages - Tuple Relational Calculus, Domain Relational calculus.

UNIT-IV

Normal Forms – Atomic domain and First Normal Form, Keys and Functional Dependencies, Second Normal Form, BCNF, BCNF and Dependency Preservation, Third Normal Form, Lossless Decomposition, Dependency- preserving, Multi valued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal Form, and Inclusion dependencies.

UNIT-V

Transactions - Transaction Concept, Transaction State, Implementation of Transaction Atomicity and Durability, Concurrent Executions, Serializability.
Concurrency Control - Lock-Based Protocols, Timestamp-Based Protocols.
Recovery System - Failure Classification, Storage, Recovery and Atomicity, Log based recovery.

❖ **TEXT BOOKS:**
   1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan,"DatabasesystemConcepts", 5thEdition, McGrawhill.

❖ **REFERENCE BOOKS:**

   1. Raghurama Krishnan, Johannes Gehrke, Data base Management Systems. 3rd Edition, Tata McGrawHill.
   2. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.
   3. Peter Rob, Ananda Rao and Carlos Corone, Database Management Systems, Cengage Learning.
   4. C.J.Date, Introduction to Database Systems.

❖ **REFERENCE LINKS:**
   https://nptel.ac.in/courses/106/105/106105175/   (IIT KHARAGPUR)
   https://nptel.ac.in/courses/106/106/106106095/   (IIT MADRAS)

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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Course Title	COMPUTER NETWORKS				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805624	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To understand the organization of computer networks, factors influencing on the performance of computer networks, and the reasons for having variety of different types of networks

- To understand various protocols of the internet and how these protocols address the standard problems of internetworking and the internet.

- Perspective study on the issues open for research in computer networks.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the terminology and concepts of the OSI reference model and TCP-IP.
CO 2	Describe the functions of Data link layer and its protocols.
CO 3	Classifying the different routing algorithms and IP addressing with network layer
CO 4	Understand connection establishment and services provides by TCP and UDP.
CO 5	Explain the working of DNS and World Wide Web

UNIT-I

Introduction: Uses of Computer Networks, Network Hardware, Reference Models: OSI, TCP/IP, Comparison of OSI & TCP/IP reference models. **Physical layer:** Guided transmission Media, UnguidedMedia, multiplexing,**switching:** Introduction, Circuit Switched Networks, Packet Switching

UNIT-II

The Data Link Layer: Data Link Layer design issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols.**MAC sublayer:**Multiple Access protocols, Ethernet, Data Link Layer Switching.

UNIT-III

The Network Layer: Network layer design issues, Routing algorithms: The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Anycast Routing,Congestion control algorithms, Quality of service, IP Addresses, IPv4,IPv6.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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UNIT-IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, The internet transport protocols: UDP, TCP: Introduction to TCP, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release.

UNIT-V

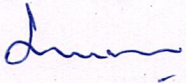**The Application layer:** Domain Name System (DNS), Electronic mail, World Wide Web (WWW)

TEXT BOOKS:

1. "Computer Networks", Andrew S. Tanenbaum, David J.Wetherall, Pearson, 5th edition, 2010.
2. "Data communications and networking", Behrouz A. Forouzan, TMH, 5th edition, 2012.

REFERENCE BOOKS:

1. "Internetworking with TCP/IP – Principles, protocols, and architecture-Volume 1, Douglas E. Comer, 5 th edition, PHI

2. "Computer Networks", 5E, Peterson, Davie, Elsevier.

3. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRCPublications.

4. "Computer Networks and Internets with Internet Applications", Comer.

NPTEL Link: https://onlinecourses.swayam2.ac.in/cec20_cs16/preview

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
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Course Title	INTERNET OF THINGS				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805722	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- Basic principles of IOT.
- Various IOT platforms and application development.
- To know about Arduino board
- To know about Raspberry pi

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the basic principles of IoT.
CO 2	Understand IoT applications.
CO 3	Understand IoT Design Methodologies
CO 4	Understand Arduino board
CO 5	Understand Raspberry pi device.

UNIT-I
INTRODUCTION TO IoT:
Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Development Templates

UNIT-II
DOMAIN SPECIFIC IoTs
Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT-III
IOT and M2M:
Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT
IoT Platform Design Methodology:
Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring

UNIT-IV
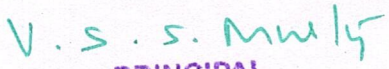### Introduction to Arduino:
Introduction, The Arduino Way, The Arduino Platform, Getting started with Arudino, Advanced Input and Output.

UNIT-V
IOT Physical Devices:
What is an IOT device, basic building blocks of an IOT device, Exemplary device: Raspberry Pi, about the board, linux on raspberry Pi, raspberry Pi interfaces.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V.S.S. Murly
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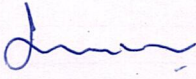KADAPA - 516 003. (A.P.)

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Text books:

1. ArshdeepBahga, Vijay Madisetti " Internet of Things(A hands on approach)" 1ST edition, VPI publications,2014.
2. Getting Started with Arduino, 3rd Edition, Massimo Banzi and Michael Shiloh

Reference Book:

1. Raj Kamal, "Internet of Things", McGraw Hill, 1st Edition, 2016.
2. Adrian McEwen,Hakin Cassimally "Designing the Internet of Things" Wiley India

Nptel:
https://nptel.ac.in/courses/106/105/106105166/

Dr. M. Sreenivasulu,
M.E.,Ph.D
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murli
PRINCIPAL
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Course Title	WEB TECHNOLOGIES				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805724	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To introduce client side scripting with Javascript and HTML

- To introduce server side programming with PHP.

- To learn the basic web concepts and Internet protocols

- To learn creating forms using validations

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Creating dynamic web pages using javascript.
CO 2	Creating Server side programming with PHP.
CO 3	Understanding Internet Protocols and web concepts
CO 4	Creating forms with validations

UNIT-I

Introduction to Web Technologies: Introduction to Web servers like Apache1.1,IIS XAMPP(Bundle Server), WAMP(Bundle Server), Handling HTTP Request and Response, installations of above servers.

UNIT-II

HTML Common tags: List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Script: Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.
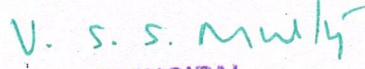
UNIT-III

Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.
Overview of Classes, Objects, and Interfaces: Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

UNIT-IV

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineerin
KADAPA - 516 003

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UNIT-V

Using Creating and Forms: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

TEXT BOOKS:

1. Beginning PHP and MySQL, 5th Edition, Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.
3. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech.

REFERENCES:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
4. PHP and MySQL by Example, E.Quigley, Prentice Hall (Pearson).
5. PHP Programming solutions, V.Vaswani, TMH

Nptel link:
https://nptel.ac.in/courses/106/105/106105084/

Dr. M. Sreenivarulu,
M.E.
Professor & HOD
K.S.R.M College of Engineering.
KADAPA - 516003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	CLOUD COMPUTING				B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805723	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs		

Course Objectives:

- To explain the cloud paradigms.
- To introduce the various levels of services that can be achieved bycloud.
- To know about service providers of cloud.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Recall different computing paradigms
CO 2	Understand the Importance of cloud computing and its architecture
CO 3	Explain and characterize different cloud deployment models and service models
CO 4	Understand API's in Cloud Computing
CO 5	Identify the Data Center environment and service providers in cloud computing

UNIT-I
Computing Paradigms:

High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing.

Cloud Computing Fundamentals:
Defining Cloud Computing: Motivation for Cloud Computing ,NIST Definition of Cloud Computing. Principles of Cloud computing: Five Essential Characteristics, Four Cloud Deployment Models, Three Service Offering Models, Cloud Ecosystem.

UNIT-II

Cloud Computing Architecture and Management : Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.

UNIT-III

Cloud Deployment Models : Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud

Cloud Service Models : Infrastructure as a Service, Platform as a Service, Software as a Service, Other Cloud Service Models.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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UNIT-IV

Cloud Computing APIs: Rackspace, IBM, Intel
Software Development in Cloud : Introduction, Different perspectives on SaaS development, New challenges, Cloud aware software development using PaaS technology.

UNIT-V

Networking for Cloud Computing : Introduction, Overview of Data Center Environment,Networking Issues in Data Centers
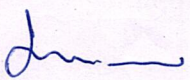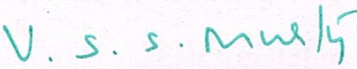
Text books:

1. K. Chandrasekaran, Essentials of Cloud Computing, CRC Press,2015

Reference books:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley-India,2010
2. RajkumarBuyya, James Broberg, Andrzej M. Goscinski,
Cloud Computing:Principles and Paradigms, Wiley,2011
3. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles,
Systemsand Applications, Springer,2012

NPTEL Link: https://onlinecourses.nptel.ac.in/noc20_cs65/preview

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	SOFTWARE ENGINEERING			B.Tech CSE (Minor Degree)		
Course Code	Hours/Week			Credits	Maximum Marks	
1805721	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs		

Course Objectives:

- Knowledge of basic Software engineering methods and practices, and their appropriate application also the software engineering layered technology and Process framework.

- A general understanding of software process models such as the waterfall and evolutionary models.

- Understanding the role of project management including planning, scheduling, risk management, etc.

- Understanding of data models, object models, context models, and behavioral models also different software architectural styles.

- Understanding of software testing approaches such as unit testing and integration testing other testing strategies and Risk management.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Ability to apply software engineering principles and techniques.
CO 2	Ability to develop, maintains, and evaluates software systems.
CO 3	To produce efficient, reliable, robust, and cost-effective software solutions.
CO 4	To manage time, processes, and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyze the common threats in each domain.

UNIT-I

Software and Software Engineering: The Nature of Software, Software Engineering, Software Process, Software Myths. Process Models: A Generic Process Model, Prescriptive Process Models, The Unified Process.

UNIT-II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

UNIT-III

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, Data Modeling Concepts, Class-Based Modeling.

Design Process, Design Concepts, The Design Model.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

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UNIT-IV

Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

User Interface Design: The Golden Rules, Interface Design Steps

UNIT- V

Coding and Testing: Testing, Testing in the Large versus Testing in the Small, Unit Testing, Integration Testing, Black-Box Testing, White-Box Testing, Debugging, System Testing.

TEXTBOOKS :

1. Software Engineering: A practitioner's Approach, Roger S. Pressman, Seventh Edition,

   2010, McGraw-Hill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, 4th Edition, 2014, PHI.

REFERENCE BOOKS:

1. Software Engineering, Ian Sommerville, Ninth Edition, Pearson education.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles, and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International

   edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer

   International Edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.
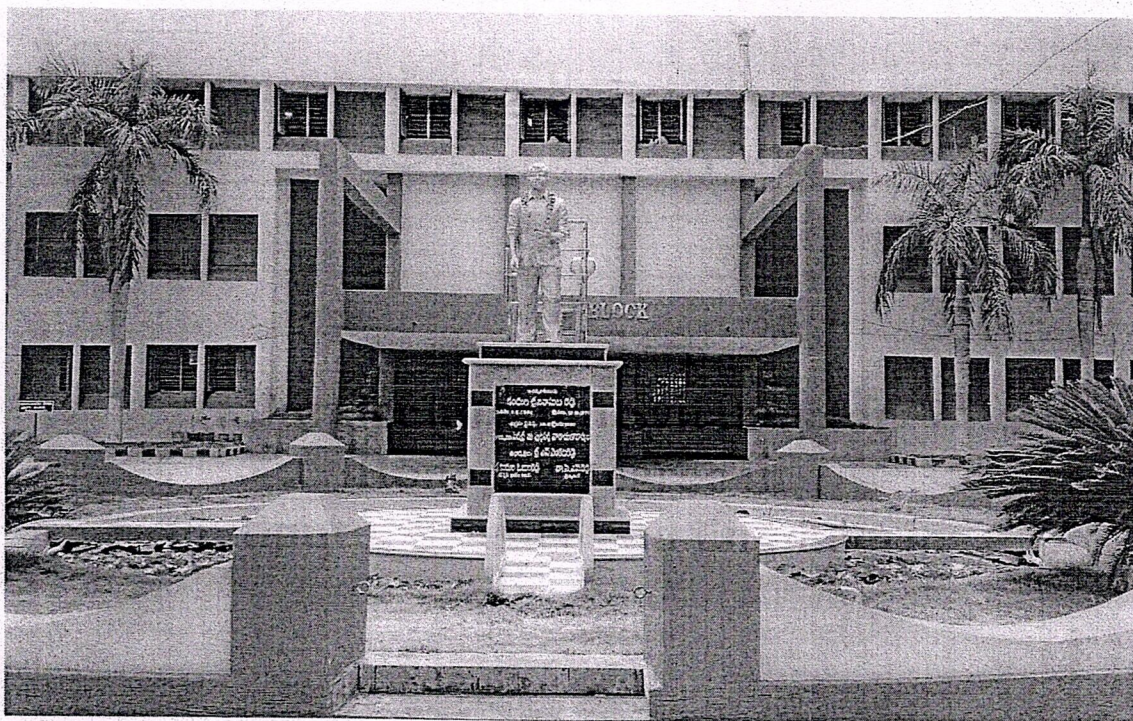
MOOC Courses on Software Engineering by:

1. NPTEL: Co-ordinated by IIT, Kharagpur.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murthy
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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Curriculum and Syllabus for
Honours Degree in
Computer Science and Engineering

Department of Computer Science and Engineering

Kandula Srinivasa Reddy Memorial College of Engineering
(Autonomous)
Kadapa 516003 AP
(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
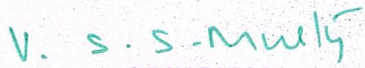(An ISO 9001-2008 Certified Institution)

CURRICULUM FOR HONOURS DEGREE IN COMPUTER SCIENCE AND ENGINEERING

S.No	Subject Number	Subject Name	Semester	L-T-P	Credits
1	1805531	Data Science	V Sem	3-0-0	3
2	1805532	Computer Architecture and Organization	V Sem	3-0-0	3
3	1805631	Applied Machine learning in Python	VI Sem	3-0-0	3
4	1805632	Deep Learning	VI Sem	3-0-0	3
5	1805731	Introduction to Block chain Technologies and Applications	VII Sem	3-0-0	3
6	1805732	Big Data and Hadoop	VII Sem	3-0-0	3
7	1805831	Introduction to Industry 4.0 and Industrial IOT	VIII Sem	2-0-0	2

Important Instructions:

1. A total of 7 Courses must be taken

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
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Course Title	DATA SCIENCE				B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805531	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- Introduce R as a programming language
- Introduce the mathematical foundations required for data science
- Introduce the first level data science algorithms
- Introduce a data analytics problem solving framework

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Describe a flow process for data science problems (Remembering)
CO 2	Classify data science problems into standard typology (Comprehension)
CO 3	Develop R codes for data science solutions (Application)
CO 4	Correlate results to the solution approach followed (Analysis)
CO 5	Assess the solution approach (Evaluation)
CO 6	Construct use cases to validate approach and identify modifications required (Creating)

UNIT-I
R – Programming:
Introduction to R, variables and datatypes In R, data frames, recasting and joining of dataframes, arithmetic, logical and matrix operations in R, functions, control structures, data visualization in R basic graphics.

UNIT-II
Linear Algebra:
Linear algebra for data science, solving linear equations, Linear algebra – distance, hyperplanes and half-spaces, Eigenvalues, Eigenvectors, statistical modeling, random variables and probability mass/density functions, sample statistics, hypotheses testing.

UNIT-III
Optimization:
Optimization for data science, unconstrained multivariate optimization, Gradient Descent learning rule, multivariate optimization with equality constraints, multivariate optimization with inequality constraints. Introduction to data science, solving data analysis problems – a guided thought process.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S.S.Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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UNIT-IV
First level data science algorithms:
Predictive modeling, linear regression, model assessment, diagnostics to improve linear model fit, simple linear regression model building, simple linear regression model assessment, multiple linear regression.
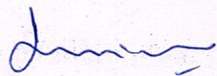
UNIT-V
Regression Analysis:
Cross validation, multiple linear regression modeling building and selection, classification, logisitic regression, performance measures, logistic regression implementation in R, K-nearest neighbors, K-nearest neighbors implementation in R, K-means clustering, K-means implementation in R.

Text Books:
1. Introduction to Linear Algebra – by Gilbert Strang
2. Applied Statistics and Probability for Engineers – by Douglas Montgomery
3. R Programming for Data Science – by Roger D. Peng

Web Links:
1. https://nptel.ac.in/courses/106/106/106106179/

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

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UNIT-IV
Input – Output Organization:
Secondary storage devices, Input Output Organization, Data transfer techniques, Interrupt handling, Dynamic Memory Access.

UNIT-V
Multiprocessors:
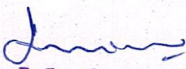Characteristics of Multiprocessors, Interconnection Structures,Interprocessor Arbitration
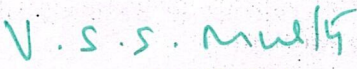Inter Processor Communication and synchronization.

TEXT BOOKS:
1. D.A.Patterson and J.L.Hennessy," ComputerArchitecture:AQuantitative approach, 5/E", Morgan KoFFman, 2011
2.Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI.
3.William Stallings,"Computer Organization and Architecture: Designing for Performance",-Tenth Edition, Pearson/PHI, 2015.
4. Carl Hamacher, ZvonksVranesic, SafeaZaky,,"Computer Organization,5/E",Vth Edition, McGraw Hill,2011.

REFERENCE BOOKS:
1. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.
2. Fundamentals of Computer Organization and Design, - SivaraamaDandamudi, Springer Int. Edition.
3. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition, Elsevier.
4. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	Computer Architecture and Organization			B.Tech CSE (Honours Degree)		
Course Code	Hours/Week		Credits	Maximum Marks		
1805532	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs		

Course Objectives:

- To make the students to understand the structure of computers and internal organization of different units like memory, I/O devices and registers.

- To Study the basic concepts of computer architecture and organization.

- To study in detail about the operation of control unit and Arithmetic unit

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the basic concepts of computer architecture and organization
CO 2	Understand the design of the control unit and memory organization
CO 3	Understand the design of Adders, Multipliers and Dividers
CO 4	Understand the basic concepts of pipelining and Vector processor
CO 5	Use of memory and I/O devices effectively and to explore requirements of cache Memory and Multiprocessors

UNIT-I
Basic Computer Organization and Design:
Evolution of Computer Systems, Basic Operation of a Computer, Memory Addressing and Languages, Software and Architecture Types, Instruction Set Architecture, Number Representation, Instruction format and Addressing Modes, CISC and RISC Architecture.

UNIT-II
Control Unit:
Measuring CPU Performance, Design of control unit.
Memory Organization:
Processor memory interaction, Static and Dynamic RAM, Asynchronous DRAM, Synchronous DRAM, Memory interfacing and addressing, Memory hierarchy design, Cache Memory, Improving cache performance.
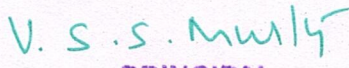
UNIT-III
Computer Arithmetic:
Design of Adders, Design of Multipliers, Design of Dividers, Floating point numbers, Floating point arithmetic.
Pipelining and Vector Processing:
Parallel processing, Pipelining, Arithmetic pipeline, Instruction Pipeline, Vector Processing.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	APPLIED MACHINE LEARNING IN PYTHON				B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805631	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:
- Understand the Machine Learning Basic concepts.
- Understand the need of python in machine learning.
- To Analyse Supervised Learning Algorithms.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	students will be able to identify the difference between a supervised (classification) and unsupervised (clustering) technique
CO 2	Understand Supervised Learning Algorithms.
CO 3	Identify which technique they need to apply for a particular dataset and need, engineer features to meet that need, and write python code to carry out an analysis.

UNIT-I

Machine learning basics: The need for Machine learning, understanding machine learning, machine learning methods, Supervised learning, Un supervised learning, semi supervised learning, reinforcement learning.

UNIT-II

The Python Machine Learning Ecosystem: Python Introduction, strengths, pitfalls, setting up a python Environment, Why Python for Data science.
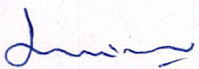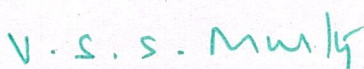**Introducing thePython Machine Learning Ecosystem:** Jupiter notebooks,Numpy, Pandas.

UNIT-III

Processing, Wrangling and Visualizing data: Data collection, Data description, Data Wrangling, data Summarization, Data Visualization.

UNIT-IV

Machine Learning Algorithms: Introduction to Classification, **Logistic Regression:** Introduction, Types of Logistic Regression,Binary Logistic regression Model, Multinomial Logistic regression Model,**Support vector machine:** Introduction to SVM, Pros and Cons of SVM classifier.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Classification Algorithms: Decision Tree, Naïve-Bayes, Random Forest.
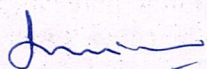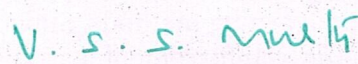**Case studies:** Analyzing Bike sharing Trends.

TEXT BOOKS:

1.Practical Machine Learning with Python- A problem solver's Guide to Building Real world intelligent Systems, Dipanjan Sarkar, Raghav Bali, Tushar Sharma.Apress publications.

2.Introduction to Machine Learning with Python- A Guide for Data Scientists, Andreas C.Miiller and sarah Guido, O'REILLY publications.

REFERENCES:
Machine Learning with Python tutorials point.www.tutorialspoint.com

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	DEEP LEARNING			B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
	L	T	P	C	Continuous Internal Assessment	End Exams	Total
1805632							
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- Study about basic concepts of deep learning
- Introduce deep learning algorithms, te problem settings and their applications to solve real world problems.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the historical trends in deep learning and use Tensor flow for performing Linear Regression, Gradient Descent, optimizers, graph visualization and training curves.
CO 2	Summarize the fundamentals of Artificial Neural Networks.
CO 3	Understand the training of Deep Neural Nets
CO 4	Understand the Convolutional Neural Networks Architecture.
CO 5	Understand the Recurrent Neural Networks and deep RNN training.

UNIT-I

Introduction to Deep Learning: Introduction, Historical trends in Deep Learning

Up and Running with TensorFlow

Installation, Creating Your First Graph and Running It in a Session, Managing Graphs, Lifecycle of a Node Value, Linear Regression with TensorFlow. Implementing Gradient Descent, Feeding Data to the Training Algorithm, Saving and Restoring Models, Visualizing the Graph and Training Curves Using TensorBoard, Name Scopes, Modularity, Sharing Variables.

UNIT-II

Introduction to Artificial Neural Networks From Biological to Artificial Neurons, Training an MLP with TensorFlow's High-Level API, Training a DNN Using Plain TensorFlow, Fine-Tuning Neural Network Hyperparameters.
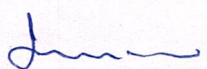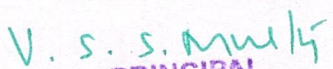
UNIT-III

Training Deep Neural Nets

Vanishing/Exploding Gradients Problems, Reusing Pretrained Layers, Faster Optimizers, Avoiding Over fitting Through Regularization.

UNIT-IV

Convolutional Neural Networks

The Architecture of the Visual Cortex, Convolutional Layer, Pooling Layer., CNN Architectures : LeNet5, AlexNet, GoogLeNet, ResNet.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)

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UNIT-V

Recurrent Neural Networks Recurrent Neurons, Basic RNNs in TensorFlow, Training RNNs, Deep RNNs.
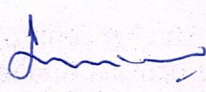
Text Books:

1. "Deep Learning" Ian Goodfellow Yoshua Bengio Aaron Courville, MIT Press book.
2. "Hands-On Machine Learning with Scikit-Learn and TensorFlow" March 2017: First Edition

Reference Books:

1. "Neural Networks and Deep Learning", Michael Nielsen.
2. 2. "Neural Networks and Deep Learning " Aggarwal, Charu C.Springer International Publishing.

Web References:

1. https://www.coursera.org/specializations/deep-learning?
2. https://www.coursera.org/learn/introduction-tensorflow?

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

U. s. s. murly

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Course Title	INTRODUCTION TO BLOCKCHAIN TECHNOLOGIES AND APPLICATIONS				B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805731	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:
- Understand how block chain systems work
- To securely interact with them
- Integrate ideas from block chain technology into their own projects

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Recall cryptographic concepts, hashing, public key cryptosystems.
CO 2	Understand basic concept of Block chain technology
CO 3	Understand design principles of Bitcoin and Alternative coins
CO 4	Study on the usecases of Block chain technology.

UNIT-I

Introduction – basic ideas behind blockchain, how it is changing the landscape of digitalization, introduction to cryptographic concepts required, Hashing, public key cryptosystems, private vs public blockchain and use cases, Hash Puzzles, Introduction to BitcoinBlockchain.

UNIT-II

BitcoinBlockchain and scripts, Use cases of BitcoinBlockchain scripting language in micropayment, escrow etc Downside of Bitcoin – mining.
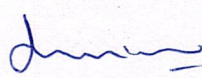
UNIT-III

Alternative coins – Ethereum and Smart contracts , IOTA, The real need for mining – consensus– Byzantine Generals Problem, and Consensus as a distributed coordination problem – Coming to private or permissioned blockchains.
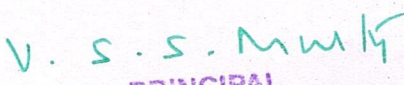
UNIT-IV

Permissioned Blockchain and use cases – Hyperledger, Corda.
UNIT-V

Uses of Blockchain in E-Governance, Land Registration, Medical Information Systems.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

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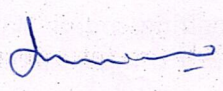K.S.R.M. COLLEGE OF ENGINEERING
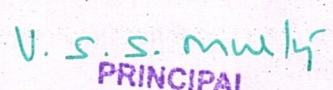KADAPA - 516 003. (A.P.)

Text Book:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

Reference Books:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies
2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
3. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
4. Nicola Atzei, Massimo Bartoletti, and TizianaCimoli, A survey of attacks on Ethereum smart contracts
https://www.gitam.edu/departments_cms/assets/uploads/syllabus/1566624781_Cert ification_course_on_Blockchain_Technology_w_e_f_2019-20_admitted_batch.pdf

SWAYAM NPTEL Link: https://onlinecourses.nptel.ac.in/noc20_cs01/preview

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	BIG DATA & HADOOP				B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805732	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- To introduce big data concepts.

- To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.

- Understanding Hadoob.

- Understanding Big data Applications (HBASE, HIVE)

- To enable students to have skills that will help them to solve complex real-world problems in for decision support.

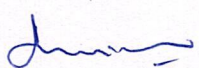| Course Outcomes: On successful completion of this course, the students will be able to	
CO 1	Installation of Hadoop Tools.
CO 2	Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
CO 3	Working with HBASE and HIVE.
CO 4	Achieve adequate perspectives of big data in various applications like recommender systems, social media applications etc

UNIT-I

Introduction to Big Data, What is Big Data Why Big Data is Important, Meet Hadoop, Big Data Storage and Analysis, Comparison with other systems, Grid Computing, A brief history of Hadoop, Apache Hadoop and the Hadoop Eco system, Linux refresher VM Ware Installation of Hadoop.
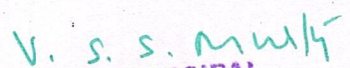
UNIT-II

The design of HDFS, HDFS concepts, Command line interface to HDFS Hadoop File Systems, Interfaces Java Interface to Hadoop, Anatomy of a file read, Anatomy of a File Write, Replica placement and Coherency Model, Parallel copying with distep, Keeping an HDFS cluster balanced.

UNIT-III

Introduction. Analyzing data with unix tools, Analyzing data with Hadoop, Java Map Reduce classes (New API). Data flow, combiner functions, Running a distributed MapReduce Job. Configuration API, Setting up the development environment. Managing configuration, Writing a unit test with MRunit, Running a Job in local job runner. Running on a cluste. Launching a job. The MapReduce WebUI.

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UNIT-IV

Classic Mapreduce. Job submission, Job Initialization, Task Assignment, Task execution, Progress and status updates, Job Completion, Shuffle and sort on Map and reducer side, Configuration tuning. Map Reduce. Types, Input formats, Output formats, Sorting Map side and Reduce Side joins.

UNIT-V

The Hive Shall, Hive services, Hive clients, The meta store. Comparison with traditional databases, Hive QI,
Hbase: Concepts, Implementation, Java and Map reduce clients. Loading data, Web queries.

Text Books:

1. Tom White, Hadoop, "The Definitive Guide" , 3rd Edition, O'Reilly Publications, 2012
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Undetstanding Big Data Analytics for Enterprise class Hadoop and Streaming Data", 1st Edition, TMH, 2012.

Reference links:

https://www.coursera.org/learn/hadoop#syllabus
https://www.coursera.org/lecture/hadoop/introduction-to-apache-hive-0AToF

Dr. M. Sreenivasulu
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
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Course Title	Introduction to Industry 4.0 and Industrial IOT				B.Tech CSE (Honours Degree)		
Course Code	Hours/Week			Credits	Maximum Marks		
1805831	L	T	P	C	Continuous Internal Assessment	End Exams	Total
	2	0	0	2	30	70	100
Mid Exam Duration: 2 Hours				End Exam Duration: 3Hrs			

Course Objectives:

- Introduction to Sensors, Communication and Networking

- Introducing Cyber Security in Industry 4.0

- To learn Big Data Analytics and SDN

- To know about various application domains

Course Outcomes: On successful completion of this course, the students will be able to	
CO 1	Understanding various sensors in IoT
CO 2	Understanding Cyber Security with IIoT
CO 3	Understanding various application domains
CO 4	Build skills in Hardware, Software, Application Systems, and Data management

UNIT-I

Introduction: Sensing & actuation, Communication, Networking.
Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Smart and Connected Business Perspective, Smart Factories
Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis.

UNIT-II

Cyber security in Industry 4.0, Basics of Industrial IoT: Industrial Processes, Industrial Sensing & Actuation, Industrial Internet Systems.
IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models, IIoT Reference Architecture.

UNIT-III

Industrial IoT- Layers: IIoT Sensing-Part I, Part II, IIoT Processing, IIoT Communication.
Industrial IoT- Layers: IIoT Communication, IIoT Networking. Industrial IoT: Big Data Analytics and Software Defined Networks: IIoT Analytics - Introduction, Machine Learning and Data Science, R and Julia Programming, Data Management with Hadoop.

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineering
KADAPA - 516 003

V. S. S. murli
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
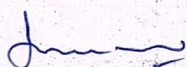KADAPA - 516 003. (A.P.)

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UNIT-IV

Big Data Analytics and Software Defined Networks: SDN in IIoT, Data Center Networks, Industrial IoT: Security and Fog Computing: Cloud Computing in IIoT.
Security and Fog Computing - Fog Computing in IIoT, Security in IIoT, Industrial IoT-Application Domains: Factories and Assembly Line, Food Industry.

UNIT-V

Application Domains: Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security (Including AR and VR safety applications), Facility Management.
Industrial IoT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Case studies. Self-Referential Structures and Introduction to Lists.

https://nptel.ac.in/courses/106/105/106105195/

Dr. M. Sreenivasulu,
M.E.,Ph.D.
Professor & HOD CSE
K.S.R.M. College of Engineerin
KADAPA - 516 003

V. S. S. Murly
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA - 516 003. (A.P.)