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

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (CSE) VII and VIII Semesters
With effect from 2019-20
(For the batch admitted in 2016-17)
(R-16)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Phones: +91-40-23146020, 23146021

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Institute Vision

Striving for a symbiosis of technological excellence and human values

Institute Mission

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow

Department Vision

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.

Department Mission

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.

B.E (CSE) Program Educational Objectives (PEO's)	
Graduates should be able to utilize the knowledge gained from their academic program to:	
PEO I	Solve problems in a modern technological society as valuable and productive engineers.
PEO II	Function and communicate effectively, both individually and within multidisciplinary teams.
PEO III	Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.
PEO IV	Continue the process of life-long learning.

	B.E. (CSE) PROGRAM OUTCOMES (PO's)
	Engineering Graduates will be able to:
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P1O	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

B.E (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	Graduates will have knowledge of programming and designing to develop solutions for engineering problems.
PSO II	Graduates will be able to demonstrate an understanding of system architecture, information management and networking.
PSO III	Graduates will possess knowledge of applied areas of computer science and engineering and execute them appropriately.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-16)
B.E. – COMPUTER SCIENCE & ENGINEERING : VII SEMESTER (2019 - 2020)

Course Code	Name of the Course	Scheme of Instruction				Scheme of Examination		
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
B.E (CSE) VII Semester								
THEORY								
PC710CS	Distributed Systems and Cloud Computing	3	-	-	3	70	30	3
PC720CS	Internet of Things	3	-	-	3	70	30	3
PE7XXCS	Professional Elective-II	3	-	-	3	70	30	3
PE7XXCS	Professional Elective-III	3	-	-	3	70	30	3
PE7XXCS	Professional Elective-IV	3	-	-	3	70	30	3
PRACTICALS								
PC711CS	Distributed Systems and Cloud Computing Lab	-	-	2	3	50	25	1
PC721CS	Internet of Things Lab	-	-	2	3	50	25	1
PW719CS	Mini Project	-	-	2	-	-	25	1
PW729CS	Project Seminar	-	-	2	-	-	25	1
	TOTAL	15	0	8	-	450	250	19
	GRAND TOTAL		23		-		700	
Left over hours are allocated for CC								

		List of Professional Electives - Stream wise							
		Artificial Intelligence & Data Engineering		Systems & Networks		Software Engineering		Applications	
		Course Code	Title	Course Code	Title	Course Code	Title	Course Code	Title
Sem VII	PE-II	PE710CS	Data Mining	PE 720CS	Multi-core and GPU Computing	PE 730CS	Software Design tools and methodologies	PE 740CS	Computer vision
	PE-III	PE 50CS	Deep Learning	PE 760CS	Mobile Communications	PE 770CS	Software Testing Methodologies	PE 780CS	Information Security
	PE -IV	PE714CS	Data Science	PE 724CS	Advanced Databases	PE 734CS	Software Processes and Agile Practices	PE 744CS	Pattern Recognition

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
DISTRIBUTED SYSTEMS & CLOUD COMPUTING

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PC710CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Explain distributed system and cloud models 2 Apply distributed computational model and understand the need for cloud computing.	1 Explain distributed system models and cloud service & deployment models. 2 Analyze the need for virtualization in a cloud environment and apply it in compute, memory and storage levels 3 Explain distributed computation model on large datasets using parallel and distributed programming approaches over cloud platforms. 4 Analyze the security issues on SPI infrastructure and explain the need for Homomorphic encryption 5 Explain the role of trust and energy efficiency in cloud

UNIT I:
Distributed System Models & Enabling technology: Scalable computing over the internet, Technologies for network based system, System models for distributed & cloud, Software environments for distributed & Cloud.
Time and Global States: Introduction, Clocks events and process states, synchronizing physical clocks, Logical clocks, Global states
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 Centres: Levels of Virtualization, Virtualization structures/Tools and Mechanism, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resources Management, Virtualization Data-Centre Automation

UNIT III:
Service Oriented Architecture for Distributed Computing: Services & SOA, Message Oriented Middleware, Workflow in SOA.
Cloud Programming & Software Environments: Features of Cloud & Grid, Parallel & Distributed programming paradigms, Programming support of Google Cloud, Amazon AWS & Azure.
Case Studies; OpenStack & Aneka

UNIT IV :
Cloud Security, 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.

UNIT V :
Trust Management & Green Cloud
Trust, Reputation and Security Management in P2P Systems, Load Balancing-HAProxy, Container based Virtualization-Docker, Green Cloud - Energy Consumption Models and Energy-aware Data Centers and Clouds

Learning Resources:

1. Kai Hwang. Geoffrey C. Fox, Jack J. Dongarra, "Distributed and Cloud Computing from parallel processing to the internet of things", Elsevier, 2012.
2. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, "Cloud Computing: principles and paradigms (Wiley Series on Parallel and Distributed Computing), Wiley Publishing (c) 2011.
3. Raluca Ada Popa, Catherine M.S. Redfiled, NickolaiZeldovich, 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. Craig Gentry,A fully Homomorhic Encryption Scheme, Doctoral Dissertation, September 2009

5. Ajay D. Kshemkalyani and Mukesh Singhal,Distributed Computing: Principles, Algorithms, and Systems, Cambridge, 2008
6. https://onlinecourses.nptel.ac.in/noc18_cs45/
7. https://cloud.google.com/load-balancing/docs/
8. https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-overview
9. https://www.docker.com/resources/what-container
10. http://www.haproxy.org/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
INTERNET OF THINGS
SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PC720CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Explore IoT technologies, architectures and standards 2 Develop IoT solutions for a given problem	1 Describe IoT architecture 2 Develop applications using Raspberry PI 3 Apply wireless protocols to develop an IoT solution 4 Integrate IoT application with Cloud 5 Recognize IoT opportunities in the industry.

UNIT-I:
Internet of Things (IoT) : Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment, Sensors and Actuators, Envisioning the Internet of Things Era, Emergence of the IoT Platform as a Service (PaaS) ,Emerging IoT Flavors.
M2M and IoT Technology Fundamentals : Devices and Gateways, Local and Wide Area Networking, Data Management, Business Processes in IoT, Everything as a Service (XaaS), M2M and IoT.

UNIT-II:
Raspberry Pi: Board Components, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python. Arduino Uno Platform, Interfacing with Uno.
IoT Ecosystem Using Wireless Technologies : Architecture for IoT Using Mobile Devices, Mobile Technologies, 5G, Software-Defined

Networking, Ultra Wide Band Technology, Near Field Communication Technology, Low Power Wide Area Networking Technologies – Sigfox, Weightless, LoRa.

UNIT-III: Infrastructure and Service Discovery Protocols for the IoT Ecosystem : Layered Architecture for IoT, Protocol Architecture of IoT, IEEE 802.15.4, IPv6 over Low-Power Wireless Personal Area Networks (6LoWPAN), Bluetooth Low Energy, Long Term Evolution-Advanced, RFID, Z-Wave, Zigbee, Device or Service Discovery for IoT-Bluetooth Beacons, Wi-Fi aware, Open Hybrid.

UNIT-IV:
Integration Technologies and Tools for IoT Environments : Sensor and Actuator Networks, Sensor-to-Cloud Integration, IoT Device Integration Concepts, Standards, and Implementations – Service Oriented Device Architecture, Device Profile for Web Services, Open Service Gateway Initiative (OSGi), REST Paradigm, Message Queue Telemetry Transport (MQTT), Advanced Message Queuing Protocol (AMQP), Constrained Application Protocol (CoAP).
Next-Generation Clouds for IoT Applications and Analytics : Hybrid and Federated Clouds, Edge or Fog Clouds, Software-Defined Clouds, Cognitive Clouds, Amazon Web services for IoT.

UNIT-V:
Industry 4.0: Industrial Internet of Things (IIoT), Reference Architecture, Characteristics of Industry 4.0.
Case Studies: Introduction, Smart Cities, Smart Homes, Smart Lighting, Smart Transportation, Industrial Automation, Smart Healthcare, Agriculture.

Learning Resources:

1. Pethuru Raj and Anupama C. Raman , "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press.
2. ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on Approach", Universities Press, 2014.

3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, 2014, Academic Press.
4. Jean-Philippe Vasseur, Adam Dunkles, "Interconnecting Smart Objects with IP", Morgan Kaufmann, 2010.
5. Peter Waher, "Learning Internet of Things", PACKT Publishing, 2015.
6. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", Springer
7. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", Wiley Publications.
8. https://www.postscapes.com/internet-of-things-protocols/
9. https://nptel.ac.in/courses/106105166/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
DATA MINING
SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE710CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

	COURSE OBJECTIVES		COURSE OUTCOMES On completion of the course, students will be able to
1	Identify the steps involved in KDD, understand various data pre-processing techniques and data mining functionalities	1	Explain the steps in KDD, Identify various pre-processing techniques and compute similarity among data objects
2	Learn different classification, Clustering and Association rule mining techniques	2	Construct Multidimensional data models to represent data cubes and perform characterization & generalization tasks on data cubes
		3	Compute associations and correlations among items by mining frequent patterns from transactional databases
		4	Build model to classify unknown data objects
		5	Build clusters using 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 Backpropagation, 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

Learning Resources:
1. Jiawei Han & Micheline Kamber and Jain Pei ,Data Mining Concepts and Techniques , Third Edition(2011), India.
2. Pang-Ning Tan, Vipin Kumar, Michael Steinbach, "Introduction to Data Mining", (2017),Pearson Education,
3. Margaret H Dunham, Data Mining Introductory and advanced topics , Pearson education
4. Arun K Pujari ,Data Mining Techniques, (2017) ,University Press
5. Sam Anahory , Dennis Murray ,Data Warehousing in the Real World, Pearson Education
6. Paulraj Ponnaiah, Data Warehousing Fundamentals, Wiley Student ed. http://web.stanford.edu/class/cs345a/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
MOBILE COMMUNICATIONS

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE760CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	On completion of the course, students will be able to
1 Learn the functionalities and standards of mobile systems	1 Explain the principles of wireless transmission and cellular wireless networks
2 Design and develop mobile applications	2 Compare GSM, GPRS, UMTS technologies and broadcasting techniques
	3 Identify and choose wireless LAN protocols for different environments
	4 Identify various protocols used in mobile network layer and implement Adhoc Network Routing Protocols
	5 Explain 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

Learning Resources:

1. Jochen H. Schiller, "Mobile Communications", Addison Wesley, Second Edition, 2009
2. Jeff McWherter, Scott Gowell, "Professional Mobile Application Development", Wiley Publishers, 2012
3. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002
4. KumkumGarg, "Mobile Computing", Pearson Education, 2010.
5. Asoke K Talukder, Roopa R Yavagal, "Mobile Computing", TMH, 2008.
6. http://nptel.ac.in/courses/117102062/
7. http://developer.android.com/index.html

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
INFORMATION SECURITY

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE780CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Learn legal and technical issues in building secure information systems. 2 Understand security standards and practices.	1 Understand various components of Information Security 2 Identify types of threats and the associated attacks to information security 3 Analyze strategies to protect information assets from common attacks 4 Evaluate security policies, standards and practices 5 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.

Learning Resources:

1. Michael E Whitman and Herbert J Mattord, Principles of Information Security, (2011), Cengage Learning.
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.
5. http://nptel.ac.in/courses/106106129/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   :   1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
ADVANCED DATABASES

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE724CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Apply knowledge of advanced database management techniques to provide solution for a database intensive problem.	1 create and query tables in object relational and object oriented databases 2 create, query and process data in XML files 3 describe query processing mechanisms and query optimization 4 explain inter query, intra query parallelism and distributed database processing techniques 5 apply performance tuning methods and describe data representation in spatial, geographical and temporal databases

UNIT-I: Object Based Databases: Overview, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.

UNIT-II: XML: Motivation, Structure of XML data, XML Document Schema, Querying and Transformation, Application program Interfaces to XML, Storage of XML Data, XML applications.

UNIT-III: Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.
Query Optimization: Overview, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of

Evaluation Plans, Materialized Views.

UNIT-IV: Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Interoperation Parallelism, Interoperation Parallelism.

Distributed Databases: Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Heterogeneous Distributed Databases, and Cloud-Based Databases.

 UNIT-V: Advanced Application Development: Performance Tuning, Performance Benchmarks, Other Issues in Application Development, Standardization.

Spatial and Temporal Data and Mobility: Motivation, Time in Databases, Spatial and Geographic Data, Multimedia Databases, Mobility and Personal Databases.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
3. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
4. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
5. http://nptel.ac.in/courses/106106093/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
DISTRIBUTED SYSTEMS & CLOUD COMPUTING LAB
SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : **PC711CS**
Credits : 1	CIE Marks : 25	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Implement distributed transactions 2 Install, configure and deploy applications using various cloud platforms	1 Implement a distributed transaction model 2 Launch and run a highly available web application on Amazon cloud platform 3 Deploy and develop scalable compute model using Distributed Storage 4 Develop full stack application using Google cloud 5 Develop a end to end application over a Cloud environment

Programming Exercise:
1. Implement a 2PC for distributed transaction management.
2. Design a Web service using Simple Object Access Protocol (SOAP)
3. Hosting a static website on Amazon AWS
4. Deploying a Node.js Web Application on AWS
5. Installation and configuration of Hadoop using Docker Container
6. Implement a distributed application on Hadoop framework to count word frequency with Map Reduce
7. Analyzing Big Data using Hadoop
8. Use native MySQL connections from Google App Engine to Google Cloud SQL
9. AngularJS CRUD application for Google App Engine
10. Final Project to develop a case study on Cloud

Learning Resources:

1. Kai Hwag. Geoffrey C. Fox, Jack J. Dongarra, "Distributed and Cloud Computing from parallel processing to the internet of things", Elsevier, 2012.
2. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, "Cloud Computing: principles and paradigms (Wiley Series on Parallel and Distributed Computing), Wiley Publishing (c) 2011.
3. Raluca Ada Popa, Catherine M.S. Redfiled, NickolaiZeldovich, and Hari Balakrishnan, "cryptDB" Protecting confidentiality with encrypted Query Processing" 23rdACM Symposium on Operating Systems principles (SOSP 2011), Cascais, Portugal October 2011.
4. Craig Gentry, A fully Homomorhic Encryption Scheme, Doctoral Dissertation, September 2009
5. Ajay D. Kshemkalyani and Mukesh Singhal, Distributed Computing: Principles, Algorithms, and Systems, Cambridge, 2008
6. https://aws.amazon.com/getting-started/projects/
7. https://onlinecourses.nptel.ac.in/noc18_cs45/
8. https://cloud.google.com/load-balancing/docs/
9. https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-overview
10. https://www.docker.com/resources/what-container

No. of Internal Tests:	01	Max. Marks for Internal Test:	10
Marks for day-to-day laboratory class work			15
Duration of Internal Test: 2 Hours			

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
INTERNET OF THINGS LAB

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code **: PC721CS**
Credits : 1	CIE Marks : 25	Duration of SEE : 3 Hours

COURSE OBJECTIVES		**COURSE OUTCOMES** On completion of the course, students will be able to
1	Develop programs to interface sensors & actuators with Raspberry PI and Arduino Uno	1	Build programs to interface sensors with Raspberry PI
2	Develop applications for smart home.	2	Develop applications to monitor devices using wireless technologies
		3	Build programs on Arduino Uno
		4	Develop applications to publish data on to cloud
		5	Implement programs to demonstrate RTOS concepts

Programming Exercise:
1. Experiments using Arduino Uno Board.
2. Programming Raspberry PI to read data from onboard sensors.
3. Interfacing ultrasonic, IR sensors to Raspberry PI
4. Interfacing Soil Moisture sensor for Agriculture based Application
5. Developing Control applications to interface actuators.
6. Demonstrate communication protocol Bluetooth
7. Application of Wi-Fi in IoT systems.
8. Demonstrate communication protocol LoRa.
9. Develop an application using MQTT Protocol.
10. Publishing data on to Cloud
11. Demonstration of following RTOS concepts
    a. Timing
    b. Multi-Tasking
    c. Semaphores

    d. Round-Robin Task Scheduling
    e. Preemptive Priority Based Task Scheduling

12. Develop a project that addresses a specific domain.

Learning Resources:

1. ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on Approach", Universities Press, 2014.
2. Peter Waher**, "**Learning Internet of Things", PACKT Publishing, 2015.
3. https://www.raspberrypi.org/
4. https://www.arduino.cc/
5. http://electronicsforu.com/resources/embedded-systems-overview/

No. of Internal Tests:	01	Max. Marks for Internal Test:	10
Marks for day-to-day laboratory class work			15
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
MINI PROJECT (DATA MINING LAB)

SYLLABUS FOR B.E. VII-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : --	Course Code **: PW719CS**
Credits : 1	CIE Marks : 25	Duration of SEE : --

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Implement various data mining functionalities 2 Design a data warehouse using an ETL tool	1 Implement Multidimensional data models 2 Implement Association rule mining algorithms and Clustering algorithms 3 Implement Classification algorithms 4 Implement Association rule mining algorithms , Classification algorithms and Clustering algorithms with modern data mining tool WEKA 5 Design a data warehouse using Informatica

Programming Exercise:
1. Implement similarity and dissimilarity measures on different type of attributes
2. Find statistical properties of data by using mean, mode, median, Quartile 1(Q1),, Quartile (Q3) and Inter Quartile Range (IQR)

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

4. Implement Apriori algorithm to generate frequent Item Sets

5. Implement the following clustering algorithms
   i. K-means

    ii.   K-mediods

    iv.   DB-SCAN

6. Implement the following classification algorithms
   i. Decision Tree Induction
   ii. KNN
   iii. Naïve bayes

7. Perform data Preprocessing using WEKA

8. Perform Discritization of data using WEKA

9. Classification algorithms using WEKA

10. Apriori algorithm using WEKA

11. Perform data transformations using an ETL Tool

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

Learning Resources:

1. Jiawei Han & Micheline Kamber and Jain Pei ,Data Mining Concepts and Techniques , Third Edition(2011), India.
2. Pang-Ning Tan, Vipin Kumar,Michael Steinbach, "Introduction to Data Mining", (2017),Pearson Education,
3. Margaret H Dunham, Data Mining Introductory and advanced topics , Pearson
   education
4. Arun K Pujari ,Data Mining Techniques, (2017) ,University Press
5. Sam Anahory , Dennis Murray ,Data Warehousing in the Real World, Pearson Education
6. Paulraj Ponnaiah, Data Warehousing Fundamentals, Wiley Student ed. http://web.stanford.edu/class/cs345a/

No. of Internal Tests:	01	Max. Marks for Internal Test:	10
Marks for day-to-day laboratory class work			15
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
PROJECT SEMINAR
SYLLABUS FOR B.E. VII-SEMESTER

| L:T:P (Hrs./week): 0:0:2 | SEE Marks : -- | Course Code **: PW729CS** |
| Credits : 1 | CIE Marks : 25 | Duration of SEE : -- |

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Select a Problem by reviewing Literature 2 Present the selected topic effectively in oral & written form	1 Select a problem related to Computer science area by reviewing the Literature 2 Analyze the existing solutions for the problem identified 3 Identify the gaps in the existing solutions 4 Present the analysis of the identified problem 5 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

Each student is required to :
1. Submit a one page synopsis before the seminar talk.

2. Give a 20 minute presentation followed by a 10 minute discussion.
3. Submit a report on the seminar topic with a list of references.

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)
<u>**SCHEME OF INSTRUCTION AND EXAMINATION (R-16)**</u>
B.E. – COMPUTER SCIENCE & ENGINEERING : VIII SEMESTER (2019 - 2020)

Course Code	Name of the Course	Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
PE8XXCS	Professional Elective-V	3	-	-	3	70	30	3
PE8XXCS	Professional Elective-VI	3	-	-	3	70	30	3
PRACTICALS								
PW819CS	Project /Internship	-	-	18	Viva-Voce	50	50	9
	TOTAL	6	-	18	-	190	110	15
	GRAND TOTAL	24			-	300		

B.E VIII (CSE) Semester

29

		List of Professional Electives - Stream wise							
		Artificial Intelligence & Data Engineering		Systems & Networks		Software Engineering		Applications	
		Course Code	Title	Course Code	Title	Course Code	Title	Course Code	Title
Sem VIII	PE-V	PE810CS	Robotic Process Automation	PE 820CS	Information Storage Management	PE 830CS	Software Quality Management	PE 840CS	Human Computer Interaction
	PE -VI	PE850CS	Natural Language Processing	PE 860CS	Ad hoc and Sensor Networks	PE 870CS	Secure Software Design	PE 880CS	Block chain Architecture

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
ROBOTIC PROCESS AUTOMATION

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE 810CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

	COURSE OBJECTIVES		COURSE OUTCOMES On completion of the course, students will be able to
1	Apply knowledge of basic concepts of Robotic Process Automation	1	Understand Robotic Process Automation technology.
2	Build on these concepts and get introduced to key RPA Design and Development strategies and methodologies in context of UiPath products. Develop flow charts.	2	Apply UiPath programming techniques to deploy robot configurations
		3	Explore various data extraction techniques and perform integrations with various popular applications
		4	Design and develop a programmed robot that includes logging and exception handling
		5	Deploy and control Bots with UiPath Orchestrator.

UNIT-I:
Introduction: What is Robotic Process Automation (RPA), Scope & techniques of Automation, Benefits of RPA, Components of RPA, RPA Platforms, UiPath Studio, Installation of UiPath Studio, Learning UiPath Studio

UNIT-II:
Sequence, Flowchart & Control Flow: Sequencing the Workflow, Activities, Flowchart, Control Flow for Decision making.
Data Manipulation: Variables, Collection, Arguments, Data Table, Clipboard management, File operations

Controls: Finding the control, waiting for a control, Act on a control, UiExplorer, Handling Events

Recording and advanced UI Interaction

Basic recording, Desktop recording, Web recording, Citrix, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR Avoiding typical failure points.

UNIT-III:

Plugins and Extensions: Terminal plugin, Java plugin, Java plugin with UiPath Studio, Citrix automation, Citrix environment, Mail plugin, PDF plugin, Web integration, Excel and Word plugins, Credential management Extensions

Handling User Events and Assistant Bots: What are assistant bots, Monitoring system event triggers: Hotkey trigger, Mouse trigger, System trigger, Monitoring image and element triggers, Launching an assistant bot on a keyboard event

UNIT-IV:

Exception Handling, Debugging, and Logging: Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots Debugging techniques, Setting breakpoints, Slow step, Highlighting, Break, Collecting crash dumps: Enabling crash dumps, Disabling crash dumps, Error reporting: Enterprise Edition customers, Community Edition users.

Managing and Maintaining the Code: Project organization, Picking an appropriate layout for each workflow, Breaking the process into smaller parts, Using exception handling, Making your workflow readable, Keeping it clean, Nesting workflows, Reusability of workflows, Templates, Commenting techniques, State Machine, When to use Flowcharts State Machines or Sequences.

UNIT-V: Deploying and Maintaining the Bot: Publishing using publish utility, Overview of Orchestration Server, Using Orchestration Server to control bots, Using Orchestration Server to deploy bots, License management, Activating and uploading a license to Orchestrator, Publishing and managing updates, Packages, Managing packages

Learning Resources:

1. Alok Mani Tripathi, Learning Robotic Process Automation, Publisher: OReilly Publishing, 2018, ISBN: 9781788470940
2. Frank Casale (Author), Rebecca Dilla (Author), Heidi Jaynes (Author), Lauren Livingston (Author), Introduction to Robotic Process Automation: a Primer, Institute of Robotic Process Automation, Amazon Asia-Pacific Holdings Private Limited, 2018
3. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant, Amazon Asia-Pacific Holdings Private Limited, 2018
4. Srikanth Merianda, Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation, 1st Edition, Consulting Opportunity Holdings LLC, 2018
5. https://www.uipath.com/rpa/robotic-process-automation
6. https://www.udemy.com/robotic-process-automation/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
NATURAL LANGUAGE PROCESSING

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE850CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Learn the concepts of Natural Language processing. 2 Gain practical understanding of relevant terminology, concepts in Natural Language Processing.	1 Explain the fundamental models of Natural Language Processing systems. 2 Design Finite-State Transducers for English Morphology. 3 Apply basic Top-Down Parser for syntax analysis of Natural Language sentences. 4 Analyze semantics of a natural language by representing meaning. 5 Explain 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.

Learning Resources:
1. Daniel Jurafsky & James H. Martin, "Speech and Language Processing", 3rd edition (2004), Pearson Education.
2. Christopher D. Manning, Hinrich Schutze, Foundations of Statistical Natural Language Processing, (1999), The MIT Press.
3. James Allan, Natural Language Understanding, 2nd edition (1994),Pearson Education
4. Tanveer Siddiqui, US Tiwary, Natural Language Processing and Information Retrieval, (2008), Oxford University Press.
5. http://nptel.ac.in/courses/106101007/
6. https://www.udemy.com/natural-language-processing/
7. https://www.youtube.com/watch?v=aeOLjFe256E
8. https://www.youtube.com/watch?v=bDPULOFFlaI

The break-up of CIE: Internal Tests + Assignments + Quizzes

1 No. of Internal Tests   : 2   Max. Marks for each Internal Test   : 20

2 No. of Assignments   : 3   Max. Marks for each Assignment   : 5

3 No. of Quizzes   : 3   Max. Marks for each Quiz Test   : 5

Duration of Internal Tests   :   1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
INFORMATION STORAGE MANAGEMENT

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE 820CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Apply various storage techniques to address the demand of storage needs generated by heterogeneous devices.	1 Explain the need for storage management and differentiate between the types of storage architectures in a classic and virtualized environments.
2 Learn business continuity solutions for providing a high available, robust and secure.	2 Illustrate the need for data protection using RAID and comprehend the role of a storage device in an Intelligent Storage Systems.
	3 Apply storage networking technologies such as FC-SAN, IP-SAN, NAS, and Object-based storage solutions for building storage products.
	4 Analyze the need for high availability of a business and examine technologies like backup and recovery, local and remote replication solutions for Business Continuity.
	5 Identify the threats faced in a storage environment and analyze the importance of Securing storage solutions.

UNIT-I: Introduction to Storage Technology:
Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities.

UNIT-II: Storage Systems Architecture:
Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system.

UNIT-III: Introduction to Networked Storage:
Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfill the need, Understand the appropriateness of the different networked storage options for different application environments.

UNIT-IV: Information Availability & Monitoring & Managing Datacenter:
List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime. Differentiate between business continuity (BC) and disaster recovery (DR),RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures, Architecture of backup/recovery and the different backup/ recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center.

UNIT-V:
Securing Storage and Storage Virtualization:

Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes.

Case Study:

1. The technologies described in the course are reinforced with EMC examples of actual solutions.
2. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

Learning Resources:

1. EMC Corporation, Information Storage and Management, Wiley, ISBN number: 04702942134, 2009.
2. Robert Spalding, Storage Networks: The Complete Reference, TataMcGraw Hill, Osborne, 2003.
3. Marc Farley, Building Storage Networks, TataMcGraw Hill, Osborne. 2001.
4. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.
5. Ulf Troppens, Rainer Erkens and Wolfgang Muller: Storage Networks Explained, Wiley India,2013
6. Richard Barker and Paul Massiglia: "Storage Area Network Essentials "A Complete Guide to understanding and Implementing SANs", Wiley India, 2006.
7. https://www.udemy.com/storageintro/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
ADHOC SENSOR NETWORKS

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code **: PE 860CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Understand the design issues and applications of an Ad hoc and sensor network.	1 Compare topologies based and position based routing approaches. Explain the environments and communication systems in an Ad hoc network.
	2 Categorize data transmission techniques in MANETs and the network architecture of wireless mesh networks.
	3 Illustrate the Cognitive Radio technologies and issues of TCP over ad hoc networks.
	4 Explain the design and network issues of a sensor network.
	5 Identify the security mechanisms of an ad hoc and sensor network. Integrate MANETs, WLANs and Cellular Networks.

UNIT-I:
Introduction: Introduction, Application of MANETs, Challenges
Routing in Ad Hoc Networks: Topology Based Routing Protocols – Proactive Routing , Reactive Routing and Hybrid Routing, Position Based Routing - Principles and Issues, Location Services, Forwarding Strategies

UNIT-II: Broadcasting, Multicasting and Geocasting
Wireless Mesh Networks: Introduction, Network Architecture, Challenging technologies

UNIT-III:

Cognitive Radio and Networks: Introduction, Spectrum Access Models, Cognitive Radio Technologies and Challenges, The IEEE 802.22 Standard
TCP over Ad Hoc Networks: TCP protocol overview, Solutions for TCP over Ad hoc

UNIT-IV:
Sensor Networks Design Considerations: Introduction, Design Issues, Localization Scheme, clustering of SNs, MAC layer, The Self-organizing MAC for WSNs and the Eaves-drop-and-Register protocol.
Sensor Networks in Controlled Environment and Actuators:
Regularly placed sensors**,** Design Issues, Network Issues
Applications of Sensor Networks: Body Area Network, Habitat monitoring, Health Care Monitoring, Greenhouse monitoring

UNIT-V:
Security in Ad Hoc and Sensor Networks:
Distributed systems security, Secure routing, Cooperation in MANETs, WSN Security.
Integrating MANETs, WLANs and Cellular Networks: Ingredients of a heterogeneous architecture, Protocol Stack, Comparison of the Integrated Architectures

Learning Resources:
1. Carlos de Morais Cordeiro and Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks : Theory and Applications", Second Edition, World Scientific Publishers, 2011
2. Prasant Mohapatra and Sriramamurtyhy, "Ad Hoc Networks: Technologies and Protocols", Springer International Edition, 2009.
3. Kazem Sohraby, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks', A John Wiley & Sons Inc. Publication, 2007.
4. https://nptel.ac.in/courses/106105160/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests :	20
2	No. of Assignments	:	3	Max. Marks for each Assignment :	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test :	5

Duration of Internal Tests : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
BLOCKCHAIN ARCHITECTURE

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 70	Course Code : **PE 880CS**
Credits : 3	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1 Apply fundamental design and architectural primitives of Blockchain.	1 Explain the basics of Blockchain architecture and its need in business application.
	2 Explain the fundamentals of distributed compute model architecture to design a fault tolerant blockchain model.
	3 Apply the cryptographic primitives in making the blockchain model robust.
	4 Apply the blockchain architecture to practice crypto currency.
	5 Illustrate real time applications using blockchain model.

UNIT-I: Introduction to Blockchain

What is Blockchain, Public Ledgers, Blockchain as public ledgers, Bitcoin, Blockchain 2.0, Smart Contracts, Block in a Blockchain, Transactions, Distributed Consensus, The Chain and the Longest Chain, Cryptocurrency to Blockchain 2.0, Permissioned Model of Blockchain

UNIT-II: Crypto Primitives

Cryptographic Hash Function, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic cryptocurrency.
Bitcoin: Creation of coins, Payments and double spending, FORTH – the precursor for Bitcoin scripting, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay.

UNIT-III: Consensus

Why Consensus, Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW), HashcashPoW, Bitcoin PoW, Attacks on PoW and the monopoly problem, Proof of Stake (POS), Proof of Burn (POB), Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool

UNIT-IV: Permissioned Blockchain:

Permissioned model and use cases, Design issues for Permissioned blockchains, Execute contracts, State machine replication, Consensus models for permissioned blockchain, Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems, Practical Byzantine Fault Tolerance, Three phase commit, View Change

UNIT-V: Blockchain for Enterprise:

Concepts and benefits of blockchain for enterprise, Actors, Components, Ledger, Events in a Blockchain, Security properties, Security considerations for Blockchain, Blockchain Crypto Service Providers, Limitations of Blockchain

Case Studies:

The Hyperledger Project, Blockchain in Government, Ethereum, Corda

Learning Resources:

1. Andreas M. Antonopoulos, Mastering Bitcoin, O'Reilly, 2014
2. Melanie Swa, Blockchain: Blueprint for a new Economy, O'Reilly, 2015
3. William Mougayar, The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology, Wiley, 2016
4. George Coulouris, Distributed Systems Concept and Design, 5th edition, Pearson, 2012
5. Daniel Drescher, Blockchain: A non-technical introduction in 25 steps, APress, 2017
6. Henrick Diedrich,Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations, Wildfire Pub, 2016
7. https://github.com/rddill-IBM/ZeroToBlockchain

The break-up of CIE: Internal Tests + Assignments + Quizzes

| 1 | No. of Internal Tests | : | 2 | Max. Marks for each Internal Test | : | 20 |

| 2 | No. of Assignments | : | 3 | Max. Marks for each Assignment | : | 5 |

| 3 | No. of Quizzes | : | 3 | Max. Marks for each Quiz Test | : | 5 |

Duration of Internal Tests   : 1 Hour

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering
PROJECT/ INTERNSHIP

SYLLABUS FOR B.E. VIII-SEMESTER

L:T:P (Hrs./week): 0:0:18	SEE Marks : 50	Course Code : **PW 819CS**
Credits : 9	CIE Marks : 50	Duration of SEE : Viva-Voce

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. To enhance practical and professional skills.	1. Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to real-world problems
2. To familiarize tools and techniques of systematic Literature survey and documentation	2. Evaluate different solutions based on economic and technical feasibility
3. To expose the students to industry practices and team work.	3. Effectively plan a project and confidently perform all aspects of project management
4. To encourage students to work with innovative and entrepreneurial ideas	4. Demonstrate effective written and oral communication skills

The aim of Project is to implement and evaluate the proposal made as part of Project Seminar. Students can also be encouraged to do full time internship as part of project.

Project coordinator will coordinate the following:

Grouping of students (maximum of 2 to 3 in a group)
Allotment of projects and project guides
Project monitoring at regular intervals

The students placed in internships need to write the new proposal in consultation with industry coordinator and internal project guide within two weeks from the commencement of instruction.

All projects (internship and departmental) will be monitored twice in a semester through student presentation for the award of sessional marks. Sessional marks are awarded by a monitoring committee comprising of faculty members as well the supervisor. The first review of projects for 25 marks is conducted after completion of five weeks. The second review for another 25 marks is conducted after 14 weeks of instruction.

The students are required to submit copies of their project report following IEEE standards one week before the last instruction date.

VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS), HYDERABAD-500031

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

S.No.	Date	Day	Details of Activity / Public Holiday
	JULY,2019		
1	15-07-2019	MON	Course Registration by Students--> BE III, V & VII SEMESTER
2	16-07-2019	TUE	Course Registration by Students--> BE III, V & VII SEMESTER
3	17-07-2019	WED	Course Registration by Students--> BE III, V & VII SEMESTER
4	18-07-2019	THU	Course Registration by Students--> BE III, V & VII SEMESTER
5	19-07-2019	FRI	Course Registration by Students--> BE III, V & VII SEMESTER
6	20-07-2019	SAT	Course Registration by Students--> BE III, V & VII SEMESTER
7	21-07-2019	SUN	PUBLIC HOLIDAY
8	22-07-2019	MON	Commencement of instruction : BE III, V & VII SEMESTER
9	23-07-2019	TUE	--
10	24-07-2019	WED	--
11	25-07-2019	THU	--
12	26-07-2019	FRI	--
13	27-07-2019	SAT	--
14	28-07-2019	SUN	PUBLIC HOLIDAY
15	29-07-2019	MON	BONALU- HOLIDAY
16	30-07-2019	TUE	--
17	31-07-2019	WED	--
	AUGUST,2019		
18	01-08-2019	THU	--
19	02-08-2019	FRI	--
20	03-08-2019	SAT	--GUEST LECTURE : BE III SEMESTER
21	04-08-2019	SUN	PUBLIC HOLIDAY
22	05-08-2019	MON	--
23	06-08-2019	TUE	--
24	07-08-2019	WED	--
25	08-08-2019	THU	-- IE EVENT: BE III SEMESTER
26	09-08-2019	FRI	--
27	10-08-2019	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
28	11-08-2019	SUN	PUBLIC HOLIDAY
29	12-08-2019	MON	BAKRID(ID-UL-FITR)
30	13-08-2019	TUE	--
31	14-08-2019	WED	--
32	15-08-2019	THU	INDEPENDENCE DAY
33	16-08-2019	FRI	--
34	17-08-2019	SAT	-- GUEST LECTURE: BE V SEMESTER
35	18-08-2019	SUN	PUBLIC HOLIDAY
36	19-08-2019	MON	--
37	20-08-2019	TUE	--
38	21-08-2019	WED	--
39	22-08-2019	THU	Orientation and Briefing session for Registration of subjects(ME/M.TECH III SEM)
40	23-08-2019	FRI	Orientation and Briefing session for Registration of subjects(ME/M.TECH III SEM)
41	24-08-2019	SAT	SRI KRISHNASHTAMI
42	25-08-2019	SUN	Orientation and Briefing session for Registration of subjects(ME/M.TECH III SEM) PUBLIC HOLIDAY
43	26-08-2019	MON	Commencement of Instruction (ME/M.TECH- III SEM)

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

44	27-08-2019	TUE	--
45	28-08-2019	WED	--
46	29-08-2019	THU	--
47	30-08-2019	FRI	--
48	31-08-2019	SAT	-- CSI EVENT: BE V SEMESTER

SEPTEMBER, 2019

49	01-09-2019	SUN	PUBLIC HOLIDAY
50	02-09-2019	MON	VINAYAKA HAVITHI
51	03-09-2019	TUE	--
52	04-09-2019	WED	--
53	05-09-2019	THU	Teachers' Daycelebrations
54	06-09-2019	FRI	--
55	07-09-2019	SAT	-- GUEST LECTURE: BE III SEMESTER
56	08-09-2019	SUN	PUBLIC HOLIDAY
57	09-09-2019	MON	I-Internal Test: BE III, V & VII SEMESTER
58	10-09-2019	TUE	MOHARRUM- PUBLIC HOLIDAY
59	11-09-2019	WED	I-Internal Test: BE III, V & VIISEMESTER
60	12-09-2019	THU	I-Internal Test: BE III, V & VII SEMESTER
61	13-09-2019	FRI	I-Internal Test: BE III, V & VII SEMESTER
62	14-09-2019	SAT	I-Internal Test: BE III, V & VII SEMESTER
63	15-09-2019	SUN	PUBLIC HOLIDAY- Engineers' Day
64	16-09-2019	MON	--
65	17-09-2019	TUE	--
66	18-09-2019	WED	-- CSI EVENT : BE III SEMESTER
67	19-09-2019	THU	-- IE EVENT : BE V SEMESTER
68	20-09-2019	FRI	--
69	21-09-2019	SAT	Parent-Teacher Meeting- BE III, V & VII SEMESTER
70	22-09-2019	SUN	--
71	23-09-2019	MON	--
72	24-09-2019	TUE	--
73	25-09-2019	WED	--
74	26-09-2019	THU	--
75	27-09-2019	FRI	--
76	28-09-2019	SAT	BATHUKAMMA STARTING DAY- PUBLIC HOLIDAY
77	29-09-2019	SUN	PUBLIC HOLIDAY
78	30-09-2019	MON	

OCTOBER, 2019

79	01-10-2019	TUE	
80	02-10-2019	WED	GANDHI JAYANTHI
81	03-10-2019	THU	
82	04-10-2019	FRI	
83	05-10-2019	SAT	
84	06-10-2019	**SUN**	PUBLIC HOLIDAY
85	07-10-2019	MON	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
86	08-10-2019	TUE	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
87	09-10-2019	WED	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
88	10-10-2019	THU	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
89	11-10-2019	FRI	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
90	12-10-2019	SAT	DASARA VACATION --> All semesters of BE, MCA & ME/M.TECH
91	13-10-2019	SUN	PUBLIC HOLIDAY
92	14-10-2019	MON	RECOMMENCEMENT OF CLASS WORK
93	15-10-2019	TUE	--
94	16-10-2019	WED	--
95	17-10-2019	THU	--
96	18-10-2019	FRI	--
97	19-10-2019	SAT	FIRST CLASS TEST: ME/M.TECH- IIISEM
98	20-10-2019	SUN	PUBLICHOLIDAY
99	21-10-2019	MON	--
100	22-10-2019	TUE	--

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

101	23-10-2019	WED	--
102	24-10-2019	THU	--
103	25-10-2019	FRI	--
104	26-10-2019	SAT	--
105	27-10-2019	SUN	PUBLICHOLIDAY- DEEPAVALI
106	28-10-2019	MON	--
107	29-10-2019	TUE	--
108	30-10-2019	WED	--
109	31-10-2019	THU	--

NOVEMBER, 2019

110	01-11-2019	FRI	--
111	02-11-2019	SAT	--
112	03-11-2019	SUN	PUBLICHOLIDAY
113	04-11-2019	MON	--
114	05-11-2019	TUE	--
115	06-11-2019	WED	--
116	07-11-2019	THU	--
117	08-11-2019	FRI	--
118	09-11-2019	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
119	10-11-2019	SUN	EID MILAD-UN-NABI- PUBLIC HOLIDAY
120	11-11-2019	MON	--
121	12-11-2019	TUE	KARTHIKA PURNIMA/ GURUNANAK'S BIRTH DAY
122	13-11-2019	WED	-- II- INTERNAL TEST-BE III, V & VII SEMESTER
123	14-11-2019	THU	-- II- INTERNAL TEST-BE III, V & VII SEMESTER
124	15-11-2019	FRI	II- INTERNAL TEST-BE III, V & VII SEMESTER
125	16-11-2019	SAT	II- INTERNAL TEST-BE III, V & VII SEMESTER--**> LASTDATE OF INSTRUCTION**
126	17-11-2019	SUN	PUBLIC HOLIDAY
127	18-11-2019	MON	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER)
128	19-11-2019	TUE	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER)
129	20-11-2019	WED	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER
130	21-11-2019	THU	PREPARATIONHOLIDAYS&PRACTICALEXAMS(BEIII,V&VIISEMESTER)
131	22-11-2019	FRI	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER)
132	23-11-2019	SAT	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER)
133	24-11-2019	SUN	PUBLIC HOLIDAY
134	25-11-2019	MON	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL
135	26-11-2019	TUE	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL
136	27-11-2019	WED	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL
137	28-11-2019	THU	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL
138	29-11-2019	FRI	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL
139	30-11-2019	SAT	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE III, V & VII SEMESTER) FDP –NIT WARANGAL

DECEMBER,2019

140	01-12-2019	SUN	PUBLIC HOLIDAY
141	02-12-2019	MON	**COMMENCEMENT OF THEORY EXAMS(BE III, V & VII SEMESTER)**
142	03-12-2019	TUE	--
143	04-12-2019	WED	--
144	05-12-2019	THU	--
145	06-12-2019	FRI	--
146	07-12-2019	SAT	--
147	08-12-2019	SUN	PUBLIC HOLIDAY
148	09-12-2019	MON	--
149	10-12-2019	TUE	--
150	11-12-2019	WED	--

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

151	12-12-2019	THU	--
152	13-12-2019	FRI	--
153	14-12-2019	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
154	15-12-2019	SUN	PUBLIC HOLIDAY
155	16-12-2019	MON	PROJECT SEMINAR(Presentation & Evaluation)- ME/M.TECH - III SEM
156	17-12-2019	TUE	PROJECT SEMINAR(Presentation & Evaluation)- ME/M.TECH - III SEM
157	18-12-2019	WED	PROJECT SEMINAR(Presentation & Evaluation)- ME/M.TECH - III SEM
158	19-12-2019	THU	PROJECT SEMINAR(Presentation & Evaluation)- ME/M.TECH - III SEM
159	20-12-2019	FRI	--
160	21-12-2019	SAT	**SECOND CLASS TEST: ME/M.TECH- IIISEM--> LAST DATE OF INSTRUCTION**
161	22-12-2019	SUN	PUBLIC HOLIDAY
162	23-12-2019	MON	**SUBJECT REGISTRATION BY STUDENTS (BE IV, VI & VIII SEMESTER)**
163	24-12-2019	TUE	**SUBJECT REGISTRATION BY STUDENTS (BE IV, VI & VIII SEMESTER)** **DISPLAY OF ATTENDANCE AND SESSIONAL MARKS: ME/M.TECH- III SEM**
164	25-12-2019	WED	CHRISTMAS- PUBLIC HOLIDAY
165	26-12-2019	THU	BOXING DAY - PUBLIC HOLIDAY
166	27-12-2019	FRI	**SUBJECT REGISTRATION BY STUDENTS (BE IV, VI & VIII SEMESTER)**
167	28-12-2019	SAT	**SUBJECT REGISTRATION BY STUDENTS (BE IV, VI & VIII SEMESTER)** **ALUMNI MEET 2019**
168	29-12-2019	SUN	PUBLIC HOLIDAY
169	30-12-2019	MON	**Commencement of instruction : BE IV, VI & VIII SEMESTER**
170	31-12-2019	TUE	--

JANUARY,2020

171	01-01-2020	WED	--
172	02-01-2020	THU	--
173	03-01-2020	FRI	--
174	04-01-2020	SAT	-- GUEST LECTURE : BE VIII SEM
175	05-01-2020	SUN	PUBLIC HOLIDAY
176	06-01-2020	MON	COMMENCEMENT OF THEORY EXAMS : ME/M.TECH - III SEMESTER
177	07-01-2020	TUE	--
178	08-01-2020	WED	--
179	09-01-2020	THU	--
180	10-01-2020	FRI	--
181	11-01-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
182	12-01-2020	SUN	PUBLICHOLIDAY
183	13-01-2020	MON	--
184	14-01-2020	TUE	--
185	15-01-2020	WED	--
186	16-01-2020	THU	--
187	17-01-2020	FRI	--
188	18-01-2020	SAT	--
189	19-01-2020	SUN	PUBLICHOLIDAY
190	20-01-2020	MON	--
191	21-01-2020	TUE	--
192	22-01-2020	WED	--
193	23-01-2020	THU	--
194	24-01-2020	FRI	--
195	25-01-2020	SAT	--

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

196	26-01-2020	SUN	REPUBLICDAY -PUBLIC HOLIDAY
197	27-01-2020	MON	--
198	28-01-2020	TUE	--
199	29-01-2020	WED	--
200	30-01-2020	THU	--
201	31-01-2020	FRI	--

FEBRUARY, 2020

202	01-02-2020	SAT	--
203	02-02-2020	SUN	PUBLIC HOLIDAY
204	03-02-2020	MON	COMMENCEMENT OF MAKE-UP EXAMS: ME/M.TECH- III SEM IE EVENT : BE IV SEMESTER
205	04-02-2020	TUE	--
206	05-02-2020	WED	--
207	06-02-2020	THU	--
208	07-02-2020	FRI	-- GUEST LECTURE : BE VI SEM
209	08-02-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
210	09-02-2020	SUN	PUBLIC HOLIDAY
211	10-02-2020	MON	I-Internal Test: BE IV, VI & VIII SEMESTER
212	11-02-2020	TUE	I-Internal Test: BE IV, VI & VIII SEMESTER
213	12-02-2020	WED	I-Internal Test: BE IV, VI & VIIISEMESTER
214	13-02-2020	THU	I-Internal Test: BE IV, VI & VIII SEMESTER
215	14-02-2020	FRI	I-Internal Test: BE IV, VI & VIII SEMESTER
216	15-02-2020	SAT	--
217	16-02-2020	SUN	PUBLICHOLIDAY
218	17-02-2020	MON	--
219	18-02-2020	TUE	--
220	19-02-2020	WED	--
221	20-02-2020	THU	Registration for ME/M.TECH : IV SEM CSI EVENT : BE VI SEMESTER
222	21-02-2020	FRI	--
223	22-02-2020	SAT	--
224	23-02-2020	SUN	PUBLIC HOLIDAY
225	24-02-2020	MON	--
226	25-02-2020	TUE	--
227	26-02-2020	WED	--
228	27-02-2020	THU	EUPHORIA & TECHFEST-2020
229	28-02-2020	FRI	EUPHORIA & TECHFEST-2020
230	29-02-2020	SAT	EUPHORIA & TECHFEST-2020

MARCH,2020

231	01-03-2020	SUN	PUBLIC HOLIDAY
232	02-03-2020	MON	--
233	03-03-2020	TUE	--
234	04-03-2020	WED	--
235	05-03-2020	THU	--
236	06-03-2020	FRI	--
237	07-03-2020	SAT	Parent-Teacher Meeting- BE IV, VI & VIII SEMESTER
238	08-03-2020	SUN	PUBLIC HOLIDAY
239	09-03-2020	MON	--
240	10-03-2020	TUE	--
241	11-03-2020	WED	--

ACTIVITY CALENDAR FOR THE ACADEMIC YEAR 2019-2020

242	12-03-2020	THU	--
243	13-03-2020	FRI	--
244	14-03-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
245	15-03-2020	SUN	PUBLIC HOLIDAY
246	16-03-2020	MON	--
247	17-03-2020	TUE	--
248	18-03-2020	WED	--
249	19-03-2020	THU	--
250	20-03-2020	FRI	--
251	21-03-2020	SAT	--
252	22-03-2020	SUN	PUBLIC HOLIDAY
253	23-03-2020	MON	--
254	24-03-2020	TUE	--
255	25-03-2020	WED	--
256	26-03-2020	THU	--
257	27-03-2020	FRI	--
258	28-03-2020	SAT	--
259	29-03-2020	SUN	PUBLIC HOLIDAY
260	30-03-2020	MON	--
261	31-03-2020	TUE	--

APRIL,2020

262	01-04-2020	WED	-- **NATIONAL CONFERENCE**
263	02-04-2020	THU	-- **NATIONAL CONFERENCE**
264	03-04-2020	FRI	--
265	04-04-2020	SAT	--
266	05-04-2020	**SUN**	**BABU JAGVIVAN RAM'S BIRTH DAY--> PUBLIC HOLIDAY**
267	06-04-2020	MON	--
268	07-04-2020	TUE	--
269	08-04-2020	WED	--
270	09-04-2020	THU	--
271	10-04-2020	FRI	--
272	11-04-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
273	12-04-2020	SUN	PUBLIC HOLIDAY
274	13-04-2020	MON	II-Internal Test : BE IV, VI & VIII SEMESTER
275	14-04-2020	TUE	DR BR AMBEDHKAR'S BIRTH DAY-PUBLIC HOLIDAY
276	15-04-2020	WED	II-Internal Test : BE IV, VI & VIII SEMESTER
277	16-04-2020	THU	II-Internal Test : BE IV, VI & VIII SEMESTER
278	17-04-2020	FRI	II-Internal Test : BE IV, VI & VIII SEMESTER
279	18-04-2020	SAT	II-Internal Test : BE IV, VI & VIII SEMESTER**--> Last date of instruction**
280	19-04-2020	SUN	PUBLIC HOLIDAY
281	20-04-2020	MON	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
282	21-04-2020	TUE	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
283	22-04-2020	WED	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
284	23-04-2020	THU	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER) **WORKSHOP – BLOCK CHAIN**
285	24-04-2020	FRI	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER) **WORKSHOP – BLOCK CHAIN**
286	25-04-2020	SAT	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER) **WORKSHOP – BLOCK CHAIN**
287	26-04-2020	SUN	PUBLIC HOLIDAY
288	27-04-2020	MON	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
289	28-04-2020	TUE	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
290	29-04-2020	WED	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
291	30-04-2020	THU	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)

MAY,2020

292	01-05-2020	FRI	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
293	02-05-2020	SAT	PREPARATION HOLIDAYS & PRACTICAL EXAMS(BE IV, VI & VIII SEMESTER)
			GUEST LECTURE : BE II SEM
294	03-05-2020	SUN	PUBLIC HOLIDAY
295	04-05-2020	MON	**COMMENCEMENT OF THEORY EXAMS(BE IV, VI & VIII SEMESTER)/ SUMMER VACATION STARTS FOR STAFF**
296	05-05-2020	TUE	--
297	06-05-2020	WED	--
298	07-05-2020	THU	--
299	08-05-2020	FRI	**LAST DATE FOR SUBMISSION OF DRAFT DISSERTATAION : ME/M.TECH IV SEM**
300	09-05-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
301	10-05-2020	SUN	PUBLIC HOLIDAY
302	11-05-2020	MON	PRE SUBMISSION VIVA VOCE EXAM: ME/M.TECH IV SEM
303	12-05-2020	TUE	--
304	13-05-2020	WED	--
305	14-05-2020	THU	--
306	15-05-2020	FRI	--
307	16-05-2020	SAT	--
308	17-05-2020	SUN	PUBLIC HOLIDAY
309	18-05-2020	MON	--
310	19-05-2020	TUE	--
311	20-05-2020	WED	--
312	21-05-2020	THU	--
313	22-05-2020	FRI	--
314	23-05-2020	SAT	--
315	24-05-2020	SUN	PUBLICHOLIDAY
316	25-05-2020	MON	--
317	26-05-2020	TUE	--
318	27-05-2020	WED	--
319	28-05-2020	THU	--
320	29-05-2020	FRI	--
321	30-05-2020	SAT	--
322	31-05-2020	SUN	PUBLIC HOLIDAY

JUNE,2020

323	01-06-2020	MON	--
324	02-06-2020	TUE	--
325	03-06-2020	WED	--
326	04-06-2020	THU	--
327	05-06-2020	FRI	--
328	06-06-2020	SAT	--
329	07-06-2020	SUN	PUBLICHOLIDAY
330	08-06-2020	MON	--
331	09-06-2020	TUE	--
332	10-06-2020	WED	--
333	11-06-2020	THU	--
334	12-06-2020	FRI	Submission of approved thesis of the students External Evaluation: ME/M.TECH IV SEM
335	13-06-2020	SAT	PUBLIC HOLIDAY(2ND SATURDAY)
336	14-06-2020	SUN	PUBLICHOLIDAY
337	15-06-2020	MON	--
338	16-06-2020	TUE	--
339	17-06-2020	WED	--
340	18-06-2020	THU	--
341	19-06-2020	FRI	--
342	20-06-2020	SAT	--
343	21-06-2020	SUN	PUBLIC HOLIDAY
344	22-06-2020	MON	Conduct of External Viva-voce : ME/M.TECH- IV SEM
345	23-06-2020	TUE	--

346 24-06-2020 WED --
347 25-06-2020 THU --
348 26-06-2020 FRI --
349 27-06-2020 SAT --
350 28-06-2020 SUN PUBLICHOLIDAY
351 29-06-2020 MON --
352 30-06-2020 TUE --
353 20.07.2020 MON COMMENCEMENT OF III, V & VII SEMESTER BE CLASS WORK FOR THE YEAR 2020-2021