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

SEMESTER – VII

Subject Code | 15CS71 | IA Marks | 20
---|---|---|---
Number of Lecture Hours/Week | 04 | Exam Marks | 80
Total Number of Lecture Hours | 50 | Exam Hours | 03

CREDITS – 04

Course Objectives: This course will enable students to

- Illustrate the Semantic Structure of HTML and CSS
- Compose forms and tables using HTML and CSS
- Design Client-Side programs using JavaScript and Server-Side programs using PHP
- Infer Object Oriented Programming capabilities of PHP
- Examine JavaScript frameworks such as jQuery and Backbone

Module – 1

Teaching Hours: 10 Hours


Module – 2

10 Hours

HTML Tables and Forms, Introducing Tables, Styling Tables, Introducing Forms, Form Control Elements, Table and Form Accessibility, Microformats, Advanced CSS: Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks.

Module – 3

10 Hours


Module – 4

10 Hours

PHP Arrays and Superglobals, Arrays, $_GET and $_POST Superglobal Arrays, $_SERVER Array, $_Files Array, Reading/Writing Files, PHP Classes and Objects, Object-Oriented Overview, Classes and Objects in PHP, Object Oriented Design, Error Handling and Validation, What are Errors and Exceptions?, PHP Error Reporting, PHP Error and Exception Handling.

Module – 5

10 Hours


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

- Adapt HTML and CSS syntax and semantics to build web pages.
- Construct and visually format tables and forms using HTML and CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- Appraise the principles of object oriented development using PHP
- Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

**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:**
SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – VII

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Number of Lecture Hours/Week</th>
<th>Exam Marks</th>
<th>Total Number of Lecture Hours</th>
<th>Exam Hours</th>
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<td>15IS72</td>
<td>20</td>
<td>4</td>
<td>80</td>
<td>50</td>
<td>03</td>
</tr>
</tbody>
</table>

CREDITS – 04

Course objectives: This course will enable students to

- Learn How to add functionality to designs while minimizing complexity.
- What code qualities are required to maintain to keep code flexible?
- To Understand the common design patterns.
- To explore the appropriate patterns for design problems

Module – 1

<table>
<thead>
<tr>
<th>Teaching Hours</th>
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<tbody>
<tr>
<td>Introduction: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm</td>
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<tr>
<td>10 Hours</td>
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</tbody>
</table>

Module – 2

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<thead>
<tr>
<th>Teaching Hours</th>
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</thead>
<tbody>
<tr>
<td>Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.</td>
</tr>
<tr>
<td>10 Hours</td>
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</table>

Module – 3

<table>
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<tr>
<th>Teaching Hours</th>
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<tbody>
<tr>
<td>Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.</td>
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<tr>
<td>10 Hours</td>
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</table>

Module – 4

<table>
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<tr>
<th>Teaching Hours</th>
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<tbody>
<tr>
<td>Interactive systems and the MVC architecture: Introduction , The MVC architectural pattern, analyzing a simple drawing program , designing the system, designing of the subsystems, getting into implementation , implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions.</td>
</tr>
<tr>
<td>10 Hours</td>
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</table>

Module – 5

<table>
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<tr>
<th>Teaching Hours</th>
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<tbody>
<tr>
<td>Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.</td>
</tr>
<tr>
<td>10 Hours</td>
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</tbody>
</table>

Course outcomes: The students should be able to:

- Design and implement codes with higher performance and lower complexity
- Be aware of code qualities needed to keep code flexible
- Experience core design principles and be able to assess the quality of a design with respect to these principles.
- Capable of applying these principles in the design of object oriented systems.
- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Be able to select and apply suitable patterns in specific contexts

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.

<table>
<thead>
<tr>
<th>Text Books:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath, universities press, 2013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference Books:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Frank Bachmann, RegineMeunier, Hans Rohnert “Pattern Oriented Software Architecture” – Volume 1, 1996.</td>
</tr>
</tbody>
</table>
MACHINE LEARNING  
[As per Choice Based Credit System (CBCS) scheme]  
(Effective from the academic year 2016 -2017)  
SEMESTER – VII

<table>
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<th>Exam Marks</th>
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<tr>
<td>Total Number of Lecture Hours</td>
<td>50</td>
<td>Exam Hours</td>
<td>03</td>
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</tbody>
</table>

CREDITS – 04

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

- Define machine learning and problems relevant to machine learning.
- Differentiate supervised, unsupervised and reinforcement learning.
- Perform statistical analysis of machine learning techniques.

**Module – 1**

**Introduction:** Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning.  
**Concept Learning:** Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.  
**Text Book1, Sections:** 1.1 – 1.3, 2.1-2.5, 2.7

**Module – 2**

**Decision Tree Learning:** Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.  
**Text Book1, Sections:** 3.1-3.7

**Module – 3**

**Artificial Neural Networks:** Introduction, Neural Network representation, Appropriate problems, Perceptrons, Backpropagation algorithm.  
**Text book 1, Sections:** 4.1 – 4.6

**Module – 4**

**Bayesian Learning:** Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, ML for predicting probabilities, MDL principle, Naive Bayes classifier, Bayesian belief networks, EM algorithm  
**Text book 1, Sections:** 6.1 – 6.6, 6.9, 6.11, 6.12

**Module – 5**

**Evaluating Hypothesis:** Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.  
**Instance Based Learning:** Introduction, k-nearest neighbor learning, locally weighted regression, radial basis function, cased-based reasoning.  
**Reinforcement Learning:** Introduction, Learning Task, Q Learning  
**Text book 1, Sections:** 5.1-5.6, 8.1-8.5, 13.1-13.3

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

- Identify the problems for machine learning. And select the either supervised,
unsupervised or reinforcement learning.

- Explain theory of probability and statistics related to machine learning
- Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q.

**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:**
2. Ethem Alpaydin, Introduction to machine learning, second edition, MIT press.
# NATURAL LANGUAGE PROCESSING

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

**SEMESTER – VII**

<table>
<thead>
<tr>
<th>Subject Code</th>
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<table>
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<th>Exam Hours</th>
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<tbody>
<tr>
<td>3</td>
<td>03</td>
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</table>

| Total Number of Lecture Hours | 40         |

**CREDITS – 03**

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

- Learn the techniques in natural language processing.
- Be familiar with the natural language generation.
- Be exposed to Text Mining.
- Understand the information retrieval techniques

## Module – 1

**Overview and language modeling:**

<table>
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<th>Teaching Hours</th>
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<td>8 Hours</td>
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## Module – 2

**Word level and syntactic analysis:**

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<th>Teaching Hours</th>
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<tr>
<td>8 Hours</td>
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</table>

## Module – 3

**Extracting Relations from Text: From Word Sequences to Dependency Paths:**
Introduction, Subsequence Kernels for Relation Extraction, A Dependency-Path Kernel for Relation Extraction and Experimental Evaluation.

**Mining Diagnostic Text Reports by Learning to Annotate Knowledge Roles:**
Introduction, Domain Knowledge and Knowledge Roles, Frame Semantics and Semantic Role Labeling, Learning to Annotate Cases with Knowledge Roles and Evaluations.

**A Case Study in Natural Language Based Web Search:** InFact System Overview, The GlobalSecurity.org Experience.

<table>
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<tr>
<th>Teaching Hours</th>
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<td>8 Hours</td>
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</table>

## Module – 4

**Evaluating Self-Explanations in iSTART:**

**Automatic Document Separation:**
A Combination of Probabilistic Classification and Finite-State Sequence Modeling: Introduction, Related Work, Data Preparation, Document Separation as a Sequence Mapping Problem, Results.

**Evolving Explanatory Novel Patterns for Semantically-Based Text Mining:**
Related Work, A Semantically Guided Model for Effective Text Mining.

<table>
<thead>
<tr>
<th>Teaching Hours</th>
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<tbody>
<tr>
<td>8 Hours</td>
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<tr>
<td>Module – 5</td>
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<tr>
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<tr>
<td><strong>Course outcomes:</strong> The students should be able to:</td>
</tr>
<tr>
<td>- Analyze the natural language text.</td>
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<tr>
<td>- Generate the natural language.</td>
</tr>
<tr>
<td>- Do Text mining.</td>
</tr>
<tr>
<td>- Apply information retrieval techniques.</td>
</tr>
<tr>
<td><strong>Question paper pattern:</strong> 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.</td>
</tr>
<tr>
<td><strong>Text Books:</strong></td>
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<tr>
<td><strong>Reference Books:</strong></td>
</tr>
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</table>
# CLOUD COMPUTING AND ITS APPLICATIONS

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

**SEMESTER – VII**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Total Number of Lecture Hours</th>
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<td>15CS742</td>
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</table>

<table>
<thead>
<tr>
<th>Course objectives: This course will enable students to</th>
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<tbody>
<tr>
<td>• Explain the fundamentals of cloud computing</td>
</tr>
<tr>
<td>• Illustrate the cloud application programming and aneka platform</td>
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<tr>
<td>• Contrast different cloud platforms used in industry</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Module – 1</th>
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<tbody>
<tr>
<td><strong>Introduction</strong>, Cloud Computing at a Glance, The Vision of Cloud Computing,</td>
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<tr>
<td><strong>Teaching Hours</strong> 8 Hours</td>
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<thead>
<tr>
<th>Module – 2</th>
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</thead>
<tbody>
<tr>
<td><strong>Teaching Hours</strong> 8 Hours</td>
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<tr>
<th>Module – 3</th>
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<tbody>
<tr>
<td><strong>Teaching Hours</strong> 8 Hours</td>
</tr>
</tbody>
</table>
| **Module – 4**  
| **Module – 5**  
| **Course outcomes:** The students should be able to:  
| • Explain cloud computing, virtualization and classify services of cloud computing  
| • Illustrate architecture and programming in cloud  
| • Describe the platforms for development of cloud applications and List the application of cloud. |  |
| **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:**  
### INFORMATION AND NETWORK SECURITY

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

**SEMESTER – VII**

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<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Number of Lecture Hours/Week</th>
<th>Exam Marks</th>
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<td>15CS743</td>
<td>20</td>
<td>3</td>
<td>80</td>
<td>40</td>
<td>03</td>
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</table>

**CREDITS – 03**

**Course objectives:** This course will enable students to
- Analyze the cryptographic processes.
- Summarize the digital security process.
- Indicate the location of a security process in the given system

**Module – 1**

**Module – 2.**

**Module – 3**
Random number generation Providing freshness Fundamentals of entity authentication Passwords Dynamic password schemes Zero-knowledge mechanisms Further reading Cryptographic Protocols Protocol basics From objectives to a protocol Analysing a simple protocol Authentication and key establishment protocols

**Module – 4**
Key management fundamentals Key lengths and lifetimes Key generation Key establishment Key storage Key usage Governing key management Public-Key Management Certification of public keys The certificate lifecycle Public-key management models Alternative approaches

**Module – 5**
Cryptographic Applications Cryptography on the Internet Cryptography for wireless local area networks Cryptography for mobile telecommunications Cryptography for secure payment card transactions Cryptography for video broadcasting Cryptography for identity cards Cryptography for home users

**Course outcomes:** The students should be able to:
- Analyze the Digital security lapses
- Illustrate the need of key management

**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:
# UNIX SYSTEM PROGRAMMING

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

## SEMESTER – VII

<table>
<thead>
<tr>
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<td>03</td>
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### Subject Details

**Number of Lecture Hours/Week**
- 3

**Total Number of Lecture Hours**
- 40

**Exam Hours**
- 03

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

- Explain the fundamental design of the unix operating system
- Familiarize with the systems calls provided in the unix environment
- Design and build an application/service over the unix operating system

### Module – 1

**Teaching Hours**
- 8 Hours


### Module – 2

**Teaching Hours**
- 8 Hours


### Module – 3

**Teaching Hours**
- 8 Hours


### Module – 4

**Teaching Hours**
- 8 Hours


### Module – 5

**Teaching Hours**
- 8 Hours

- Interprocess Communication: Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores.
<table>
<thead>
<tr>
<th>Course outcomes: The students should be able to:</th>
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</thead>
<tbody>
<tr>
<td>• Ability to understand and reason out the working of Unix Systems</td>
</tr>
<tr>
<td>• Build an application/service over a Unix system.</td>
</tr>
</tbody>
</table>

**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:**
# SOFT AND EVOLUTIONARY COMPUTING

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

## SEMESTER – VII

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Exam Marks</th>
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<tbody>
<tr>
<td>15CS751</td>
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<td>80</td>
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</tbody>
</table>

| Number of Lecture Hours/Week | 3 |
| Total Number of Lecture Hours  | 40 |
| Exam Hours  | 03 |

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

- Familiarize with the basic concept of soft computing and intelligent systems
- Compare with various intelligent systems
- Analyze the various soft computing techniques

## Module – 1

**Teaching Hours:**

| Introduction to soft computing: ANN, FS, GA, SI, ES, Comparing among intelligent systems |
| ANN: introduction, biological inspiration, BNN&ANN, classification, first Generation NN, perceptron, illustrative problems |
| Text Book 1: Chapter1: 1.1-1.8, Chapter2: 2.1-2.6 |

**Module – 2**

| Adaline, Medaline, ANN: (2nd generation), introduction, BPN, KNN, HNN, BAM, RBF, SVM and illustrative problems |
| Text Book 1: Chapter2: 3.1,3.2,3.3,3.6,3.7,3.10,3.11 |

**Module – 3**

| Fuzzy logic: introduction, human learning ability, undecidability, probability theory, classical set and fuzzy set, fuzzy set operations, fuzzy relations, fuzzy compositions, natural language and fuzzy interpretations, structure of fuzzy inference system, illustrative problems |
| Text Book 1: Chapter 5 |

**Module – 4**

| Introduction to GA, GA, procedures, working of GA, GA applications, applicability, evolutionary programming, working of EP, GA based Machine learning classifier system, illustrative problems |
| Text Book 1: Chapter 7 |

**Module – 5**

| Swarm Intelligent system: Introduction, Background of SI, Ant colony system. Working of ACO, Particle swarm Intelligence (PSO). |
| Text Book 1: 8.1-8.4, 8.7 |

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

- Understand soft computing techniques
- Apply the learned techniques to solve realistic problems
- Differentiate soft computing with hard computing 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:**


**Reference Books:**

**COMPUTER VISION AND ROBOTICS**  
[As per Choice Based Credit System (CBCS) scheme]  
(Effective from the academic year 2016 -2017)  
**SEMESTER – VII**

<table>
<thead>
<tr>
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<tr>
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**CREDITS – 03**

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

- Review image processing techniques for computer vision
- Explain shape and region analysis
- Illustrate Hough Transform and its applications to detect lines, circles, ellipses
- Contrast three-dimensional image analysis techniques, motion analysis and applications of computer vision algorithms

**Module – 1**

**CAMERAS:** Pinhole Cameras, **Radiometry – Measuring Light:** Light in Space, Light Surfaces, Important Special Cases, **Sources, Shadows, And Shading:** Qualitative Radiometry, Sources and Their Effects, Local Shading Models, Application: Photometric Stereo, Interreflections: Global Shading Models, **Color:** The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

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**Module – 2**

**Linear Filters:** Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, **Edge Detection:** Noise, Estimating Derivatives, Detecting Edges, **Texture:** Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture.

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**Module – 3**

**The Geometry of Multiple Views:** Two Views, **Stereopsis:** Reconstruction, Human Stereopsis, Binocular Fusion, Using More Cameras, **Segmentation by Clustering:** What Is Segmentation?, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering.

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<th><strong>Teaching Hours</strong></th>
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**Module – 4**

**Segmentation by Fitting a Model:** The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness, **Segmentation and Fitting Using Probabilistic Methods:** Missing Data Problems, Fitting, and Segmentation, The EM Algorithm in Practice, **Tracking With Linear Dynamic Models:** Tracking as an Abstract Inference Problem, Linear Dynamic Models, Kalman Filtering, Data Association, Applications and Examples.

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**Module – 5**

**Geometric Camera Models:** Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, **Geometric Camera Calibration:** Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization, **Model- Based Vision:** Initial Assumptions, Obtaining

<table>
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<th><strong>Teaching Hours</strong></th>
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</table>
### Course outcomes:
The students should be able to:

- Implement fundamental image processing techniques required for computer vision
- Perform shape analysis
- Implement boundary tracking techniques
- Apply chain codes and other region descriptors
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques.
- Implement motion related techniques.
- Develop applications using computer vision 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:

### Reference Books:
### INFORMATION MANAGEMENT SYSTEM

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

**Semester – VII**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IA Marks</th>
<th>Exam Marks</th>
<th>Total Number of Lecture Hours</th>
<th>Exam Hours</th>
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<tbody>
<tr>
<td>15IS753</td>
<td></td>
<td>20</td>
<td>40</td>
<td>03</td>
</tr>
</tbody>
</table>

**CREDITS – 03**

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

- Explain the Role of information management system in business
- Evaluate the role of the major types of information systems in a business environment and their relationship to each other

### Module – 1


**Teaching Hours:** 08 Hours

### Module – 2


**Teaching Hours:** 08 Hours

### Module – 3


**Teaching Hours:** 08 Hours

### Module – 4


**Teaching Hours:** 08 Hours

### Module – 5

Decision support in business: Introduction, Decision support trends, Decision support systems (DSS), Management Information Systems, Online analytical processing, Using DSS, Executive information systems, Enterprise portals and decision support, Knowledge management systems, Business and Artificial Intelligence (AI), An overview of AI, Expert systems.

**Teaching Hours:** 08 Hours

**Course outcomes:** The students should be able to:
- Describe the role of information technology and information systems in business
- Record the current issues of information technology and relate those issues to the firm
- Interpret how to use information technology to solve business problems

**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:**
STORAGE AREA NETWORKS
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – VII

Subject Code 15CS754 IA Marks 20
Number of Lecture Hours/Week 3 Exam Marks 80
Total Number of Lecture Hours 40 Exam Hours 03

CREDITS – 03

Course objectives: This course will enable students to

• Evaluate storage architectures,
• Define backup, recovery, disaster recovery, business continuity, and replication
• Examine emerging technologies including IP-SAN
• Understand logical and physical components of a storage infrastructure
• Identify components of managing and monitoring the data center
• Define information security and identify different storage virtualization technologies

Module – 1
Teaching Hours

Storage System Introduction to evolution of storage architecture, key data center elements, virtualization, and cloud computing. Key data center elements – Host (or compute), connectivity, storage, and application in both classic and virtual environments. RAID implementations, techniques, and levels along with the impact of RAID on application performance. Components of intelligent storage systems and virtual storage provisioning and intelligent storage system implementations.

8 Hours

Module – 2
Storage Networking Technologies and Virtualization Fibre Channel SAN components, connectivity options, and topologies including access protection mechanism ‘zoning’, FC protocol stack, addressing and operations, SAN-based virtualization and VSAN technology, iSCSI and FCIP protocols for storage access over IP network, Converged protocol FCoE and its components, Network Attached Storage (NAS) - components, protocol and operations, File level storage virtualization, Object based storage and unified storage platform.

8 Hours

Module – 3
Backup, Archive, and Replication This unit focuses on information availability and business continuity solutions in both virtualized and non-virtualized environments. Business continuity terminologies, planning and solutions, Clustering and multipathing architecture to avoid single points of failure, Backup and recovery - methods, targets and topologies, Data deduplication and backup in virtualized environment, Fixed content and data archive, Local replication in classic and virtual environments, Remote replication in classic and virtual environments, Three-site remote replication and continuous data protection

8 Hours

Module – 4
Cloud Computing Characteristics and benefits This unit focuses on the business drivers, definition, essential characteristics, and phases of journey to the Cloud. Business drivers for Cloud computing, Definition of Cloud computing, Characteristics of Cloud computing, Steps involved in transitioning from Classic data center to Cloud computing environment Services and deployment models, Cloud infrastructure components, Cloud migration considerations

8 Hours

Module – 5
Securing and Managing Storage Infrastructure

This chapter focuses on framework and domains of storage security along with covering security implementation at storage networking. Security threats, and countermeasures in various domains Security solutions for FC-SAN, IP-SAN and NAS environments, Security in virtualized and cloud environments, Monitoring and managing various information infrastructure components in classic and virtual environments, Information lifecycle management (ILM) and storage tiering, Cloud service management activities

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

- Identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Explain components and the implementation of NAS
- Describe CAS architecture and types of archives and forms of virtualization
- Illustrate the storage infrastructure and management activities

**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. Information Storage and Management, Author: EMC Education Services, Publisher: Wiley ISBN: 9781118094839

**Reference Books:**
NIL
MACHINE LEARNING LABORATORY
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)

SEMESTER – VII

Subject Code 15CSL76 IA Marks 20
Number of Lecture Hours/Week 01I + 02P Exam Marks 80
Total Number of Lecture Hours 40 Exam Hours 03

CREDITS – 02

Course objectives:
This course will enable students to
1. Make use of Data sets in implementing the machine learning algorithms
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

Description (If any):
1. The programs can be implemented in either JAVA or Python.
2. For Problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.
3. Data sets can be taken from standard repositories (https://archive.ics.uci.edu/ml/datasets.html) or constructed by the students.

Lab Experiments:
1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
<table>
<thead>
<tr>
<th>Course outcomes: The students should be able to:</th>
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<tbody>
<tr>
<td>1. Understand the implementation procedures for the machine learning algorithms.</td>
</tr>
<tr>
<td>2. Design Java/Python programs for various Learning algorithms.</td>
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<tr>
<td>3. Apply appropriate data sets to the Machine Learning algorithms.</td>
</tr>
<tr>
<td>4. Identify and apply Machine Learning algorithms to solve real world problems.</td>
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<th>Conduction of Practical Examination:</th>
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<tr>
<td>• All laboratory experiments are to be included for practical examination.</td>
</tr>
<tr>
<td>• Students are allowed to pick one experiment from the lot.</td>
</tr>
<tr>
<td>• Strictly follow the instructions as printed on the cover page of answer script</td>
</tr>
<tr>
<td>• Marks distribution: Procedure + Conduction + Viva: <strong>20 + 50 +10 (80)</strong></td>
</tr>
</tbody>
</table>

**Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.**
WEB TECHNOLOGY LABORATORY WITH MINI PROJECT
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016-2017)
SEMESTER – VII

Subject Code: 15CSL77  IA Marks: 20
Number of Lecture Hours/Week: 01L + 02P  Exam Marks: 80
Total Number of Lecture Hours: 40  Exam Hours: 03

CREDITS – 02

Course objectives: This course will enable students to
1. Design and develop static and dynamic web pages.
2. Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.
3. Learn Database Connectivity to web applications.

Description (If any):
NIL

Lab Experiments:

PART A

1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.
2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.
3. Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.
4. Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems:
   a. Parameter: A string
   b. Output: The position in the string of the left-most vowel
   c. Parameter: A number
   d. Output: The number with its digits in the reverse order
5. Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
7. Write a PHP program to display a digital clock which displays the current time of the server.
8. Write the PHP programs to do the following:
   a. Implement simple calculator operations.
   b. Find the transpose of a matrix.
   c. Multiplication of two matrices.
   d. Addition of two matrices.
9. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas". Write a PHP program that does the following:
   a. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named statesList.
   b. Search for a word in states that begins with k and ends in s. Perform a case-insensitive comparison. [Note: Passing re.I as a second parameter to method compile performs a case-insensitive comparison.] Store this word in element 1 of statesList.
   c. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list.
   d. Search for a word in states that ends in a. Store this word in element 3 of the list.

10. Write a PHP program to sort the student records which are stored in the database using selection sort.

**Study Experiment / Project:**
Develop a web application project using the languages and concepts learnt in the theory and exercises listed in part A with a good look and feel effects. You can use any web technologies and frameworks and databases.

Note:
1. In the examination each student picks one question from part A.

2. A team of two or three students must develop the mini project. However during the examination, each student must demonstrate the project individually.

3. The team must submit a brief project report (15-20 pages) that must include the following
   a. Introduction
   b. Requirement Analysis
   c. Software Requirement Specification
   d. Analysis and Design
   e. Implementation
   f. Testing

**Course outcomes:** The students should be able to:
- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Have a good understanding of Web Application Terminologies, Internet Tools other web services.
- Learn how to link and publish web sites

**Conduction of Practical Examination:**
1. All laboratory experiments from part A are to be included for practical examination.
2. Mini project has to be evaluated for 30 Marks.
3. Report should be prepared in a standard format prescribed for project work.
4. Students are allowed to pick one experiment from the lot.
5. Strictly follow the instructions as printed on the cover page of answer script.
6. Marks distribution:
   a) Part A: Procedure + Conduction + Viva: 10 + 35 + 5 = 50 Marks
   b) Part B: Demonstration + Report + Viva voce = 15 + 10 + 05 = 30 Marks
Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.