Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

For

Bachelor of Technology

In

Computer Science & Engineering

Semester-VII

(Effective from the session: 2022-23)

Department of Computer Science & Engineering

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Four Years B.TECH Programme

Scheme of Teaching and Examination

B.TECH Seventh Semester

Computer Science Engineering

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(**Effective from the Academic Year 2022-2023**)

S.No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	**T**	**P**		Continuous Evaluation	Sem End Exam	Total	
1	EBT04701	Cryptography & Network Security	3	1	-	4	30	70	100	3 Hrs.
2	EBT04702	Cloud Computing	3	1	-	4	30	70	100	3 Hrs.
3	EBT04703	Machine Learning With R	3	1	-	4	30	70	100	3 Hrs.
4	EBT04704	Internet of Things	3	1	-	4	30	70	100	3 Hrs.
5	EBT04751	**Elective - II**	3	1	-	4	30	70	100	3 Hrs.
6	EBT04791	Machine Learning with R Lab	-	-	2	1	15	35	50	3 Hrs.
7	EBT04792	IOT Lab	-	-	2	1	15	35	50	3 Hrs.
8	EBT04793	Mini Project/Seminar	-	-	2	1	15	35	50	3 Hrs.
9	EBT04793	Vocational Training	-	-	2	1	15	35	50	3 Hrs.
Total Contact hr. per week: 30			**Total Credit: 24**				**Grand Total Marks:**		**700**	

Table – II		
Elective – II		
Sr. No	**Subject Code**	**Subject Name**
1	EBT04751A	Big Data
2	EBT04751B	Data Visualization
3	EBT04751C	Block chain Technology

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech – CSE – 7th Semester

<table>
<tr><td>Course Title</td><td colspan="5">Cryptography & Network Security</td></tr>
<tr><td>Course Code</td><td colspan="5">EBT04701</td></tr>
<tr><td>Semester</td><td colspan="5">7th Semester</td></tr>
<tr><td rowspan="2">Course Credit</td><td>L</td><td>T</td><td>P</td><td>T C</td><td></td></tr>
<tr><td>3</td><td>1</td><td>-</td><td>4</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Network Security</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. To understand basics of Cryptography and Network Security.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4. To understand various protocols for network security to protect against the threats in the networks.</td></tr>
<tr><td>Course Contents</td><td colspan="5">Unit-I INTRODUCTION: OSI Security Architecture, Classical Encryption techniques, Cipher Principles, Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality.
Unit-II PUBLIC KEY CRYPTOGRAPHY: Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.
Unit-III AUTHENTICATION AND HASH FUNCTION: Authentication requirements – Authentication functions Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs, MD5 message Digest algorithm, Secure Hash Algorithm, RIPEMD, HMAC Digital Signatures, Authentication Protocols – Digital Signature Standard.
Unit-IV NETWORK SECURITY: Authentication Applications: Kerberos – X.509, Authentication Service, And Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.
Unit-V SYSTEM LEVEL SECURITY: Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.</td></tr>
</table>

Course Outcomes	1. Provide security of the data over the network. 2. Do research in the emerging areas of cryptography and network security. 3. Implement various networking protocols. 4. Protect any network from the threats in the world.
Text Books	1. Cryptography And Network Security – Principles and Practices, William Stallings, Prentice Hall of India, Third Edition, 2003. 2.Wade Trappe, Lawrence C Washington, " Introduction to Cryptography with coding theory", Pearson
Reference Books	1. Network Security Private Communication in a public world, Charlie Kaufman, Radia Perlman & Mike Speciner, Prentice Hall of India Private Ltd., New Delhi. 2. Cryptography and Network Security, Atul Kahate, Tata McGraw-Hill, 2003. 3. Applied Cryptography, Bruce Schneier, John Wiley & Sons Inc, 2001. 4. Security in Computing, Third Edition, Charles B. Pfleeger, Shari Lawrence Pfleeger, Pearson Education, 2003.

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B.Tech – CSE – 7th Semester

<table>
<tr><td>Course Title</td><td colspan="5">Cloud Computing</td></tr>
<tr><td>Course Code</td><td colspan="5">EBT04702</td></tr>
<tr><td>Semester</td><td colspan="5">7th</td></tr>
<tr><td rowspan="2">Course Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>3</td><td>1</td><td>-</td><td>4</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Cloud</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. To understand the concept of cloud computing.
2. To appreciate the evolution of cloud from the existing technologies.
3. To have knowledge on the various issues in cloud computing.
4. To be familiar with the lead players in cloud.
5. To appreciate the emergence of cloud as the next generation computing paradigm.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT-I: Introduction: Introduction to Cloud Computing, Definition of Cloud, Evolution of Cloud Computing, Underlying Principles of Parallel and Distributed Computing, Cloud Characteristics, Elasticity in Cloud – On-Demand Provisioning.
UNIT-II: Cloud Enabling Technologies: Service Oriented Architecture, REST and Systems of Systems, Web Services, Publish-Subscribe Model, Basics of Virtualization, Types of Virtualization, Implementation Levels of Virtualization, Virtualization Structures, Tools and Mechanisms, Virtualization of CPU, Memory, I/O Devices, Virtualization Support and Disaster Recovery.
UNIT-III: Cloud Architecture, Services And Storage: Layered Cloud Architecture Design, NIST Cloud Computing Reference Architecture, Public, Private and Hybrid Clouds, laaS, PaaS, SaaS, Architectural Design Challenges, Cloud Storage, Storage-as-a-Service, Advantages of Cloud Storage, Cloud Storage Providers, S3.</td></tr>
</table>

	UNIT-IV: Resource Management And Security In Cloud: Inter Cloud Resource Management, Resource Provisioning and Resource Provisioning Methods, Global Exchange of Cloud Resources, Security Overview, Cloud Security Challenges, Software-as-a-Service Security, Security Governance, Virtual Machine Security, IAM, Security Standards. **UNIT-V: Cloud Technologies And Advancements:** Hadoop, MapReduce, Virtual Box, Google App Engine, Programming Environment for Google App Engine, Open Stack, Federation in the Cloud, Four Levels of Federation, Federated Services and Applications, Future of Federation.
Course Outcomes	Upon completion of the course, it is expected that student will be able to: 1. Articulate the main concepts, key technologies, strengths and limitations of cloud computing. 2. Learn the key and enabling technologies that help in the development of cloud. 3. Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. 4. Explain the core issues of cloud computing such as resource management and security. 5. Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
Text Books	1. Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, Morgan Kaufmann Publishers. 2. Cloud Computing: Implementation, Management and Security, Rittinghouse, John W., and James F. Ransome, CRC Press.
Reference Books	1. Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Tata Mcgraw Hill. 2. Cloud Computing - A Practical Approach, Toby Velte, Anthony Velte, Robert Elsenpeter, Tata McGraw Hill. 3. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice), George Reese, O'Reilly.

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B.Tech – CSE – 7th Semester

Course Title	Machine Learning With R				
Course Code	**EBT04703**				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Machine Learning , Data Analytics				
Course Objectives	1. Provide an understanding of the role of big data in the real-world scenarios 2. Provide technical details about various algorithms and software/hardware tools/platforms related to big data				
Course Contents	**Unit-I** Introduction: What is big data, Unreasonable effectiveness of data, Streaming algorithms: Streaming Naive Bayes, Stream and sort Platforms for learning from big data: MapReduce, New Software Stack, Large Scale File System Organization. **Unit-II** Nearest Neighbor Search, Jaccardi Similarity of Sets, Similarity of Documents, Locality Sensitive Hashing, The Stream Data Model Randomized methods: Clustering, Hashing, Sketching, Scalable stochastic gradient descent. **Unit- III** Frequent Item sets: The Market Basket Model, A-Priori Algorithm, Handling larger datasets in Main Memory, Limited-Pass Algorithms, Counting Frequent Items in a Stream. **Unit-IV** Parameter Servers: Introduction, Abstraction, Parameter Cache Synchronization, Asynchronous execution, Model Parallel Examples Graph-based method **Unit-V** Page Rank, Topic Sensitive Page Rank, Approaches to Page Rank iteration, Link Spam, Semi-supervised learning, Scalable link analysis, Models for Recommendation Systems, Social Networks as Graphs Large-scale Machine Learning with CPUs and GPUs				

Course Outcomes	Students are expected to have the ability to: 1. Develop an understanding of big data in the modern context, and independently work on problems relating to big-data. 2. Design and program efficient algorithms for big data from the perspective of a project.
Text Books	1. Leskovec,J., Rajaraman,A., Ullman,J., (2014), *Mining of Massive Datasets*, 2nd Edition, Cambridge University Press 2. Bekkerman,R., Bilenko,M., Langford,J., (2011), *Scaling Up Machine Learning*, Cambridge University Press.
Reference Books	1. Department of Machine Learning, Carnegie Mellon University, Machine Learning with Large Datasets Course 2. Department of Computer Science, University of California, Berkeley, Scalable Machine Learning 3. ETH Zurich, Data Mining: Machine Learning from Large Datasets

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B.Tech – CSE – 7th Semester

Course Title	Internet of Things				
Course Code	**EBT04704**				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Internet of things				
Course Objectives	1. Describe what IoT is and how it works today. 2. Recognise the factors that contributed to the emergence of IoT. 3. Design and program IoT devices. 4. Use real IoT protocols for communication. 5. Secure the elements of an IoT device				
Course Contents	Unit I: IOT - What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues. Unit II:IOT PROTOCOLS - Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security Unit-III: IOT ARCHITECTURE - IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction Unit-IV: WEB OF THINGS - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Unit-V: IOT APPLICATIONS - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.				
Course Outcomes	1. Able to understand the application areas of IOT · 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks· 3. Able to understand building blocks of Internet of Things and characteristics.				

Text Books	1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012. 2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet• ofThings", Springer, 2011. 3. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a• HighlyConnected World", Cambridge University Press, 2010. 4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key• applicationsand Protocols", Wiley, 2012.
Reference Books	1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014 2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to• ConnectingEverything", 1st Edition, Apress Publications, 2013 3. CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-• 4493-9357-1

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B.Tech – CSE – 7th Semester

<table>
<tr><td>Course Title</td><td colspan="5">Elective – II – Big Data</td></tr>
<tr><td>Course Code</td><td colspan="5">EBT04751A</td></tr>
<tr><td>Semester</td><td colspan="5">7th Semester</td></tr>
<tr><td rowspan="2">Course Credit</td><td>L</td><td>T</td><td>P</td><td>T C</td><td></td></tr>
<tr><td>3</td><td>1</td><td>-</td><td>4</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Big Data , Data Analytics</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. Understand the Big Data Platform and its Use cases
2. Provide an overview of Apache Hadoop
3. Provide HDFS Concepts and Interfacing with HDFS
4. Understand Map Reduce Jobs
5. Provide hands on Hodoop Eco System
6. Apply analytics on Structured, Unstructured Data.
7. Exposure to Data Analytics with R.</td></tr>
<tr><td>Course Contents</td><td colspan="5">Unit- I Introduction to Big Data: Types of Digital Data-Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – 3Vs of Big Data – Non Definitional traits of Big Data – Business Intelligence vs. Big Data – Data warehouse and Hadoop environment – Coexistence. Big Data Analytics: Classification of analytics – Data Science – Terminologies in Big Data – CAP Theorem – BASE Concept. NoSQL: Types of Databases – Advantages – NewSQL – SQL vs. NOSQL vs NewSQL. Introduction to Hadoop: Features – Advantages – Versions –
Unit- II Overview of Hadoop Eco systems – Hadoop distributions – Hadoop vs. SQL – RDBMS vs. Hadoop – Hadoop Components – Architecture – HDFS – Map Reduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression. Hadoop 2 (YARN): Architecture – Interacting with Hadoop Eco systems.
Unit- III No SQL databases: Mongo DB: Introduction – Features – Data types – Mongo DB Query language – CRUD operations – Arrays</td></tr>
</table>

	Key spaces – CRUD operations – Collections – Counter – TTL – Alter commands – Import and Export – Querying System tables. **Unit-IV** Hadoop Eco systems: Hive – Architecture – data type – File format – HQL – SerDe – User defined functions – Pig: Features – Anatomy – Pig on Hadoop – Pig Philosophy – Pig Latin overview – Data types – Running pig – Execution modes of Pig – HDFS commands – Relational operators – Eval Functions – Complex data type – Piggy Bank – User defined Functions – Parameter substitution – Diagnostic operator. Jasper Report: Introduction – Connecting to Mongo DB – Connecting to Cassandra – Introduction to Machine learning: Linear Regression – Clustering – Collaborative filtering – Association rule mining – Decision tree. **Unit-V** : Data Analytics with R Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with Big R.
Course Outcomes	The students will be able to: 1. Identify Big Data and its Business Implications. 2. List the components of Hadoop and Hadoop Eco-System • Access and Process Data on Distributed File System 3. Manage Job Execution in Hadoop Environment 4. Develop Big Data Solutions using Hadoop Eco System 5. Analyze Infosphere BigInsights Big Data Recommendations. 6. Apply Machine Learning Techniques using R.
Text Books	1. Seema Acharya, Subhashini Chellappan, “Big Data and Analytics”, Wiley Publication, 2015. 2. Tom White “ Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012.
Reference Books	1. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, “Big Data for Dummies”, John Wiley & Sons, Inc., 2013. 2. Pete Warden, “Big Data Glossary”, O’Reily, 2011. 3. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013. 4. ArvindSathi, “BigDataAnalytics: Disruptive Technologies for Changing the Game”, MC Press, 2012 • Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

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B.Tech – CSE – 7th Semester

Course Title	**Elective – II Block Chain Technology**				
Course Code	EBT04751B				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**T C**	
	3	**1**	**-**	**4**	
Prerequisites	Block Chain				
Course Objectives	1. Explain how blockchain technology works. 2. Integrate blockchain technology into the current business processes to make them secure.				
Course Contents	**Unit-I** Introduction of Cryptography and Blockchain: What is Blockchain, Blockchain Technology Mechanisms & Networks, Blockchain Origins, Objective of Blockchain, Blockchain Challenges, Transactions And Blocks, P2P Systems, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. **Unit- II** BitCoin and Cryptocurrency: What is Bitcoin, The Bitcoin Network, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets, Decentralization and Hard Forks, Ethereum Virtual Machine (EVM), Merkle Tree, Double-Spend Problem, Blockchain And Digital Currency, Transactional Blocks, Impact Of Blockchain Technology On Cryptocurrency. **Unit- III** Introduction to Ethereum: What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?, Smart Contracts. **Unit- IV** Introduction to Hyperledger: What is Hyperledger? Distributed Ledger Technology & its Challenges, Hyperledger & Distributed Ledger Technology, Hyperledger Fabric, Hyperledger Composer. **Unit- V** Solidity Programming: Solidity - Language of Smart Contracts, Installing Solidity & Ethereum Wallet, Basics of Solidity, Layout of a Solidity Source File & Structure of Smart Contracts, General Value Types (Int, Real, String, Bytes, Arrays, Mapping, Enum, address)				

Course Outcomes	1. Understand and explore the working of Blockchain technology (Understanding) 2. Analyze the working of Smart Contracts (Analyze) 3. Understand and analyze the working of Hyperledger (Analyze). 4. Apply the learning of solidity and de-centralized apps on Ethereum (Apply).
Text Books	1. Andreas M. Antonopoulos , "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media Inc, 2015 2. Melanie Swa "Blockchain", First Edition, O'Reilly Jan 2015
Reference Books	1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016). 2. Antonopoulos, Mastering Bitcoin. • Antonopoulos and G. Wood, Mastering Ethereum. 3. D. Drescher, Blockchain Basics. Apress, 2017.

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B.Tech – CSE – 7th Semester

Course Title	**Data Visualization**				
Course Code	EBT04793				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**T C**	
	3	**1**	**-**	**4**	
Prerequisites					
Course Objectives	1. Explain techniques and algorithms for creating effective visualizations based on principles from graphic design. 2. 2. Introduce several industry-standard software tools to create a compelling and interactive visualization of various types of data				
Course Contents	**Unit- I Introduction:** Data for Graphics, Design principles, Value for visualization, Categorical, time series, and statistical data graphics, Introduction to Visualization Tools. **Unit- II Graphics Pipeline:** Introduction, Primitives: vertices, edges, triangles, Model transforms: translations, rotations, scaling, View transform, Perspective transform, window transform **Unit- III Aesthetics and Perception:** Graphical Perception Theory, Experimentation, and the Application, Graphical Integrity, Layering and Separation, Color and Information, Using Space Effectively. **Visualization Design:** Visual Display of Quantitative Information, Data-Ink Maximization, Graphical Design, Exploratory Data Analysis, Heat Map. **Un it- IV Multidimensional Data:** Query, Analysis and Visualization of Multi-dimensional Relational Databases, Interactive Exploration, tSNE **Interaction:** Interactive Dynamics for Visual Analysis, Visual Queries, Finding Patterns in Time SeriesData, Trend visualization, Animation, Dashboard, Visual Storytelling. **Unit- V Collaboration:** Graph Visualization and Navigation, Online Social Networks, Social Data Analysis,Collaborative Visual Analytics, Text, Map, Geospatial data.				

Course Outcomes	1. An understanding of the key techniques and theory used in visualization, including data models, graphical perception, and techniques for visual encoding and interaction. 2. Exposure to a number of common data domains and corresponding analysis tasks, including multivariate data, networks, text, and cartography. 3. Practical experience building and evaluating visualization systems.
Text Books	1. E. TUFTE (2001), The Visual Display of Quantitative Information, Graphics Press, 2nd Edition. 2. J. KOPONEN, J. HILDÉN (2019), Data Visualization Handbook, CRC Press.
Reference Books	1. M. LIMA (2014), The Book of Trees: Visualizing Branches of Knowledge, Princeton Architectural Press. 2. R. TAMASSIA (2013), Handbook of Graph Drawing and Visualization, CRC Press. 3. S. MURRAY (2017), Interactive Data Visualization for the Web, O'Reilly Press, 2nd Edition.

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B.Tech – CSE – 7th Semester

Course Title	Machine Learning with R Lab				
Course Code	EBT04791				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**TC**	
	-	**-**	**4**	**2**	
Prerequisites	Machine Learning				
Course Objectives	1. Understand the implementation procedures for the machine learning algorithms. 2. Design R programs for various Learning algorithms. 3. Apply appropriate data sets to the Machine Learning algorithms. 4. Identify and apply Machine Learning algorithms to solve real world problems.				
Course Contents	1. Study of R Libraries for ML application 2. Write a R program to compute Central Tendency Measures: Mean, Median, Mode, Variance, Standard Deviation. 3. Extract the data from database using R. 4. Write a R program to demonstrate Linear Regression. 5. Implement k-nearest neighbours classification using R. 6. Implement an algorithm to demonstrate the significance of genetic algorithm. 7. T Test in R 8. Chi-Square Test in R 9. Implementation of Logistic Regression using R 10. Implementation of KNN using R 11. Performance analysis of Classification Algorithms on a specific dataset				
Course Outcomes	1. Understand modern notions in predictive data analysis. 2. Select data, model selection, model complexity and identify the trends. 3. Understand a range of machine learning algorithms along with their strengths and weaknesses. 4. Build predictive models from data and analyze their performance				
Text Books	1. Leskovec,J., Rajaraman,A., Ullman,J., (2014), *Mining of Massive Datasets*, 2nd Edition, Cambridge University Press 2. Bekkerman,R., Bilenko,M., Langford,J., (2011), *Scaling Up Machine Learning*, Cambridge University Press.				

Reference Books	1. Department of Machine Learning, Carnegie Mellon University, Machine Learning with Large Datasets Course 2. Department of Computer Science, University of California, Berkeley, Scalable Machine Learning 3. ETH Zurich, Data Mining: Machine Learning from Large Datasets

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B.Tech – CSE – 7th Semester

Course Title	**IOT Lab**				
Course Code	EBT04792				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**TC**	
	-	**-**	**4**	**2**	
Prerequisites	Arduino				
Course Objectives	1. Design and program IoT devices. 2. Use real IoT protocols for communication. 3. Secure the elements of an IoT device.				
Course Contents	1. Sense the Available Networks Using Arduino 2. Measure the Distance Using Ultrasonic Sensor and Make Led Blink Using Arduino 3. Detect the Vibration of an Object Using Arduino 4. Connect with the Available Wi-Fi Using Arduino 5. Sense a Finger When it is Placed on Board Using Arduino 6. Temperature Notification Using Arduino 7. LDR to Vary the Light Intensity of LED Using Arduino 8. MySQL Database Installation in Raspberry Pi 9. SQL Queries by Fetching Data from Database in Raspberry Pi 10. Switch Light On and Off Based on the Input of User Using Raspberry Pi				
Course Outcomes	1. Able to understand the application areas of IOT · 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks· 3. Able to understand building blocks of Internet of Things and characteristics				
Text Books	1.Honbo Zhou, “The Internet of Things in the Cloud: A Middleware Perspective”, CRC Press,2012. 2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet• ofThings”, Springer, 2011. 3. David Easley and Jon Kleinberg, “Networks, Crowds, and Markets: Reasoning About a• HighlyConnected World”, Cambridge University Press, 2010.				

Reference Books	1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014 2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything", 1st Edition, Apress Publications, 2013

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B.Tech – CSE – 7th Semester

Course Title	Mini Project				
Course Code	EBT04793				
Semester	**7th Semester**				
Course Credit	**L**	**T**	**P**	**T C**	
	3	**1**	**-**	**4**	
Prerequisites	Learning				
Course Objectives	1. To create an Industrial environment and culture within the institution. 2. To set up production lab utilizing the infrastructure of the institution. 3. To standardize laboratories to industrial standard, thereby giving exposure to industrial housekeeping standards. 4. To provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education. 5. To promote the concept of entrepreneurship.				
Course Contents	1. A mini project requires comparatively less time than major projects. They are comparatively simpler and have shorter duration. Mini Project helps students to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. 2. Mini Project can help them to boost their skills and widen their horizon of thinking. It will act like a beginners guide to undertake the major project/dissertation during the final year and will ensure preparedness of students to undertake major projects/dissertation. 3. Students will be required to select the topic relevant to their specialization and that has value addition. Students will get an opportunity to work in actual industrial environment if they opt for internship. Based on the selected topic student will also prepare seminar report based on the literature survey Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available. End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution. Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by the departmental committee.				

Course Outcomes	In this course the students will learn how to design and develop software, and to manage projects, using the following principles: 1. Identify engineering problems reviewing available literature. 2. Study different techniques used to analyze complex systems. 3. Solve a live problem using software/analytical/computational tools and present solution by using his/her technique applying engineering principles. 4. Learn to write technical reports and develop skills to present and defend their work in front of technically qualified audience.