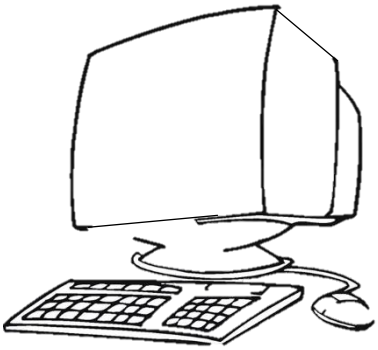
VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)

Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SYLLABI (AUTONOMOUS) FOR
B.E (CSE) FOURTH YEAR
WITH EFFECT FROM 2017-18
(For the students admitted in 2014-15)



DEPARTMENT OFCOMPUTER SCIENCE ENGINERING
+91-40-23146020, 23146021
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VISION OF THE DEPARTMENT

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals.

MISSION OF THE DEPARTMENT

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Ibrahimbagh, Hyderabad-500 031, Telangana State

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATIONS FOR

B.E IV YEAR I SEMESTER WITH EFFECT FROM THE ACADEMIC YEAR 2017-18

(2014-15 JOINED BATCH)

Course Code	B.E. FOURTH YEAR I SEMESTER Name of the Course	Instruction Hours per week				Scheme of Examination			Credits
		L	T	D	P	Duration in Hours	Maximum Marks		
	THEORY						SEE	CIE	
CS 4010	Distributed Systems	3	1	-	-	3	70	30	3
CS 4020	Artificial Intelligence	3	1	-	-	3	70	30	3
CS 4030	Principles & Applications of Embedded Systems	3	1	-	-	3	70	30	3
CS 4040	Information Security	3	-	-	-	3	70	30	3
CS 4050	Data Mining	3	1	-	-	3	70	30	3
CS 4XXX	ELECTIVE-II	3	-	-	-	3	70	30	3
	LABS								
CS 4061	Distributed Systems lab	-	-	-	2	3	50	25	1
CS 4071	Embedded Systems Lab	-	-	-	2	3	50	25	1
CS 4081	Data Mining Lab	-	-	-	2	3	50	25	1
CS 4096	Project Seminar	-	-	-	2	-	-	25	1
	Total	**18**	**4**	**-**	**8**		**570**	**280**	**22**
Grand Total		**30**					**850**		

ELECTIVE-II			
CS 4100	Mobile Communications	CS 4130	Software Reuse Techniques
CS 4110	Software Project Management	CS 4140	Operations Research
CS 4120	Human Computer Interaction	ME 4150	Entrepreneurship

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
DISTRIBUTED SYSTEMS

Instructions:3+1 Hours/Week	SEE Marks:70	Sub Ref Code:CS4010
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, Students will be able to
• Acquire an understanding of the various challenges in distributed systems • Study architectures and working of distributed file systems and implement fault tolerant systems	• Understand the challenges, design models and tasks of Operating System in a distributed environment • Analyze the role of middleware using RPC, RMI and design a name server • Evaluate distributed algorithms for clock synchronization and examine coordination techniques for distributed processes • Apply fault tolerant techniques to improve concurrency among distributed transactions • Apply distributed file system architecture to build a distributed application

Unit-I

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges.

System Models: Introduction, Architectural models, Fundamental models.

Operating System Support: Introduction, The operating system layer, Protection, Processes and threads, Communication and invocation, Operating system architecture.

Unit-II

Interprocess Communication: Introduction, The API for the internet protocols, External data representation and marshalling, Client server communication, Group communication **Interprocess communication in UNIX**, Distributed objects and Remote Invocation: Introduction, Communication between distributed objects, Remote procedure call, Events and notifications, Case study: Java RMI.

Name Services: Introduction, Name services and the Domain Name System, Directory services, Case study of the X.500 Directory Service.

Unit-III

Time and Global States: Introduction, Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed debugging.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication, Consensus and related problems.

Unit-IV

Transactions and Concurrency Control: Introduction, Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit process, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Replication: Introduction, System model and group communication, Fault-tolerant services.

Unit-V

Distributed File Systems: Introduction, File service architecture, Case Study: Sun Network File System, Google File System.

Designing Distributed Systems: Case Study: Google, Search engine, Overall Architecture and design Philosophy, underlying communication protocol, Data storage and coordination services, Distributed Computation Services: Map Reduce.

Suggested Books:

1. Colouris, Dollimore andKindberg, Distributed Systems Concepts and Design, 5thEdition (2012), Pearson Education, India.

Reference Books:

1. Andrew S. Tanenbaum and Van Steen, Distributed Systems, 2nd Edition (2007), Pearson Education, India.
2. Singhal M, Shivratari N.G., Advanced Concepts in Operating Systems, (2001), McGraw Hill, India
3. Pradeep K Sinha, Distributed Operating Systems: Concepts and Design, (2007), PHI Learning Pvt. Ltd, New Delhi.

Online Resources:

1. http://hadoop.apache.org/

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
ARTIFICIAL INTELLIGENCE

Instructions:3+1 Hours/Week	SEE Marks:70	Sub Ref Code:CS4020
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Understand issues and techniques involved in the creation of intelligent systems • Create logical agents to do inference using predicate logic, fuzz logic or probability theory.	• Choose appropriate state space searching techniques to maximize the performance • Understand first-order propositional and predicate logic to represent knowledge. • Solve problems involving uncertain information using probabilistic techniques. Apply planning algorithms to find optimal solutions. • Apply techniques like decision tree , neural network and rule learning to a given AI application for learning. • Understand the steps involved in Natural language processing.

UNIT-I

Introduction: Definition, history and applications of AI. Search in State Spaces: Agents that plan, Uninformed search, Algorithm A*, Heuristic Functions and Search Efficiency, Alternative Search Formulations and Applications, Adversarial Search.

UNIT – II

Knowledge Representation and Reasoning: The Propositional Calculus, Resolution in Propositional Calculus, The Predicate Calculus, Resolution in Predicate Calculus, Rule-Based Expert Systems, Representing Common Sense Knowledge.

UNIT-III

Reasoning with Uncertain Information: Review of probability theory, Probabilistic Inference, Bayes Networks.
Planning Methods Based on Logic: The Situation Calculus, Planning.

UNIT-IV

Learning from Observations: Learning decision-trees using Information theory, Learning General Logical Descriptions, Neural Networks: Perceptron, Multilayer feed-forward neural network. Rule Learning.

UNIT-V

Natural Language Processing: Communication among agents.
Speech Recognition: Signal Processing, Speech Recognition Model (Language Model + Acoustic Model), The Viterbi Algorithm.

Suggested Books:

1. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, (1998),Elsevier

Reference Books:

1. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2015), Pearson
2. Elaine Rich, Kevin Knight, Shivashankar B Nair, Artificial Intelligence, Third Edition (2009), Tata McGraw Hill
3. George F Luger , Artificial Intelligence, Structures and strategies for Complex Problem Solving, Sixth Edition (2009), Pearson

Online Resources :

1. http://www.nptel.ac.in/courses/106105077
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-spring-2005
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
PRINCIPLES & APPLICATIONS OF EMBEDDED SYSTEMS

Instructions:3+1 Hours/Week	SEE Marks:70	Sub Ref Code:CS4030
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
• Learn the building blocks of embedded system • Develop programs to communicate between processor and embedded system components	• Understand the embedded system design process • Build programs on ARM and Arduino Uno • Identify real-time constraints associated with Embedded System and relate them with RTOS principles • Analyze scheduling algorithms of an embedded system and understand multiprocessor systems • Apply debugging techniques to test embedded system software

UNIT I

Embedded Computing: Introduction, Complex Systems and Microprocessor, Embedded System Design Process, Formalisms for System Design, Design Examples.
Instruction Sets: Preliminaries, ARM Processor

UNIT II

Arduino Uno, The Arduino Platform, Sensors and Actuators, Blinking an LED, Analog Input, Analog Sensors, Serial Communication, Driving Motors and Complex Sensors.
CPUs: Co-Processors, CPU Performance, CPU Power Consumption
Computing Platforms: Basic Computing Platforms, the CPU Bus, Memory Devices & Systems, Consumer electronics Architecture, Platform-level Performance Analysis, Design Example.

UNIT III

Introduction to Real- Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.
Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like µC-OS (Open Source)

UNIT IV

Multirate Systems, Priority Based Scheduling, Evaluating Operating System Performance.

Networks and Multiprocessors: Networks and Multiprocessor, Categories of Multiprocessors, distributed Embedded Systems, MPSoCs and shared memory Multiprocessors, Design Example.

UNIT V

Embedded Software Development Tools: Host and Target machines, Link/Locators for Embedded Software, Getting Embedded Software into the Target System;

Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Suggested Books:

1. Marilyn Wolf, Computers as Components: Principles of Embedded Computing System Design, 3rd Edition (2012), Elsevier Morgan Kauffmann Publishers.
2. David E. Simon, An Embedded Software Primer, (2004), Pearson Education.
3. Massimo Banzi, Michael Shiloh, Make: Getting started with Arduino, 3rd Edition (2015), O'Reilly.

Reference Books:

1. K. Shibu, Introduction to Embedded Systems, (2009), Paperback.
2. Raj Kamal, Embedded Systems, 2nd Edition (2008), Tata McGraw Hill.

Online Resources:

1. http://electronicsforu.com/resources/embedded-systems-overview/
2. https://www.arduino.cc/

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
INFORMATION SECURITY

Instructions:3 Hours/Week	SEE Marks:70	Sub Ref Code:CS4040
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Learn legal and technical issues in building secure information systems. • Understand security standards and practices.	• Understand various components of Information Security. • Identify types of threats and the associated attacks to information security. • Analyze strategies to protect information assets from common attacks. • Evaluate security policies, standards and practices. • Identify the role of management in enforcing security policies and standards.

UNIT-I

Introduction: History, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, the SDLC, the Security SDLC. Need for Security: Business Needs, Threats, Attacks, and Secure Software Development

UNIT-II

Legal, Ethical and Professional Issues: Law and ethics in Information Security, Relevant U.S. Laws, International Laws and Legal Bodies, Ethics and Information Security. Risk Management: Overview, Risk Identification, Risk Assessment, Risk Control Strategies, Selecting a Risk Control Strategy, Quantitative versus Qualitative Risk Control Practices, Risk Management discussion Points, and Recommended Risk Control Practices.

UNIT-III

Planning for Security: Security policy, Standards and Practices, Security Blue Print, Security Education, Continuity strategies. Security Technology: Firewalls and VPNs: Physical Design, Firewalls, Protecting Remote connections.

UNIT-IV

Security Technology: Intrusion Detection, Access Control, and other Security Tools: Intrusion Detection and Prevention Systems-Scanning, and Analysis Tools- Access Control Devices. Cryptography: Foundations of Cryptology, Cipher methods, Cryptographic Algorithms, Cryptographic Tools, Protocols for Secure Communications, Attacks on Cryptosystems.

UNIT-V

Implementing Information Security: Information security project management, Technical topics of implementation, Non Technical Aspects of implementation, Security Certification and Accreditation. Security and Personnel: Positioning and staffing security function, Employment Policies and Practices, and Internal control Strategies. Information Security Maintenance: Security management models, Maintenance model, and Digital Forensics.

Suggested Books:

1. Michael E Whitman and Herbert J Mattord, Principles of Information Security, (2011), Cengage Learning.

Reference Books:

2. Thomas R Peltier, Justin Peltier, John Blackley, Information Security Fundamentals,(2010), Auerbach Publications.
3. Detmar W Straub, Seymour Goodman, Richard L Baskerville, Information Security, Policy, Processes, and Practices, (2008), PHI.
4. Mark Merkow and Jim Breithaupt, Information Security Principle and Practices, (2007), Pearson Education.

Online Resources:

1. http://nptel.ac.in/courses/106106129/

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 SECOND SEMESTE
DATA MINING

Instructions:3+1 Hours/Week	SEE Marks:70	Sub Ref Code:CS4050
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Identify the steps involved in KDD, understand various data pre-processing techniques and data mining functionalities • Learn different classification, , Clustering and Association rule mining techniques	• Understand the steps in KDD, Identify various pre-processing techniques and compute similarity among data objects • Construct Multidimensional data models to represent data cubes and perform characterization and generalization tasks on data cubes • Compute associations and correlations among items by mining frequent patterns from transactional databases • Build model to classify unknown data objects • Build clusters using various clustering techniques and evaluate clusters formed

UNIT-I
Introduction: Fundamentals of Data Mining, Kinds of Patterns can be mined, Technologies Used, Applications and Issues in Data Mining
Types of Data: Attribute types, Basic Statistical descriptions of Data, Measuring data Similarity and Dissimilarity

UNIT-II
Data Preprocessing: Need of Preprocessing, Data Cleaning, Data Integration, Data Reduction, Data Transformation

Data Warehouse and OLAP: Data Warehouse, Data Warehouse Modeling, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-oriented induction

UNIT-III
Mining Frequent Patterns, Associations and Correlations: Market Basket Analysis, Association rule mining, Frequent Item set mining methods, Pattern Evaluation methods, Constraint based frequent pattern mining, Mining Multilevel and Multidimensional patterns

UNIT-IV

Classification: General approach to classification, Classification by Decision Tree Induction , Bayes Classification methods, Bayesian Belief Networks, Classification by Backpropogation, Lazy Learners, Other Classification methods , Classification using Frequent patterns, Model Evaluation and selection

UNIT-V

Cluster Analysis: Basic Clustering methods, Partitioning methods, Density –Based Methods, Grid-based methods, and Evaluation of Clustering, Outlier Analysis and Detection methods

Suggested Books:

1. Jiawei Han & Micheline Kamber and Jain Pei ,Data Mining Concepts and Techniques , Third Edition(2011), India.

Reference Books:

1. Pang-Ning Tan, Vipin Kumar,Michael Steinbach, "Introduction to Data Mining", (2017),Pearson Education.
2. Margaret H Dunham, Data Mining Introductory and advanced topics , Pearson education.
3. Arun K Pujari ,Data Mining Techniques, (2017) ,University Press.
4. Sam Anahory , Dennis Murray ,Data Warehousing in the Real World, Pearson Education.
5. Paulraj Ponnaiah, Data Warehousing Fundamentals, Wiley Student ed.

Online Resources:

1. http://web.stanford.edu/class/cs345a/

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
MOBILE COMMUNICATIONS

Instructions:3 Hours/Week	SEE Marks:70	Sub Ref Code: CS 4100
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Learn the functionalities and standards of mobile systems • Design and develop mobile applications	• Understand the principles of wireless transmission and cellular wireless networks • Compare GSM, GPRS, UMTS technologies and broadcasting techniques • Identify and choose wireless LAN protocols for different environments • Identify various protocols used in mobile network layer and implement Ad hoc Network Routing Protocols • Understand file systems and transactions for mobility support and develop mobile applications

UNIT I

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II

Telecommunication systems – GSM – GPRS – UMTS, Satellite Networks –Basics, Routing, Localization, Handover , Capacity Allocation – FAMA and DAMA, Broadcast Systems – Digital Audio Broadcasting, Digital Video Broadcasting

UNIT III

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – Blue Tooth.

UNIT IV

Mobile IP, Dynamic Host Configuration Protocol, Routing in MANETs: DSDV, DSR, AODV and ZRP.
MANETS vs VANETs.

UNIT V

Traditional TCP – classical TCP improvements – WAP, and WAP 2.0,Mobile Transaction models, File Systems and Mobility Management ,Mobile Platforms – A case study on Android, iOS, Windows Phone

Suggested Books:

1. Jochen H. Schiller, Mobile Communications, Second Edition(2009),Addison Wesley.
2. Jeff McWherter, Scott Gowell, Professional Mobile Application Development, (2012), Wiley Publishers.

Reference Books:

3. William Stallings, Wireless Communications and Networks, (2002), PHI/Pearson Education.
4. KumkumGarg, Mobile Computing, (2010), Pearson Education.
5. Asoke KTalukder, Roopa R Yavagal, Mobile Computing, (2008), Tata McGraw Hill.

Online Resources:

1. http://nptel.ac.in/courses/117102062/
2. https://developer.android.com/index.html

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
DISTRIBUTED SYSTEMS LAB

Instructions:2 Hours/Week	SEE Marks:50	Sub Ref Code: CS 4061
Credits: 1	Sessional Marks:25	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of this course, students will be able to
• Implement a distributed algorithm • Demonstrate understanding of Distributed Architectures	• Design a Multichat server to simulate multi client server environment using Sockets for TCP & UDP communication • Develop File Upload/Download using FTP • Implement middleware using RMI • Implement the functionality of a distributed environment using 2PC • Demonstrate Distributed File System using NFS and HDFS

Programming Exercise:

1. Demonstrate the TCP & UDP Communication
2. Develop an FTP Client. Provide a GUI interface for the access of all the services.
3. Implement a mini DNS protocol using RMI.
4. Implement a chat server using JAVA.
5. Implement a 2PC for distributed transaction management.
6. Study of NFS.
7. Design a Web service using Simple Object Access Protocol (SOAP)
8. Installation and configuration of Hadoop
9. Implement a distributed application on Hadoop framework to count word frequency with Map Reduce
10. Implement a distributed application on Hadoop framework to process a log file of a system

Suggested Books:

1. Colouris, Dollimore andKindberg, Distributed Systems Concepts and Design, 5thEdition (2012), Pearson Education, India.

Reference Books:

1. Andrew S. Tanenbaum and Van Steen, Distributed Systems, 2nd Edition (2007), Pearson Education, India.
2. Singhal M, Shivratari N.G., Advanced Concepts in Operating Systems, (2001), McGraw Hill, India
3. Pradeep K Sinha, Distributed Operating Systems: Concepts and Design, (2007), PHI Learning Pvt. Ltd, New Delhi.

Online Resources:

1. http://hadoop.apache.org/

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
EMBEDDED SYSTEMS LAB

Instructions:2 Hours/Week	SEE Marks:50	Sub Ref Code: CS 4071
Credits: 1	Sessional Marks:25	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
• Develop programs to interface components with 8051, ARM processor, Arduino Uno • Demonstrate RTOS functions	• Build programs to interface I/O units to microcontroller • Develop control applications for traffic and elevator using microcontroller • Implement RTOS concepts using VxWorks • Build programs on Arduino Uno • Debug the programs

Programming Exercise:

1. Experiments to interface and to access all internal and external peripherals such as
    a. Stepper Motor interface.
    b. LCD interface.
    c. LED interface.
    d. Keyboard interface.
    e. Serial and ADC interface.
2. Develop control applications for Traffic Controller and Elevator Controller.
3. Experiments using Arduino Uno Board.
4. Demonstrate communication protocols on Arduino Uno: Bluetooth, Wifi & Zigbee.
5. Demonstration of following RTOS concepts using VxWorks
    a. Timing
    b. Multi-Tasking
    c. Semaphores
    d. Message Queues
    e. Round-Robin Task Scheduling
    f. Preemptive Priority Based Task Scheduling
    g. Priority Inversion
6. Develop a project that addresses a specific problem.

Suggested Book:

1. Massimo Banzi, Michael Shiloh, Make: Getting started with Arduino, 3rd Edition (2015), O'Reilly.

Reference Books:

1. K. Shibu, Introduction to Embedded Systems, (2009), Paperback.

Online Resources:

1. https://www.arduino.cc/
2. http://electronicsforu.com/resources/embedded-systems-overview/

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
DATA MINING LAB

Instructions:2 Hours/Week	SEE Marks:50	Sub Ref Code: CS 4081
Credits: 1	Sessional Marks:25	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to:	At the end of the Course students will be able to:
• Implement various data mining functionalities • Design a data warehouse by using an ETL tool	• Implement Multidimensional data models • Implement Association rule mining algorithms and Clustering algorithms • Implement Classification algorithms • Implement Association rule mining algorithms , Classification algorithms and Clustering algorithms with modern data mining tool such as WEKA • Design a data warehouse by using Informatica.

Programming Exercise:

1. Implement the following Multidimensional Data Models
   i. Star Schema
   ii. Snowflake Schema
   iii. Fact Constellation

2. Implement Apriori algorithm to generate frequent Item Sets

3. Implement the following clustering algorithms
   i. K-means
   ii. K-mediods

4. Implement the following classification algorithms
   i. Decision Tree Induction
   ii. KNN

5. Perform data Preprocessing using WEKA

6. Perform Discritization of data using WEKA

7. Classification algorithms using WEKA

8. Apriori algorithm using WEKA

9. Perform data transformations using an ETL Tool

10. A small case study involving all stages of KDD. (Datasets are available online like UCI Repository etc.)

Suggested Books:

1. Jiawei Han & Micheline Kamber and Jain Pei ,Data Mining Concepts and Techniques , Third Edition(2011), India.

Reference Books:

1. Pang-Ning Tan, Vipin Kumar,Michael Steinbach, "Introduction to Data Mining", (2017),Pearson Education,
2. Margaret H Dunham, Data Mining Introductory and advanced topics , Pearson education
3. Arun K Pujari ,Data Mining Techniques, (2017) ,University Press
4. Sam Anahory , Dennis Murray ,Data Warehousing in the Real World, Pearson Education
5. Paulraj Ponnaiah, Data Warehousing Fundamentals, Wiley Student ed.

Online Resources:

1. http://web.stanford.edu/class/cs345a/

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
PROJECT SEMINAR

Instructions:2 Hours/Week	SEE Marks:--	Sub Ref Code: CS 4096
Credits: 1	Sessional Marks:25	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Select a Problem by reviewing Literature • Present the selected topic effectively in oral & written form	• Select a problem related to Computer science area by reviewing the Literature • Analyze the existing solutions for the problem identified • Identify the gaps in the existing solutions • Present the analysis of the identified problem • Design a Document according to the format

Oral presentation is an important aspect of Engineering education. The objective of the Project seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his/her specialization of the Project.

Project Seminar topics may be chosen by the students with advice from the faculty members. Students are to be exposed to the following aspects of a seminar presentation.

- Problem Definition and Specification
- Literature survey
- Broad Knowledge of available techniques to solve a particular problem
- Organization of the material
- Presentation of OHP slides/PC presentation

Each student is required to :

1. Submit a one page synopsis before the seminar talk for display on the notice board.
2. Give a 20 minute presentation through OHP, PC, Slide projector followed by a 10 minute discussion.
3. Submit a report on the seminar topic with a list of references and slides used.

Seminars are to be scheduled from the 3rd week to the last week of the semester and any change in schedule should be discouraged. For award of the Sessional marks, students are to be judged by at least two faculty members on the basis of an oral and written presentation as well as their involvement in the discussions.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderabad-500 031, Telangana State
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATIONS FOR
B.E IV YEAR II SEMESTER WITH EFFECT FROM THE A.Y 2017-18
(2014-15 JOINED BATCH)

Course Code	B.E. FOURTH YEAR II SEMESTER Name of the Course	Instruction Hours per week				Scheme of Examination			Credits
		L	T	D	P	Duration in Hours	Maximum Marks		
THEORY							SEE	Sessionals	
CS 4XXX	ELECTIVE –III	3	-	-	-	3	70	30	3
CS 4XXX	ELECTIVE-IV	3	-	-	-	3	70	30	3
LABS									
CS 4135	Project / Internship	-	-	-	18	Viva Voce	50	50	9
	Total	**6**	**-**	**-**	**18**	**-**	**190**	**110**	**15**
Grand Total		**24**					**300**		

ELECTIVE-III	
CS 4200	Cloud Computing
CS 4210	Information Retrieval Systems
CS 4220	Ad hoc & Sensor Networks
CS 4230	Neural Networks
CS 4240	Semantic Web
ME 4250	Intellectual Property Rights
ELECTIVE-IV	
CS 4260	Big Data
CS 4270	Image Processing
CS 4280	Natural Language Processing
CS 4290	Soft Computing
CS 4300	Simulation & Modelling
CE 4531	Disaster Mitigation and Management

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 SECOND SEMESTER
CLOUD COMPUTING (ELECTIVE – III)

Instructions:3 Hours/Week	SEE Marks:70	Sub Ref Code: CS 4200
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Understand the basic principles of Cloud computing and compare the various Levels of Virtualization. • Use the theoretical principles for Architectural Design of Compute and Storage Clouds. • Develop Confidentiality Protection and Improve User Access to Cloud Computing using Parallel and Distributed Programming Paradigms.	• Understand the cloud enabling technologies and the Cloud service models. • Choose the levels of virtualization and tools for resource provisioning. • Compare the cloud platform architectures of virtualized data centers and Inter-cloud Resource Management. • Analyze the principles of Security and Trust management to protect confidentiality of data in the Cloud. • Propose the standards of Parallel and Distributed Programming Paradigms for improving user Access to Cloud Computing.

UNIT-I

Introduction to Cloud Computing: Cloud Computing in a Nutshell, System Model for Distributed and Cloud Computing, Roots of Cloud Computing, Grid and Cloud, Layers and Types of Clouds, Desired Features of a Cloud, Basic Principles of Cloud Computing, Challenges and Risks, Service Models.

UNIT-II

Virtual Machines and Virtualization of Cluster and Data Centers, Levels of Virtualization, Virtualization structures/Tools and Mechanism, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resources Management, Virtualization Data-Center Automation.

Case studies: Xen Virtual machine monitors – Xen API. VMware – VMware products-VMware Features. Microsoft Virtual Server – Features of Microsoft Virtual Server.

UNIT-III

Cloud computing architecture over Virtualized data Centers: Data- Center design and inter connection network, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, GAE, AWS, Azure, Inter-cloud Resource Management.

UNIT -IV

Cloud Security and Trust Management, Data Security in the Cloud: An Introduction to the Idea of Data Security, The Current State of Data Security in the Cloud CryptDb: Onion Encryption layers- DET, RND, OPE, JOIN, SEARCH, HOM, and Homomorphism Encryption, FPE. Trust, Reputation and Security Management.

UNIT -V

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, parallel and distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

Common Standards in Cloud Computing: The Open Cloud Consortium the Distributed Management Task Force, Standards for Application Developers, Standards for Messaging. Internet Messaging Access Protocol(IMAP), Standards for Security, Examples of Eng-User Access to Cloud Computing.

Suggested Books:

1. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Cloud Computing: principles and paradigms (Wiley Series on Parallel and Distributed Computing), (2011), Wiley Publishing (c).
2. Kai Hwag. Geoffrey C. Fox, Jack J. Dongarra, Distributed and Cloud Computing from parallel processing to the internet of things, (2012), Elsevier.
3. Raluca Ada Popa, Catherine M.S. Redfiled, Nickolai Zeldovich, and Hari Balakrishnan, crypt DB Protecting confidentiality with encrypted Query Processing, 23rd ACM Symposium on Operating Systems principles (SOSP 2011), Cascais, Portugal October 2011.
4. John W. Rittinghouse, Cloud Computing: Implementation, management, and security, James F. Ransome, (2009), CRC Press.

Reference Books:

1. A fully Homomorhic Encryption Scheme, Craig Gentry, September 2009.
2. David Marshall, Wade A. Reynolds, Advanced server virtualization: VMware and Microsoft platform in the virtual Data Center, (2006), Aucrbach publications.

Online resources:

1.https://cloudacademy.com/cloud-computing/what-is-cloud-computing-introductory-course/
2. http://cloudschool.com/courses

With effect from the Academic Year 2017-18

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. 4/4 II-SEMESTER

INTELLECTUAL PROPERTY RIGHTS (ELECTIVE-III)

Instruction : 3Hrs/week	SEE Marks : 70	Subj Ref Code : ME 4250
Credits : 3	Sessional Marks : 30	Duration of SEE: 3 Hours

Course objectives	Course Out comes
The objectives of this course are to: 1. have an insight on various intellectual properties. 2. know the procedure to file patents. 3. analyse the classes of articles registrable under industrial designs. 4. understand registered and unregistered trademarks. 5. know the subject matter of copyrights and the procedure to apply for copyright protection.	On completion of the course, the student will be able to: 1. Learn the meaning and nature of IPR and have knowledge of various international conventions 2. Awareness about how to file a patent and rights and obligations of a patentee 3. Knowledge of the aspects of industrial design and the articles eligible for registration 4. Know the importance of protecting trademarks and the associated goodwill 5. Learn the procedure to apply for copyrights and the various forms of copyrights

UNIT – I

Introduction: Overview of intellectual property (IP), importance of IP, Types of IP, territoriality of IP, impact of IP in socio-economic development, International organizations, treaties, and conventions associated with intellectual property; WTO, WIPO, GATT, TRIPS & TRIMS

UNIT – II

Patents: Meaning of a patent, commercial significance, patentable subject matter, filing and obtaining of a patents, rights and obligations of a patentee, specification, register of patents, rights and obligations of a patentee, compulsory licenses - revocation, surrender, i0nfringement. Utility models differences between a utility model and a patent.

UNIT – III

Industrial Design: Meaning of an industrial designs, registration, rights conferred by registration, infringement of "copyright in design".
Trade Marks: Meaning of a trade mark, purpose of protecting trademarks, trademarks registry, assignment, transmission, and licensing of trade marks, passing off.

UNIT – IV

Copy Rights: Nature of copy right, subject-matter of copyright, rights conferred by copyright, broadcasting, publication, computer programme, database, assignment, transmission, and relinquishment of copyright, infringement of copy right.

UNIT – V

Other forms of intellectual property: confidential information, know-how, industrial and trade secrets, and geographical indications.
Enforcement of Intellectual Property Rights:Infringement of intellectual property rights, enforcement measures, emerging issues in intellectual property protection.
Unfair Competition: meaning of unfair competition, relation between unfair competition and intellectual property laws.

Learning Resources:

1. P.Narayanan, Intellectual property law, 3rd edn., Eastern Law House Revised 2017
2. B.L.Wadehra, Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications, 5th edition, Universal law Publishing Pvt. Ltd., India 2014
3. Cronish W.R., Intellectual property - patents, copyright, trademarks and allied rights, Sweet & Maxwell, 1999
4. Deborah E. Brouchoux, Intellectual Property, 3rd edition, Cengage learning 2012

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 FIRST SEMESTER
IMAGE PROCESSING (ELECTIVE – IV)

Instructions:3 Hours/Week	SEE Marks:70	Sub Ref Code: CS 4270
Credits: 3	Sessional Marks:30	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Understand the fundamentals of image processing algorithms. • Implement and gain experience in applying image processing algorithms to real problems.	• Distinguish sampling and quantization processes in obtaining digital images from continuously sensed data and describe the steps in image processing. • Apply Fourier transformation and other transformation techniques to enhance digital image. • Apply different techniques in spatial domain and frequency domain to enhance and segment digital images. • Describe different methods to encode raw image data into standard compressed image format. • Demonstrate most commonly applied image restoration and color models and their use in basic image processing.

UNIT-I

Introduction to Digital Image Processing, Origins and Applications of Digital Image Processing. Fundamental Steps in Digital Image Processing, Components of Digital Image Processing System. Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization.

UNIT-II

Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of One Variable, Extension to Function of Two Variables, Image Smoothing and Sharpening using Frequency Domain Filters.

UNIT-III

Intensity Transformations and Spatial Filtering: Histogram Processing, Fundamental of Spatial Filtering, Smoothing and Sharpening Spatial Filters. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation.

UNIT-IV

Image Compression: Fidelity Criteria, Image Compression Models, Image Formats, Containers and Compression Standards, Compression Methods: Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-Length Coding.

UNIT-V

Restoration: Noise Models, Inverse filtering, Least squares Filtering.

Color Image Processing : Color fundamentals, color models, Pseudocolor Image Processing, Basics of full color image processing.

Suggested Books:

1. Gonzalez R.C., Woods R.E, Digital Image Processing, Third Edition (2007), Prentice Hall, USA.
2. Jayaraman S, Esakkirajan S, Veerakumar T, Digital image processing, 13th reprint (2014), McGraw Hill Education, New Delhi.

Reference Books:

1. William K. Pratt, Digital Image Processing, 3rd Edition (2001) , John Wiley & Sons Inc, UK.
2. McAndrew, Introduction to Digital Image Processing, (2004), Cengage Learning.
3. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, (2008), Cengage Learning.
4. Rosenfeld A. Kak AC, Digital Picture Processing Vol.I & II Acad, Press, 2nd Edition.

Online Resources:

1. https://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/introduction/.
2. http://freevideolectures.com/Course/2316/Digital-Image-Processing-IIT-Kharagpur.

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR BE 4/4 SECOND SEMESTER
NATURAL LANGUAGE PROCESSING (ELECTIVE – IV)

Instructions: 3 Hours / Week	SEE Marks : 70	Sub Ref Code: CS 4330
Credits: 3	Sessional Marks : 30	Duration of SEE: 3 Hours.

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Learn the concepts of Natural Language processing. • Gain practical understanding of relevant terminology, concepts in Natural Language Processing.	• Understand the fundamentals models of Natural Language Processing systems. • Design Finite-State Transducers for English Morphology. • Apply basic Top-Down Parser for syntax analysis of Natural Language sentences. • Analyze semantics of a natural language by representing meaning. • Understand the discourse of Natural languages.

UNIT-I

Introduction: Knowledge in Speech and Language Processing, Ambiguity, Models and Algorithms, Language, Thought and Understanding.

Morphology and Finite-State Transducers: Survey of English Morphology, Finite-State Morphological Parsing, Combining FST Lexicon and Rules, Lexicon-Free FSTs-The Porter Stemmer.

UNIT-II

N-grams: Counting words in Corpora, Simple (Unsmoothed) N-grams, Smoothing, Backoff, Deleted Interpolation, N-grams for Spelling and Pronunciation, Entropy.

Part-of-Speech Tagging: Part-of-Speech Tagging, Rule-Based Part-of-Speech Tagging, Stochastic Part-of-Speech Tagging, Transformation Based Tagging.

UNIT-III

Parsing with Context-Free Grammars: Parsing as Search, A Basic Top-Down Parser, Problems with the Basic Top-Down Parser, The Earley Algorithm, Finite-State Parsing Methods.

Lexicalized and Probabilistic Parsing: Probabilistic Context-Free Grammars, Problems with PCFGs, Probabilistic Lexicalized CFGs.

UNIT-IV

Representing Meaning: Computational Desiderata for Representations, Meaning Structure of Language, First Order Predicate Calculus, Some Linguistically Relevant Concepts, Related Representational Approaches.

Semantic Analysis: Syntax-Driven Semantic Analysis, Attachments for a Fragment of English, Integrating Semantic Analysis into the Earley Parser, Idioms and Compositionality.

UNIT-V

Discourse: Reference Resolution, Text Coherence, Discourse Structure.

Natural Language Generation: Introduction to Language Generation, An Architecture for Generation, Surface Realization, Discourse Planning.

Suggested book:

1. Daniel Jurafsky & James H. Martin, "Speech and Language Processing", 3rd edition (2004), Pearson Education.

Reference Books:

1. Christopher D. Manning, Hinrich Schutze, Foundations of Statistical Natural Language Processing, (1999), The MIT Press.
2. James Allan, Natural Language Understanding, 2nd edition (1994),Pearson Education
3. Tanveer Siddiqui, US Tiwary, Natural Language Processing and Information Retrieval, (2008), Oxford University Press.

Online resources:

1. http://nptel.ac.in/courses/106101007/
2. https://www.udemy.com/natural-language-processing/
3. https://www.youtube.com/watch?v=aeOLjFe256E
4. https://www.youtube.com/watch?v=bDPULOFFlaI

With effect from the A.Y 2017-18

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. IV/IV - II SEMESTER
ELECTIVE – IV
DISASTER MITIGATION AND MANAGEMENT

Instruction:	3Hrs/ Week	SEE Marks:	70	Subject Code:	CE 4210
Credits:	3	CIE Marks:	30	Duration of SEE:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures 3. Expose students to various technologies used for disaster mitigation and management.	1. Attain knowledge on various types, stages, phases in disaster with international & national policies & programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and Management Systems in India 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management Systems in India. 4. Explain the utility of geographic information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Develop understanding on the concepts of risk, vulnerability, warning and forecasting methods in disaster management.

UNIT-I

Introduction: Hazard, vulnerability and risk, Types of disasters , Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT-II

Natural Disasters: Hydro - meteorological based disasters – Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT-III

Human induced hazards: chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT-IV

Remote sensing and GIS for Disaster Management: Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT-V

Disaster Management: Risk assessment and hazard mapping – mitigation and management options – warning and forecasting.

Suggested Books:

1. Rajib, S and Krishna Murthy, R.R. "Disaster Management Global Challenges and Local Solutions", Universities Press,2012.
2. Navele, P & Raja, C.K. Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, 2009.

Reference Books:

1. Fearn-Banks, K Crises Computations Approach: A case book approach, Route ledge Publishers, 2011.
2. Battacharya, T. Disaster Science and Management, Tata McGraw Hill Company, 2012.

With effect from the A.Y 2017-18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E 4/4 SECOND SEMESTER
PROJECT

Instructions:18 Hours/Week	SEE Marks:50	Sub Ref Code: CS 4135
Credits: 9	Sessional Marks:50	Duration of SEE:3 Hours

Course objectives	Course outcomes
Students should be able to	At the end of the Course Students will be able to
• Review the literature to find a problem in Computer science area • Design a system for identified problem, analyze , implement and demonstrate the Problem identified	• Perform literature survey and find a problem in the interested area • Analyze the feasibility of selected problem to design a solution • Design a system to address the proposed problem • Develop a system based on the design ,verify the correctness of the system with exhaustive test cases and provide the conclusion for the proposed system • Demonstrate the work done in the project

Solving a real life problem should be the focus of U.G. projects. Faculty members should propose the projects (brief scope and references) well in advance which should be made available to the students at the department library. The project could be classified as hardware, software, modeling, simulation etc. The project should involve one or many elements of techniques such as analysis, design, synthesis.

The department will appoint a project coordinator who will coordinate the following:

Grouping of students (maximum of 3 in a group)
Allotment of projects and project guides
Project monitoring at regular intervals.

All projects allotment is to be completed by the 4th week of 4th year 1st semester so that the students get sufficient time for completion of the project.

All projects will be monitored at least twice in a semester through student presentations. Sessional marks are to be based on the Grades/Marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts should be made that some of the projects are carried out in industries with the help of industry coordinators, Problems can also be invited from the industries to be worked out through U.G. projects.

Common norms will be established for the final documentation of the project report by the respective departments.

Note: Three periods of contact load will be assigned to each project guide.