K.S.INSTITUTE OF TECHNOLOGY, BANGALORE

(AFFLIATED TO VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM)

DEPARTMENT OF COMPUTER SCIENCE & ENGG.

INTERNET OF THINGS TECHNOLOGY SEMESTER – VIII			
Subject Code	**15CS81**	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			

Module – 1	**Teaching Hours**
What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.	**10 Hours**
Module – 2	
Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.	**10 Hours**
Module – 3	
IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.	**10 Hours**
Module – 4	
Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment	**10 Hours**
Module – 5	
IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture,	**10 Hours**

Smart City Security Architecture, Smart City Use-Case Examples.	

Course Outcomes: After studying this course, students will be able to

- Interpret propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the properties of integers and fundamental principle of counting in discrete structures.
- Utilize the understandings of relations and functions and be able to determine their properties
- Solve the problems using the concept of graph theory and trees properties
- Solve problems using recurrence relations and Principle of Inclusion and Exclusion

Question paper pattern:

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry,**"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things",** 1st Edition, Pearson Education (Cisco Press Indian Reprint). (**ISBN:** 978-9386873743)
2. Srinivasa K G, **"Internet of Things",**CENGAGE Leaning India, 2017

Reference Books:

1. Vijay Madisetti and ArshdeepBahga, **"Internet of Things (A Hands-on-Approach)",** 1st Edition, VPT, 2014. (**ISBN:** 978-8173719547)
2. Raj Kamal, **"Internet of Things: Architecture and Design Principles",** 1st Edition, McGraw Hill Education, 2017. (**ISBN:** 978-9352605224)

BIG DATA ANALYTICS
SEMESTER – VIII

Subject Code	15CS82	IA Marks	20
Number of Lecture Hours/Week	4	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Module – 1	**Teaching Hours**
Hadoop Distributed File System Basics, Running Example Programs and Benchmarks, Hadoop MapReduce Framework, MapReduce Programming	**10 Hours**
Module – 2	
Essential Hadoop Tools, Hadoop YARN Applications, Managing Hadoop with Apache Ambari, Basic Hadoop Administration Procedures	**10 Hours**
Module – 3	
Business Intelligence Concepts and Application, Data Warehousing, Data Mining, Data Visualization	**10 Hours**
Module – 4	
Decision Trees, Regression, Artificial Neural Networks, Cluster Analysis, Association Rule Mining	**10 Hours**
Module – 5	
Text Mining, Naïve-Bayes Analysis, Support Vector Machines, Web Mining, Social Network Analysis	**10 Hours**

Course outcomes: The students should be able to:

- Identify the Applications of Business Intelligence, Data Warehousing, Data Mining and Data Visualization.
- Apply the different Data Mining Techniques such Decision Trees, Regression, Artificial Neural Networks, Cluster Analysis and Association Rule.
- Identify the Applications of Text and Web Mining and also Utilize the Machine learning Techniques such as Naïve-Bayes Analysis and Support Vector Machines
- Make use of the basic concepts of Hadoop Distributed File system and Map Reduce programming.
- Utilize the Essential Hadoop Tools and Hadoop administration procedures.

Question paper pattern:
The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Douglas Eadline,**"Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem",** 1st Edition, Pearson Education, 2016. ISBN-13: 978-9332570351

2. Anil Maheshwari, **"Data Analytics",** 1st Edition, McGraw Hill Education, 2017. ISBN-13: 978-9352604180

Reference Books:

1) Tom White, **"Hadoop: The Definitive Guide",** 4th Edition, O'Reilly Media, 2015.ISBN-13: 978-9352130672
2) Boris Lublinsky, Kevin T.Smith, Alexey Yakubovich,**"Professional Hadoop Solutions",** 1stEdition, Wrox Press, 2014ISBN-13: 978-8126551071
3) Eric Sammer,**"Hadoop Operations: A Guide for Developers and Administrators",**1stEdition, O'Reilly Media, 2012.ISBN-13: 978-9350239261

USER INTERFACE DESIGN SEMESTER – VIII			
Subject Code	15CS832	IA Marks	20
Number of Lecture Hours/Week	3	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			

Module – 1	**Teaching Hours**
Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.	**10 Hours**
Module – 2	
User interface design process- obstacles-usability-human characteristics in design - Human interaction speed-business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system timings - Human consideration in screen design - structures of menus - functions of menus-contents of menu-formatting -phrasing the menu - selecting menu choice-navigating menus-graphical menus.	**10 Hours**
Module – 3	
Windows: Characteristics-components-presentation styles-types-managements-organizations-operations-web systems-device-based controls: characteristics-Screen -based controls: operate control - text boxes-selection control-combination control-custom control-presentation control.	**10 Hours**
Module – 4	
Text for web pages - effective feedback-guidance & assistance-Internationalization-accessibility -Icons-Image-Multimedia-coloring.	**10 Hours**
Module – 5	
Windows layout-test :prototypes - kinds of tests - retest - Information search - visualization - Hypermedia - www - Software tools.	**10 Hours**

Course outcomes: The students should be able to:

- Identify characteristics of human, graphical, web user interface and various obstacles in user interface design process.
- Determine the problems in menu creation, window design with colour, text and graphics.
- Make use of the menus and window with its controls in the design process
- Make use of UID principles, feedback and multimedia in design process.
- Utilize control combination and user interfaces over all aspects of technology by various testing methods.

Question paper pattern:
The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Wilbent. O. Galitz ,"The Essential Guide to User Interface Design", John Wiley&

Sons, 2001.

Reference Books:

1. Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.
2. Alan Cooper, "The Essential of User Interface Design", Wiley - Dream Tech Ltd., 2002.

SYSTEM MODELLING AND SIMULATION SEMESTER – VIII			
Subject Code	15CS834	IA Marks	20
Number of Lecture Hours/Week	3	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			

Module – 1	**Teaching Hours**
Introduction: When simulation is the appropriate tool and when it is not appropriate, Advantages and disadvantages of Simulation; Areas of application, Systems and system environment; Components of a system; Discrete and continuous systems, Model of a system; Types of Models, Discrete-Event System Simulation Simulation examples: Simulation of queuing systems. **General Principles, Simulation Software:**Concepts in Discrete-Event Simulation. The Event-Scheduling / Time-Advance Algorithm, Manual simulation Using Event Scheduling	**10 Hours**
Module – 2	
Statistical Models in Simulation :Review of terminology and concepts, Useful statistical models,Discrete distributions. Continuous distributions,Poisson process, Empirical distributions. **Queuing Models:**Characteristics of queuing systems,Queuing notation,Long-run measures of performance of queuing systems,Long-run measures of performance of queuing systems cont…,Steady-state behavior of M/G/1 queue, Networks of queues,	**10 Hours**
Module – 3	
Random-NumberGeneration: Properties of random numbers; Generation of pseudo-random numbers, Techniques for generating random numbers,Tests for Random Numbers, **Random-Variate Generation:** ,Inverse transform technique Acceptance-Rejection technique.	**10 Hours**
Module – 4	
Input Modeling: Data Collection; Identifying the distribution with data, Parameter estimation, Goodness of Fit Tests, Fitting a non-stationary Poisson process, Selecting input models without data, Multivariate and Time-Series input models. **Estimation of Absolute Performance:** Types of simulations with respect to output analysis ,Stochastic nature of output data, Measures of performance and their estimation, **Contd..**	**10 Hours**
Module – 5	
Measures of performance and their estimation,Output analysis for terminating simulations Continued..,Output analysis for steady-state simulations. **Verification, Calibration And Validation:** Optimization: Model building, verification and validation, Verification of simulation models, Verification of	**10 Hours**

simulation models,Calibration and validation of models, Optimization via Simulation.	

Course outcomes: The students should be able to:

- Identify the System components and apply analytical modeling methods to simulate the activities of systems- Queuing, inventory & reliability.
- Make use of the characteristics of a Discrete system and Event scheduling time advance algorithm to model the Single Queuing Simulation in Java. Identify useful statistical models, discrete and continuous distributions.
- Model the behaviour of M/G/1 queue behaviour with measures of performance of queuing systems, Random number and variate generation, Tests for random numbers.
- Identify the steps in Input Modelling by choosing parameters, Solve Goodness of fit tests problems.
- Apply effective verification, calibration and validation of methods, Plan Optimization through Simulation.

Question paper pattern:
The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation, 5 th Edition, Pearson Education, 2010.

Reference Books:

1. Lawrence M. Leemis, Stephen K. Park: Discrete – Event Simulation: A First Course, Pearson Education, 2006.
2. Averill M. Law: Simulation Modeling and Analysis, 4 th Edition, Tata McGraw-Hill, 2007