**INTERNET OF THINGS TECHNOLOGY**  
[As per Choice Based Credit System (CBCS) scheme]  
(Effective from the academic year 2016 -2017)

**SEMESTER – VIII**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>15CS81</th>
<th>IA Marks</th>
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<tbody>
<tr>
<td>Number of Lecture Hours/Week</td>
<td>04</td>
<td>Exam Marks</td>
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<tr>
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<td>50</td>
<td>Exam Hours</td>
<td>03</td>
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</table>

**CREDITS – 04**

**Course Objectives:** This course will enable students to

- Assess the genesis and impact of IoT applications, architectures in real world.
- Illustrate diverse methods of deploying smart objects and connect them to network.
- Compare different Application protocols for IoT.
- Infer the role of Data Analytics and Security in IoT.
- Identifiesensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

**Module – 1**  
Teaching Hours

10 Hours

**Module – 2**

10 Hours

**Module – 3**

10 Hours

**Module – 4**

10 Hours

**Module – 5**

10 Hours
### Course Outcomes

After studying this course, students will be able to:

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

### 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:


### Reference Books:

## BIG DATA ANALYTICS

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)

**SEMESTER – VIII**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
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</table>

**CREDITS – 04**

### Course objectives:
This course will enable students to
- Understand Hadoop Distributed File system and examine MapReduce Programming
- Explore Hadoop tools and manage Hadoop with Ambari
- Appraise the role of Business intelligence and its applications across industries
- Assess core data mining techniques for data analytics
- Identify various Text Mining techniques

### 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:
- Master the concepts of HDFS and MapReduce framework
- Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
- Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
- Infer the importance of core data mining techniques for data analytics
- Compare and contrast different Text Mining Techniques

### 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:

<table>
<thead>
<tr>
<th>Reference Books:</th>
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</table>
# HIGH PERFORMANCE COMPUTING

**[As per Choice Based Credit System (CBCS) scheme]**

**(Effective from the academic year 2016 -2017)**

**SEMESTER – VIII**

<table>
<thead>
<tr>
<th>Subject Code</th>
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</table>

**CREDITS – 03**

**Course objectives:** This course will enable students to

- Introduce students the design, analysis, and implementation, of high performance computational science and engineering applications.
- Illustrate on advanced computer architectures, parallel algorithms, parallel languages, and performance-oriented computing.

**Module – 1**

<table>
<thead>
<tr>
<th><strong>Introduction: Computational Science and Engineering:</strong> Computational Science and Engineering Applications; characteristics and requirements, Review of Computational Complexity, Performance: metrics and measurements, Granularity and Partitioning, Locality: temporal/spatial/stream/kernel, Basic methods for parallel programming, Real-world case studies (drawn from multi-scale, multi-discipline applications)</th>
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**Module – 2**

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**Module – 3**

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<td>10 Hours</td>
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**Module – 4**

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<tr>
<th><strong>Parallel Programming:</strong> Revealing concurrency in applications, Task and Functional Parallelism, Task Scheduling, Synchronization Methods, Parallel Primitives (collective operations), SPMD Programming (threads, OpenMP, MPI), I/O and File Systems, Parallel Matlabs (Parallel Matlab, Star-P, Matlab MPI), Partitioning Global Address Space (PGAS) languages (UPC, Titanium, Global Arrays)</th>
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<td>10 Hours</td>
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**Module – 5**

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<tr>
<th><strong>Achieving Performance:</strong> Measuring performance, Identifying performance bottlenecks, Restructuring applications for deep memory hierarchies, Partitioning applications for heterogeneous resources, using existing libraries, tools, and frameworks</th>
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<td>10 Hours</td>
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**Course outcomes:** The students should be able to:

- Illustrate the key factors affecting performance of CSE applications, and
- Make mapping of applications to high-performance computing systems, and
Apply hardware/software co-design for achieving performance on real-world applications

**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:**

**Reference Books:**
### USER INTERFACE DESIGN

**[As per Choice Based Credit System (CBCS) scheme]**

**(Effective from the academic year 2016 -2017)**

**SEMESTER – VIII**

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<th>Subject Code</th>
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</table>

**CREDITS – 03**

**Course objectives:** This course will enable students to

- To study the concept of menus, windows, interfaces
- To study about business functions
- To study the characteristics and components of windows and the various controls for the windows.
- To study about various problems in windows design with color, text, graphics.
- To study the testing methods

**Module – 1**

<table>
<thead>
<tr>
<th>Teaching Hours</th>
<th>Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic &amp; principles.</th>
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**Module – 2**

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**Module – 3**

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**Module – 4**

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**Module – 5**

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<td>10 Hours</td>
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</tbody>
</table>

**Course outcomes:** The students should be able to:

- Design the user interface, design, menu creation and windows creation and connection between menu and windows

**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:**


**Reference Books:**

<p>| | |</p>
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</table>
## Course Objectives:
This course will enable students to:

- Explain understanding of this technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.
- Illustrate process of creating virtual environments

### Module – 1

Introduction: The three I’s of virtual reality, commercial VR technology and the five classic components of a VR system.

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Text book1: 1.1, 1.3, 1.5, 2.1, 2.2 and 2.3

### Module – 2

Output Devices: Graphics displays, sound displays & haptic feedback.

Text book1: 3.1, 3.2 and 3.3

### Module – 3

Modeling: Geometric modeling, kinematics modeling, physical modeling, behaviour modeling, model management.

Text book1: 5.1, 5.2 and 5.3, 5.4 and 5.5

### Module – 4

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues.

Text book1: 7.1, 7.2 and 7.3

### Module – 5

Applications: Medical applications, military applications, robotics applications.

Text book1: 8.1, 8.3 and 9.2

### Course Outcomes:
The students should be able to:

- Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.
- Explain process of creating virtual environments

### 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:

### Reference Books:
# SYSTEM MODELLING AND SIMULATION

[As per Choice Based Credit System (CBCS) scheme]

(Effective from the academic year 2016 -2017)

**SEMESTER – VIII**

<table>
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<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Exam Marks</th>
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<tbody>
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<td>80</td>
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</table>

**Number of Lecture Hours/Week** | 3 | Exam Hours | 03 |

**Total Number of Lecture Hours** | 40 |

**CREDITS – 03**

**Course objectives:** This course will enable students to

- Explain the basic system concept and definitions of system;
- Discuss techniques to model and to simulate various systems;
- Analyze a system and to make use of the information to improve the performance.

## Module – 1

**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

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Hours</th>
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<tr>
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</table>

## 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.

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
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</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td></td>
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</table>

## 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..**

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Hours</th>
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<tbody>
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</table>

## 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
### Course outcomes:
The students should be able to:

- Explain the system concept and apply functional modeling method to model the activities of a static system.
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Simulate the operation of a dynamic system and make improvement according to the simulation results.

### 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:


### Reference Books:

<table>
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**CREDITS – 02**

**Course objectives:** This course will enable students to

**Description (If any):**

**Course outcomes:** The students should be able to:

**Evaluation of Internship:**
## PROJECT WORK PHASE II

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)

### SEMESTER – VIII

<table>
<thead>
<tr>
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<th>Exam Marks</th>
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</table>

| Number of Lecture Hours/Week | 06 |
| Total Number of Lecture Hours | -- |

**Exam Hours**: 03

**CREDITS – 05**

### Course objectives:
This course will enable students to

### Description (If any):

### Course outcomes:
The students should be able to:

### Conduction of Practical Examination:
<table>
<thead>
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<th>Subject Code</th>
<th>IA Marks</th>
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<th>Total Number of Lecture Hours</th>
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<th>Number of Lecture Hours/Week</th>
<th>Exam Hours</th>
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</table>

**Course objectives:** This course will enable students to

- ...

**Description:**

- ...

**Course outcomes:** The students should be able to:

- ...

**Evaluation of seminar:**