## VI SEMESTER SYLLABUS

## WEB TECHNOLOGY

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS61** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **PBL** | **Total Hours :** | **45** |

**Course Objectives:**

- Provides basics involved in publishing content on world wide web.
- Includes HTML language fundamentals of how internet and web functions.
- Describes creation of graphics for the web general introduction and advanced topics such as programming and scripting.
- It will also expose students to basic tools and applications used in web publishing.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Adapt HTML and CSS syntax and semantics to build web pages.

**CO2:** Construct and visually format tables and forms using HTML and CSS.

**CO3:** Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.

**CO4:** Appraise the principles of object-oriented development using PHP.

**CO5:** Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

### MODULE 1

**Introduction to HTML**: Introduction to HTML, what is HTML and Where did it come from? HTML Syntax, Semantic Markup, Structure of HTML Documents, Quick Tour of HTML Elements, HTML5 Semantic Structure Elements, Introduction to CSS, what is CSS, CSS Syntax, Location of Styles, Selectors, The Cascade: How Styles Interact, The Box Model, CSS Text Styling.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept*.

**9 Hours**

### MODULE 2

**HTML Tables and Forms**: 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

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**JavaScript**: Client-Side Scripting, What is JavaScript and What can it do?, JavaScript Design Principles, Where does JavaScript Go?, Syntax, JavaScript Objects, The Document Object Model (DOM), JavaScript Events, Forms, Introduction to Server-Side Development with PHP, What is Server-Side Development, A Web Server's Responsibilities, Quick Tour of PHP, Program Control, Functions

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**PHP Arrays and Super global**: 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

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Managing State**: Managing State, The Problem of State in Web Applications, Passing Information via Query Strings, Passing Information via the URL Path, Cookies, Serialization, Session State, HTML5 Web Storage, Caching, Advanced JavaScript and jQuery, JavaScript Pseudo-Classes, jQuery Foundations, AJAX, Asynchronous File Transmission, Animation, Backbone MVC Frameworks, XML Processing and Web Services, XML Processing, JSON, Overview of Web Services.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 30 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 05 |
| 4 | Attendance | As per the Guidelines given in the Regulations | 05 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", 1st Edition, Pearson Education India. (ISBN:978-9332575271)


## Reference Books:


1. Robin Nixon, "Learning PHP, MySQL &JavaScript with jQuery, CSS and HTML5", 4th Edition, O'Reilly Publications, 2015. (ISBN:978-9352130153)

2. Luke Welling, Laura Thomson, "PHP and MySQL Web Development", 5th Edition, Pearson Education, 2016. (ISBN:978-9332582736)

3. Nicholas C Zakas, "Professional JavaScript for Web Developers", 3rd Edition, Wrox/Wiley India, 2012. (ISBN:978-8126535088)

4. David Sawyer Mcfarland, "JavaScript & jQuery: The Missing Manual", 1st Edition, O'Reilly/Shroff Publishers & Distributors Pvt Ltd, 2014 (ISBN:978- 9351108078)

5. Zak Ruvalcaba Anne Boehm, "Murach's HTML5 and CSS3", 3rdEdition, Murachs/Shroff Publishers & Distributors Pvt Ltd, 2016. (ISBN:978-9352133246)

## FUNDAMENTALS OF IOT

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS62** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To study fundamental concepts of IoT.
- To understand roles of sensors in IoT.
- To Learn different protocols used for IoT design.
- To be familiar with data handling and analytics tools in IoT.
- Understand the role of IoT in various domains of Industry.
- Appreciate the role of big data, cloud computing and data analytics in a typical IoT

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Understand the various concepts, terminologies and architecture of IoT systems.

**CO2:** Use sensors and actuators for design of IoT.

**CO3:** Understand and apply various protocols for design of IoT systems.

**CO4:** Understand various applications of IoT, Use various techniques of data storage and analytics in IoT.

**CO5:** Understand APIs to connect IoT related technologies.

### MODULE 1

**Fundamentals of IoT**: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept*.

**9 Hours**

### MODULE 2

**Sensors Networks**: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberry Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Wireless Technologies for IoT**: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, BACnet, Modbus.

IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT.
Edge connectivity and protocols
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Data Handling& Analytics**: Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications
***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Applications of IoT**: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**
**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
**PART B: TWO** questions to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Hakima Chaouchi, — "The Internet of Things Connecting Objects to the Web"
    a. ISBN: 978-1- 84821-140-7, Wiley Publications

2. Olivier Hersent, David Boswarthick, and Omar Elloumi, — "The Internet of Things: Key Applications and Protocols", Wiley Publications

3. Vijay Madisetti and ArshdeepBahga, — "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.

4. 4. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.

5. Keysight Technologies, "The Internet of Things: Enabling Technologies and Solutions for Design and Test", Application Note, 2016.


## Reference Books:


1. Daniel Minoli, — "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications

2. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press

3. https://onlinecourses.nptel.ac.in/noc17_cs22/course

4. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

## IMAGE PROCESSING

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS631** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To learn digital image fundamentals.
- To be exposed to simple image processing techniques.
- To be familiar with image compression and segmentation techniques.
- To represent image in form of features.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Understand the fundamentals of image processing, image transforms and their properties.

**CO2:** Compare transformation algorithms develop any image processing application.

**CO3:** Contrast enhancement, segmentation and compression techniques learn different techniques employed for the enhancement of images.

**CO4:** Learn different causes for image degradation and overview of image restoration techniques**.**

**CO5:** Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.

### MODULE 1

**Introduction**: Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Sampling and Quantization, Representing Digital Images (Data structure), Some Basic Relationships Between Pixels- Neighbors and Connectivity of pixels in image, Applications of Image Processing: Medical imaging, Robot vision, Character recognition, Remote Sensing.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Image Enhancement in The Spatial Domain**: Image Enhancement In The Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Image Enhancement in Frequency Domain**: Image Enhancement In Frequency Domain: Introduction, Fourier Transform, Discrete Fourier Transform (DFT), properties of DFT, Discrete Cosine Transform (DCT), Image filtering in frequency domain.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Image Segmentation**: Introduction, Detection of isolated points, line detection, Edge detection, Edge linking, Region based segmentation- Region growing, split and merge technique, local processing, regional processing, Hough transform, Segmentation using Threshold.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Image Compression**: Introduction, coding Redundancy, Inter-pixel redundancy, image compression model, Lossy and Lossless compression, Huffman Coding, Arithmetic Coding, LZW coding, Transform Coding, Sub-image size selection, blocking, DCT implementation using FFT, Run length coding.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:

1. Rafael C G., Woods R E. and Eddins S L, Digital Image Processing, Prentice Hall, 3rd edition, 2008.

## Reference Books:

1. Milan Sonka," Image Processing, analysis and Machine Vision", Thomson Press India Ltd, Fourth Edition.
2. Fundamentals of Digital Image Processing- Anil K. Jain, 2nd Edition, Prentice Hall of India.
3. S. Sridhar, Digital Image Processing, Oxford University Press, 2nd Ed, 2016.

## COMPUTATIONAL INTELLIGENCE

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS632** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To gain comprehensive theoretical knowledge as well as practical skills related to the design, implementation and analysis of CI approaches, algorithms and methods.
- To explain, critically review, and discuss research papers in areas of CI; independently analyze research papers in areas of CI and write literature review papers on topics of CI.
- To discuss and argue about current topics in CI.
- To design and build CI algorithms and approaches to real-life problems, analyse and improve these algorithms and approaches, as well as argue, justify and discuss decisions made during the development processes.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Design intelligent systems using neural networks, fuzzy logic and genetic algorithms for solving practical problems.

**CO2:** Evaluate performance of intelligent systems in solving specific problems in engineering and science.

**CO3:** Communicate the results of intelligent system designs through writing professional reports.

**CO4:** To assess the nature of a problem at hand and determine whether a machine learning technique/algorithm can solve it efficiently enough.

**CO5:** Able to evaluate and contrast basic techniques and algorithms used in machine learning, will be able to formulate specific algorithmic requirements for a given problem and propose an appropriate solution.

### MODULE 1

**Introduction to AI**: Artificial Intelligence – a brief review – Pitfalls of traditional AI – Why Computational Intelligence? – Computational intelligence concept – Importance of tolerance of imprecision and uncertainty – Constituent techniques – Overview of Artificial Neural Networks, Fuzzy Logic, Evolutionary Computation.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Neural Network:** Biological and artificial neuron, neural networks, supervised and unsupervised learning. Single layer Perceptron, Multilayer Perceptron – Back propagation learning. Neural networks as associative memories – Hopfield networks, Bidirectional Associative Memory. Topologically organized neural networks – competitive learning, kohonen maps.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Fuzzy Logic**: Fuzzy sets, properties, membership functions, fuzzy operations. Fuzzy logic and fuzzy inference and applications, Evolutionary Computation – constituent algorithms, Swarm intelligence algorithms – Overview of other bio-inspired algorithms – Hybrid approaches (neural networks, fuzzy logic, genetic algorithms etc.)

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Machine Learning**: Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data – Naive Bayes models, Learning with hidden data – EM algorithm, Reinforcement learning.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Pattern Recognition**: Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods – Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbour (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Kumar S., "Neural Networks – A Classroom Approach", Tata McGraw Hill, 2004.
2. Konar A., "Computational Intelligence: Principles, Techniques and Applications", Springer Verlag, 2005.
3. Artificial Intelligence – A Modern Approach – Stuart Russell and Peter Norvig, Pearson Education.
4. Artificial Intelligence – Elaine Rich and Kevin Knight, McGraw-Hill


## Reference Books:


1. Engelbrecht, A.P, "Fundamentals of Computational Swarm Intelligence", John Wiley & Sons, 2006.
2. Ross T J, "Fuzzy Logic with Engineering Applications", McGraw Hill, 2002.
3. Eiben A E and Smith J E, "Introduction to Evolutionary Computing", Second Edition, Springer, Natural Computing Series, 2007.
4. Jang J S R and Sun C T, Mizutani E, "Neuro – Fuzzy and Soft Computing", PHI, 2002.
5. Rajashekaran S and Vijayalakshmi Pai G A, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
6. Introduction to Artificial Intelligence – E Charniak and D McDermott, Pearson Education
7. Artificial Intelligence and Expert Systems – Dan W. Patterson, Prentice Hall of India

## NATURAL LANGUAGE PROCESSING

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS633** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To explain the advantages and disadvantages of different NLP technologies and their applicability in different business situations.
- To Use NLP technologies to explore and gain a broad understanding of text data, Use NLP methods to analyze sentiment of a text document.
- To Use NLP methods to perform topic modelling, Interpret the results of a NLP project.
- To Organize and implement a NLP project in a business environment.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** To identify, engage, interpret and analyse stakeholder needs and cultural perspectives, establish priorities and goals, and identify constraints, uncertainties and risks to define the system requirements.

**CO2:** To apply problem solving, design and decision-making methodologies to develop components, systems and processes to meet specified requirements.

**CO3:** Communicate the results of intelligent system designs through writing professional reports.

**CO4:** To apply abstraction, mathematics and discipline fundamentals, software, tools and techniques.

**CO5:** To evaluate, implement and operate systems.

### MODULE 1

**Overview and language modelling:** Overview: Origins and challenges of NLP Language and Grammar-Processing Indian Languages- NLP Applications Information Retrieval. Language Modelling: Various Grammar- based Language Models-Statistical Language Model.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Word level and syntactic analysis:** Word Level Analysis: Regular Expressions Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word Classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar-Constituency-Parsing-Probabilistic Parsing.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## 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 Labelling, Learning to Annotate Cases with Knowledge Roles and Evaluations. **A Case Study in Natural Language Based Web Search:** In Fact System Overview, The GlobalSecurity.org Experience.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Evaluating Self-Explanations in iSTART: Word Matching, Latent Semantic Analysis, and Topic Models:** Introduction, iSTART: Feedback Systems, iSTART: Evaluation of Feedback Systems, **Textual Signatures: Identifying Text-Types Using Latent Semantic Analysis to Measure the Cohesion of Text Structures:** Introduction, Cohesion, CohMetrix, Approaches to Analysing Texts, Latent Semantic Analysis, Predictions, Results of Experiments. **Automatic Document Separation: A Combination of Probabilistic Classification and Finite-State Sequence Modelling:** 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.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**INFORMATION RETRIEVAL AND LEXICAL RESOURCES:** Information Retrieval: Design features of Information Retrieval Systems-Classical, Non classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame Net- Stemmers-POS Tagger- Research Corpora.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information b Retrieval", Oxford University Press, 2008.
2. Anne Kao and Stephen R. Poteet (Eds), "Natural Language Processing and Text Mining", Springer-Verlag London Limited 2007.


## Reference Books:


1. Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", 2nd Edition, Prentice Hall, 2008.
2. James Allen, "Natural Language Understanding", 2nd edition, Benjamin/Cummings publishing company, 1995.
3. Gerald J. Kowalski and Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer academic Publishers, 2000.

## COMPUTER VISION

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS634** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To study the development of algorithms and techniques to analyze and interpret the visible world around us.
- To Be familiar with both the theoretical and practical aspects of computing with images.
- To understand the basic concepts of Computer Vision.
- Understand the geometric relationships between 2D images and the 3D world.
- To Organize and implement a NLP project in a business environment.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** To identify, engage, interpret and analyze stakeholder needs and cultural perspectives, establish priorities and goals, and identify constraints, uncertainties and risks to define the system requirements.

**CO2:** To apply problem solving, design and decision-making methodologies to develop components, systems and processes to meet specified requirements.

**CO3:** Communicate the results of intelligent system designs through writing professional reports.

**CO4:** To apply abstraction, mathematics and discipline fundamentals, software, tools and techniques.

**CO5:** To evaluate, implement and operate systems.

### MODULE 1

**Introduction**, image formation – geometric primitives and transformations, photometric image formation, digital camera, image processing – point operators, linear filtering, neighborhood operators, fourier transforms, segmentation.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Feature Detection and Matching** – points and patches, edges, lines, Feature-based Alignment – 2D, 3D feature-based alignment, pose estimation, Image Stitching, Dense motion estimation – Optical flow – layered motion, parametric motion, Structure from Motion.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Recognition** – object detection, face recognition, instance recognition, category recognition, Stereo Correspondence – Epipolar geometry, correspondence, 3D reconstruction. framework, auto-calibration, apparel. Feature extraction: Edges canny, LOG, DOG. Line detectors (Hough Transform), Corners: Harris and Hessian Affine, orientation histogram, SIFT, SURF, HOG, GLOH.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Scale-Space Analysis**: Image pyramids and Gaussian derivative filters, Gabor filters and DWT. Image Segmentation: Region growing, edge-based approaches to segmentation, graph-cut, mean-shift, MRFs, texture segmentation, object detection. Clustering: K-Means, K-Medoids, mixture of Gaussians. Classification: Discriminant function, supervised, un-supervised, semi-supervised.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Classification**: Discriminant function, supervised, un-supervised, semi-supervised. Classifiers: Bayes, KNN, ANN models. Dimensionality Reduction, Motion Analysis: background subtraction and modeling, optical flow, KLT, spatio-temporal analysis, dynamic stereo, motion parameter estimation. Shape from X: light at surfaces, phong model, reflectance map, Albedo estimation, photometric stereo, use of surface smoothness, constraint, shape from texture, color, motion and edges. Applications: CBIR, CBVR, activity recognition, computational photography, biometrics, stitching and document processing. Recent Trends: 3-D Printing, 3-D sensing, simultaneous location and mapping, GPU, edge-computing, augmented reality, virtual reality cognitive models, fusion and super resolution.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Computer Vision: Algorithms and Applications by Richard Szeliski R., "Computer Vision: Algorithms and Applications", Springer, 2010
2. Computer Vision: A Modern Approach by D. A. Forsyth and J. Ponce, Pearson Education
3. Multiple View Geometry in Computer Vision by Richard Hartley and Andrew Zisserman, Cambridge University Press.


## Reference Books:


1. Shapiro L. G. and Stockman G., "Computer Vision", Prentice Hall, 2001.
2. Forsyth D. A. and Ponce J., "Computer Vision – A Modern Approach", Second Edition, Pearson Education, 2012.
3. Davies E. R., "Machine Vision: Theory, Algorithms, Practicalities", Morgan Kaufmann, 2004.
4. Jain R., Kasturi R. and Shunck B. G., "Machine Vision", McGraw Hill, 1995.
5. Introduction to Statistical Pattern Recognition by K. Fukunaga, Academic Press, Morgan Kaufmann.
6. Digital Image Processing by R.C. Gonzalez and R.E. Woods, PHI.

## DISTRIBUTED COMPUTING

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS635** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To expose students to both the abstraction and details of file systems.
- To introduce concepts related to distributed computing systems.
- To focus on performance of systems design.
- To explore on issues related to systems design decisions.
- To know about the challenges of system design

**Course Outcomes:**

On Completion of this course the students are able to,
**CO1:** Explain the characteristics of a distributed system along with its and design challenges.
**CO2:** Illustrate the mechanism of IPC between distributed objects.
**CO3:** Describe the distributed file service architecture.
**CO4:** Understand the important characteristics of SUN NFS.
**CO5:** Discuss concurrency control algorithms applied in distributed transactions.

### MODULE 1

**Characterization of Distributed Systems**: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. System Models: Introduction, Architectural Models, Fundamental Models.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging. Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Inter Process Communication:** Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX. Distributed Objects and Remote Invocation: Introduction, Communication

between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Distributed File Systems:** Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System. Name Services: Introduction, Name Services and the Domain Name System, Directory Services,
Case Study of the Global Name Services. Distributed Shared Memory: Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency, Munin Case Study, Other Consistency Models.
***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Transactions and Concurrency Control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control. Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**
**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
**PART B: TWO** questions to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, Edition. 2009.

## Reference Books:

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2nd Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman& Hall/CRC, Taylor & Fransis Group, 2007.

## DATA WAREHOUSE AND DATA MINING

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS641** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To understand the principles of Data warehousing and Data Mining.
- To be familiar with the Data warehouse architecture and its Implementation.
- To know the Architecture of a Data Mining system.
- To understand the various Data preprocessing Methods.
- To perform classification and prediction of data.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Design a Data warehouse system and perform business analysis with OLAP tools.

**CO2:** Apply suitable pre-processing and visualization techniques for data analysis.

**CO3:** Apply frequent pattern and association rule mining techniques for data analysis.

**CO4:** Apply appropriate classification and clustering techniques for data analysis

**CO5:** Data mining and data warehousing applications in bioinformatics will also be explored.

### MODULE 1

**Data Warehousing and Business Analysis**: - Data warehousing Components –Building a Data warehouse –Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept*.

**9 Hours**

### MODULE 2

**Data Mining**: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation- Architecture of A Typical Data Mining Systems- Classification of Data Mining Systems. **Association Rule Mining**: - Efficient and Scalable Frequent Item Set Mining Methods Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Classification and Prediction**: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**MODULE 4**

**Cluster Analysis**: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**MODULE 5**

**Mining Object, Spatial, Multimedia, Text and Web Data**: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:

1. Jiawei Han, Micheline Kamber and Jian Pei “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2011

## Reference Books:

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.

## NETWORK AND SYSTEM SECURITY

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS642** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To enable students to learn the various security standards set by the global industry.
- The various security applications that are used by industry.
- Gain a complete knowledge on types of security attacks, services and mechanisms.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Understand the implementation of Internetwork security model and its standards and vulnerabilities.

**CO2:** Demonstrate the Conventional Encryption Principles and the Public key cryptography principles.

**CO3:** Take up projects on email privacy system and compare Pretty Good Privacy (PGP) and S/MIME.

**CO4:** Build a model of Firewall and test the security issues.

**CO5:** Identify the vulnerable points for attacks in simple networks.

### MODULE 1

**Security Attacks**: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Conventional Encryption**: Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Cryptography:** Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Email privacy**: Pretty Good Privacy (PGP) and S/MIME.IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Basic concepts** of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats. Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W. Manzuik and Ryan Permeh, Wiley Dreamtech

## Reference Books:


1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World by Charlien Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Cengage Learning.

## PRINCIPLES OF USER INTERFACE DESIGN

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS643** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To design the User Interface, design, menu creation, windows creation and connection between menus and windows.
- To create high quality user interfaces, emphasizes on 2D graphical user interfaces.
- The study of different paradigms and principles of design and how these can be applied ro screen to be explored.
- It will provide a framework within which we can analyze existing user interface and design new one.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Design interfaces with end user in mind.

**CO2:** Enumerate the important principles that underlie all good user interface design, perform usability testing on newly designed interfaces.

**CO3:** Work efficiently as a part of screen design team, design stand-alone system.

**CO4:** Document and present the design to user during all phases of design.

**CO5:** Design user interface from inception through the beginning development stage.

### MODULE 1

**The User Interface**-Introduction, Overview, The importance of user interface – Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces, Principles of user interface design.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**The User Interface Design process**- Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions- Business definition and requirement analysis, Basic business functions, Design standards.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**System menus and navigation schemes**- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, selecting menu choices, Navigating menus, Kinds of graphical menus.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Windows -** Characteristics, Components of window, Window presentation styles, Types of windows, Window management, Organizing window functions, Window operations, Web systems, Characteristics of device-based controls.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Screen based controls**- Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:

1. Wilbert O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, Second Edition 2002.

## 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

## MOBILE COMPUTING

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS644** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To develop and understand the ways that mobile technologies can be used for teaching and learning.
- Also consider the impact of mobile computing on the field of education.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Understand the concepts and techniques related to Mobile Communication.

**CO2:** Analyze the architectures, protocols and features of GSM, GPRS, UMTS, Mobile IP, DHCP and issues related to Mobile Databases and Mobile OS.

**CO3:** Analyze the architectures, protocols and features of MANETs and WSN

**CO4:** Examine the implementation aspects of HSPA, LTE, 4G, WiMAX and Mobile Application Development.

**CO5:** To understand transport layers of mobile communication.

### MODULE 1

**Introduction to Mobile Computing** and Wireless Networking: What is Mobile Computing, MC Vs Wireless Networking, MC applications, Characteristics of MC, Structure of MC Application, Cellular Mobile Communication, GSM, GPRS, UMTS MAC Protocols: Properties required of MAC protocols, Wireless MAC protocols, Taxonomy, Fixed Assignment Schemes (FDMA, TDMA, CDMA), Random Assignment Schemes, Reservation-based Schemes, The 802.11 Standard, MAC for Ad Hoc Networks.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Mobile Internet Protocol**: Mobile IP, Packet delivery, Overview, Desirable Features, Key Mechanism, Route Optimization, DHCP Mobile Transport Layer: Overview and Terminologies of TCP/IP, Improvement in TCP performance Mobile Databases: Issues in Transaction processing, Transaction processing environment, Data Dissemination, Transaction Processing in Mobile Environment, Data Replication, Mobile Transaction Models, Rollback Process, Two-phase Commit protocol, Query Processing, Recovery.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Mobile Adhoc Networks**: Characteristics, Applications, MANET design issues, Routing, Essentials of Traditional Routing Protocols, Routing in MANET's, Popular protocols, VANETs, MANET Vs VANET, Security Issues, Attacks and Countermeasures Wireless Sensor Networks: WSN Vs MANET, Applications, Architecture of a Sensor node, Design Challenges, Characteristics, WSN Routing Protocols, Target Coverage.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**OS for Mobile Computing**: OS responsibilities, Mobile O/S, Special Constraints and Requirements of Mobile O/S, Comparative study of Mobile Oss HSPA 3G network, LTE, WiMAX, Broadband Wireless Access, 4G Networks – Requirements & Design, Modulation & Multiplexing techniques for 4G, HSOPA, LTE Advanced, WiMAX advanced.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Mobile Application Development and Protocols**: Mobile Devices as Web Clients, WAP, J2ME, Android Software Development Kit (SDK) – Android SDK, Features, Android Application Components, Android Software Stack Structure, Advantages.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Prasant Kumar Patnaik, "Fundamentals of Mobile Computing", PHI, 2012
2. Raj Kamal, "Mobile Computing", Second Edition, Oxford University Press-New Delhi, 2012.


## Reference Books:


1. Dr. Sunil kumar S. Manavi, Mahabaleshwar S. Kakkasageri, "Wireless and Mobile Networks, concepts and protocols", Wiley India, 2014,
2. William Stallings "Wireless Communications and Networks", Second Edition, Pearson Education
3. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009 E resources and other digital material
4. https://www.cse.iitb.ac.in/~mythili/teaching/cs653_spring2014/index.html
5. http://www.iitg.ernet.in/scifac/qip/public_html/cd_cell/EC632.pdf
6. http://people.ee.duke.edu/~romit/courses/s11/ece256-sp11.html

## CRYPTOGRAPHY AND NETWORK SECURITY

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS645** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To understand basics of Cryptography and Network Security.
- To be able to secure a message over insecure channel by various means.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
- To understand various protocols for network security to protect against the threats in the networks.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Provide security of the data over the network.

**CO2:** Do research in the emerging areas of cryptography and network security.

**CO3:** Implement various networking protocols.

**CO4:** Protect any network from the threats in the world.

**CO5:** Know about intruders and intruder detection mechanisms. Types of malicious software.

### MODULE 1

**Introduction to Cryptography and Block Ciphers:** Introduction to security attacks - services and mechanism - introduction to cryptography -Conventional Encryption: Conventional encryption model - classical encryption techniques -substitution ciphers and transposition ciphers – cryptanalysis – steganography - stream and block ciphers - Modern Block Ciphers: Block ciphers principals - Shannon's theory of confusion and diffusion - fiestal structure - data encryption standard(DES) - strength of DES - differential and linear crypt analysis of DES - block cipher modes of operations - triple DES – AES.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Confidentiality and Modular Arithmetic:** Confidentiality using conventional encryption - traffic confidentiality - key distribution - random number generation - Introduction to graph - ring and field - prime and relative prime numbers - modular arithmetic - Fermat's and Euler's theorem - primality testing - Euclid's Algorithm - Chinese Remainder theorem - discrete algorithms.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Public key cryptography and Authentication requirements:** Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography – Elgamel encryption - Message Authentication and Hash Function: Authentication requirements - authentication functions - message authentication code - hash functions - birthday attacks – security of hash functions and MACS.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Integrity checks and Authentication algorithms:** MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509 - directory authentication service - electronic mail security-pretty good privacy (PGP) - S/MIME.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**IP Security and Key Management:** IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations - key management. Web Security: Secure socket layer and transport layer security - secure electronic transaction (SET) - System Security: Intruders - Viruses and related threads - firewall design principals – trusted systems.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. William Stallings, "Cryptography and Network security Principles and Practices", Pearson/PHI.
2. Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", Pearson.


## Reference Books:


1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing – Prentice Hall of India.

## SOFTWARE PROJECT MANAGEMENT

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS646** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To introduce the primary important concepts of project management related to managing software development projects.
- To get familiar with the different activities involved in Software Project Management.
- To know how to successfully plan and implement a software project management activity, and to complete a specific project in time with the available budget.
- To Suggest an efficient management strategy for a business scenario.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Identify the different project contexts and suggest an appropriate management strategy.

**CO2:** Practice the role of professional ethics In successful software development.

**CO3:** Identify and describe the key phases of project management.

**CO4:** Determine an appropriate project management approach through an evaluation of the business context and scope of the project.

**CO5:** Demonstrate an ability to present his/her ideas both formally and informally to a group of their peers and the management.

### MODULE 1

**SOFTWARE MANAGEMENT & ECONOMICS**: The Waterfall Model, Conventional Software Management Performance; Evolution of Software Economics - Software economics, Pragmatic software cost estimation, Reducing software product size, Improving software processes.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept*.

**9 Hours**

### MODULE 2

**THE OLD AND THE NEW WAY OF PROJECT MANAGEMENT**: Improving team effectiveness, Improving automation through software environment, Achieving required quality; Peer inspections – A pragmatic view, The principles of conventional software engineering, Principles of modern software management, Transitioning to an iterative process.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**SOFTWARE MANAGEMENT PROCESS FRAMEWORK**: Life cycle phases, The artifact sets, Management artifacts, Engineering artifacts, Pragmatic artifacts; Model-Based Software Architectures - A management perspective and A technical perspective.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**PROJECT ORGANIZATION AND PLANNING:** Work breakdown structures, Planning guidelines, the cost and schedule estimating process, The iteration planning process, Pragmatic planning, Line-of-Business organizations, Project organizations, Evolution of organizations; Process automation - Automation building blocks, The project environment.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**PROJECT CONTROL AND PROCESS INSTRUMENTATION**: The Seven-Core metrics, Management indicators, Quality indicators, Life-Cycle expectations, Pragmatic software metrics, Metrics automation, Modern project profiles, Next generation software economics, Modern process transitions.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Walker Royce, "Software Project Management", 1st Edition, Pearson Education,2006.


## Reference Books:


1. Bob Hughes and Mike Cotterell, "Software Project Management", 3rd Edition, Tata McGraw Hill Edition, 2005.

2. Joel Henry, "Software Project Management", 1st Edition, Pearson Education, 2006.

3. PankajJalote, "Software Project Management in practice", 1st Edition, Pearson Education, 2005.

## STORAGE AREA NETWORKS

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS647** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To expose the students to different Backup, Archive and Replication, Business Continuity, Local Replication, Cloud Computing, Securing Storage Infrastructure.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Describe about Information availability and Business continuity.

**CO2:** Describe the backup/recovery topologies.

**CO3:** Describe local replication and remote replication technologies and their operation.

**CO4:** Describe processes and technologies for identifying, analyzing, and mitigating security risks in storage infrastructure

**CO5:** Students will demonstrate effective oral and writing communication skills necessary to be effective and to compete at global business environment.

### MODULE 1

Introduction to Storage Technology Information storage, evolution of storage technology and architecture, data center infrastructure, key challenges in Managing information, information lifecycle. Storage system Environments: components of storage system environment, Disk Drive components, Disk Drive Performance, fundamental laws governing disk performance, logical components of the host, application requirements and disk performance.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept*.

**9 Hours**

### MODULE 2

**Data Protection**: RAID: Implementation of RAID, RAID array components, RAID levels, RAID comparison, RAID Impact on disk performance, host spares. Intelligent Storage System: Components of an Intelligent Storage System, Intelligent Storage array, concepts in Practice: EMC CLARIION and Symmetric.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Direct – Attached Storage and Introduction to SCSI**: Types of DAS, DAS benefits and limitations, disk drive interfaces, introduction to parallel SCSI, SCSI command model. Storage

Area Networks: fibre channel, The SAN and Its evolution, components of SAN, FC connectivity, Fibre channel ports, fibre channel architecture, zoning, fiber channel login types, concepts in practice: EMC Connectrix.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Network attached storage**: General purpose servers vs NAS Devices, benefits of NAS, NAS file I/O, components of NAS, NAS Implementations, NAS file sharing protocols, NAS I/O operations, factors effecting NAS Performance and availability, concepts in practice: EMC Celerra.IP SAN: iscsi, fcip. Content – addressed storage: Fixed content and Archives, types of archives, features and benefits of CAS, CAS Architecture, object storage and retrieval in CAS, CAS Examples, concepts in practice: EMC Centera.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Storage Virtualization**: Formats of Virtualization, SNIA Storage virtualization taxonomy, storage virtualization configurations, storage virtualization challenges, types of storage virtualization, concepts in practice: EMC Invista, Rainifinity. Introduction to business continuity: information availability, BC terminology, BC planning life cycle, Failure analysis, business impact analysis, BC technology solutions, concepts in practice: EMC Power path. Backup and recovery: backup purpose, backup considerations, backup granularity, recovery considerations, backup methods, backup process, backup and restore operations, backup topologies, backup in NAS environments, backup technologies, concepts in practice: EMC Networker, EMC Disk Library (EDL).

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. G. Somasundaram, A. Shrivastava, EMC Corporation: Information Storage and Management, 1st Edition, Wiley publishing, 2009.

2. Robert Spalding, Storage Networks: The Complete Reference, 1st Edition, TMH, 2003.


## Reference Books:


1. Marc Farley: Building Storage Networks, 2nd Edition, Tata McGraw Hill, Osborne, 2001.

2. Meeta Gupta: Storage Area Network Fundamentals, 2nd Edition Pearson Education Limited, 2002.

**BUSINESS INTELLIGENCE**

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SBM651** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To provide students with solid understanding of IT role at the enterprise.
- Modern information systems dedicated for both data collection and knowledge discovery will provide management with an easy and understandable toolkit for online operations control over a scaling business in a diverse environment.
- Provides an overview of BI and demonstrates how it facilitates effective implementation of organizational strategies through better business decision making.

**Course Outcomes:**

On Completion of this course the students are able to,
**CO1:** Describe the concepts and components of Business Intelligence.
**CO2:** Critically evaluate use of BI for supporting decision making in an organization.
**CO3:** Understand and use the technologies and tools that make up BI (OLAP).
**CO4:** Understand and design the technological architecture that underpins BI systems.
**CO5:** Plan the implementation of a BI system.

**MODULE 1**

**Introduction to Business Intelligence:** Understanding the scope of today's BI solutions and how they fit into existing infrastructure Assessing new options such as SaaS and cloud-based technology. Describe BI, its components & architecture, previewing the future of BI Crafting a better experience for all business users, End User Assumptions, setting up Data for BI, The Functional Area of BI Tools, Query Tools and Reporting, OLAP and Advanced Analytics, Supporting the requirements of senior executives, including performance management.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**MODULE 2**

**Elements of Business Intelligence Solutions:** Reports & ad hoc queries; Analyse OLAP data; Dashboards & Scorecards development, Metadata Models; Automated tasks & events; Mobile & disconnected BI; Collaboration capabilities; Real time monitoring capabilities; Software development kit; Consume BI through portals, web applications, Desktop applications.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Building the BI Project:** Planning the BI project, Project Resources; Project Tasks, Risk Management and Mitigation, Cost-justifying BI solutions and measuring success,
Collecting User Requirements, Requirements-Gathering Techniques; Prioritizing & Validating BI Requirements, Changing Requirements; BI Design and Development, Best Practices for BI Design; Post-Implementation Evaluations, Maintaining Your BI Environment.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Reporting authoring:** Building reports with relational vs Multidimensional data models; Types of Reports – List, crosstabs, Statistics, Chart, map, financial etc.; Data Grouping & Sorting, Filtering Reports, Adding Calculations to Reports, Conditional formatting, Adding Summary Lines to Reports. Drill up, drill- down, drill-through capabilities. Run or schedule report, different output forms – PDF, excel, csv, xml etc.
***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**BI Deployment, Administration & Security:** Centralized Versus Decentralized Architecture, BI Architecture Alternatives, phased & incremental BI roadmap, System Sizing, Measurements and Dependencies, System Sizing, Measurements, and Dependencies. Setting Early Expectations and Measuring the Results. End-User Provisos. OLAP Implementations. Expanding BI Authentication Authorization, Access Permissions, Groups and Roles, Single-sign on Server Administration, Manage Status & Monitoring, Audit, Mail server & Portal integration, Back Up and Restore.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**
**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
**PART B: TWO** questions to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Business Intelligence (IBM ICE Publication).


## Reference Books:


1. http://en.wikipedia.org/wiki/Business_intelligence.
2. http://www.webopedia.com/TERM/B/Business_Intelligence.html.
3. Http://www.cio.com/article/40296/Business_Intelligence_Definition_and_Solutions.

## INTRODUCTION TO BUSINESS MANAGEMENT

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SBM652** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- Describe the context and purpose of business.
- Analyze the business environment, discuss legal forms of business.
- Explain and analyze basics of accounting function, identify the importance of management to business.
- Describe and demonstrate decision-making skills in marketing function, human resource management.

**Course Outcomes:**

On Completion of this course the students are able to,
**CO1:** Describe the finance function and its relation to the securities market.
**CO2:** Describe the role and functions of a manager and management skills.
**CO3:** Distinguish among primary functions within a business.
**CO4:** Identify the interests and roles of key business stakeholders.
**CO5:** Demonstrate a working vocabulary of business terms.

### MODULE 1

**Nature of Management and its Process:** Meaning, Objectives, Importance; Nature of Management- Science, Art, Profession; Evolution of Management; Management Functions- Planning, Organising, Personnel Management, Directing and Control; Principles of Management- Fayol and Taylor Principles; Managerial Skills; Task and Responsibilities of Professional Manager.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Planning:** Concept, Features, Importance, Limitations; Planning process; Types of Plans Objectives, Strategy, Policy, Procedures, Method, Rule, Budget; Plan vs. Programme Policies and Procedures; Decision making**. Organizing:** Concept, Features, Importance, Limitations; Organising process; Types of Organisation; Structure of Organisation; Centralisation and De-Centralisation; Delegation; Growth in Organisation.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Human Resource Management:** Concept, Features, Importance, Limitations; Recruitment process- Selection; Training and Development, Methods; Functions of Personnel Manager; Performance Management; Appraisal Methods; Human Resource Planning,; Talent Management; Organization Development. Direction and Co-ordination Direction: Concept, Features, Importance, Limitations; Elements of Directing Supervision, Motivation, Leadership, Communication; Co-Ordination-Concept, Features, Importance, Limitations; Co-Ordination Types- Internal and External; Coordination- the Essence of Management.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Controlling:** Concept, Features, Importance, Limitations; Control process; Essentials of a Good Control System; Techniques of Control-Traditional and Non-Traditional Control devices; Relationship between Planning and Controlling.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

Recent Trends in Management Change Management; Crisis Management; Total Quality Management; Risk Management; Global Practices.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. L.M. Prasad Principles and Practice of Management.
2. N.C. Jain, Saakshi Management: Theory and Practice; A.I.T.B.S. Publishers, Delhi.
3. J.P. Mahajan Management – Theory and Practice; Ane Books Pvt. Ltd., Daryaganj, New Delhi-26
4. T. Ramasamy Principles of Management; Himalaya Publishing House


## Reference Books:


1. M.C. Shukla Business Organisation & Management; Sultan Chand & Co., New Delhi.
2. Y.K. Bhusan Fundamentals of Business Organisation & Management; Sultan Chand & Co., New Delhi.
3. Singh & Chabra Business Organisation and Management; Kitab Mahal, Allahabad.
4. J.S. Chandan Management: Concepts and Strategies; Vikas Publishing House Pvt. Ltd., New Delhi.
5. George IT Milkovich Human Resource Management and Jahri W. Boudreau, Chicago LanBreadwell and Human Resource Management; Macmillan, New Delhi. Lan Holden

## OPERATIONS RESEARCH

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SBM653** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To impart knowledge in concepts and tools of Operations Research.
- To understand mathematical models used in Operations Research.
- To apply these techniques constructively to make effective business decisions.
- To introduce quantitative methods and techniques for decision making, model formation and applications.
- Understand the usage of game theory and Simulation for Solving Business Problems.

**Course Outcomes:**

On Completion of this course the students are able to,

**CO1:** Be able to understand the characteristics of different types of decision-making environments and the appropriate decision-making approaches and tools.

**CO2:** Be able to build and solve Transportation models and assignment models.

**CO3:** To design new simple models like CPM, MSTP.

**CO4:** Improve decision-making and develop critical thinking and objective analysis of decision problems.

**CO5:** Be able to implement practical cases by using TORA, WinQSB.

### MODULE 1

**Introduction to OR:** Introduction to OR- Origin, Nature, Definitions, Managerial Applications and Limitations of OR. Linear and Non- Linear, Integer, Goal [Multi- Objective] and Dynamic Programming Problems (Emphasis is on Conceptual Frame Work-no Numerical Problems). Linear Programming: Mathematical Model, Formulation of LPP, Assumptions Underlying LPP, Solution by the Graph and Exceptional Cases.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Linear Programming Problem**: LPP – Simplex Method- Solution to LP Problems, Maximization and Minimization Cases, Optimality conditions, Degeneracy. Dual – Formulation, Relationship between Primal, Dual, Solution of Dual.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 3

**Transportation Problem and Assignment Problem:** Transportation Problem (TP) - Mathematical Model, IBFS using Northwest Corner Rule, Row and Column Minimum Methods, Matrix Minimum (Low-Cost Entry) Method and Vogel's Approximation Method, Unbalanced TP, Degeneracy, Optimality Test and Managerial Applications. Assignment Problem (AP): Mathematical Model, Unbalanced AP, Restricted AP, Method of Obtaining Solution- Hungarian Method.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Network Fundamentals:** Network Fundamentals- Scheduling the Activities -Fulkerson's Rule – CPM- Earliest and Latest Times - Determination of Earlier Starting Time and Earliest Finishing Time in the Forward Pass – Latest Starting Time and Latest Finishing Time in Backward Pass, Determination of Critical Path, Crashing, Time Cost Trade Off, PERT Beta Distribution, Probabilistic Models, Calculation of CP.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Applications of OR**: Queuing Theory, Concepts of Queue/Waiting Line, General Structure of a Queuing system, Operating C h a r a c t e r i s t i c s o f Q u e u e s , deterministic Queuing Models, Probabilistic Queuing Model, Cost Analysis. Single Channel Queuing Model, Poisson Arrival and Exponential Service Times with Infinite Population. Game Theory, Concepts, Saddle Point, Dominance, Zero-Sum Game, Two, Three and More Persons Games, Analytical Method of Solving Two Person Zero Sum Games, Graphical Solutions for (m x 2) and (2 x n) Games.

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Hillier, Frederick S. & Lieberman, "Introduction to Operations Research Concepts and Cases", 2010, 8th Ed. TMH
2. N.D. Vohra, "Quantitative Techniques in Management", 2010, 4thEd.TMH.
3. J.K. Sharma, "Operations Research Theory and Applications 2009,4th Ed. McMillan.


## Reference Books:


1. Kasana, HS & Kumar, KD, "Introductory Operations Research theory and Applications", 2008, Springer.

2. Chakravarty, P, "Quantitative Methods for Management and Economics", 2009, 1st Ed. HPH.

## INTRODUCTION TO ENTERPRENEURSHIP

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SBM654** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **3** | **Exam Hours :** | **2** |
| **Credits :** | **3** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **45** |

**Course Objectives:**

- To provide students with solid understanding of IT role at the enterprise.
- Modern information systems dedicated for both data collection and knowledge discovery will provide management with an easy and understandable toolkit for online operations control over a scaling business in a diverse environment.
- Provides an overview of BI and demonstrates how it facilitates effective implementation of organizational strategies through better business decision making.

**Course Outcomes:**

On Completion of this course the students are able to,
**CO1:** Describe the concepts and components of Business Intelligence.
**CO2:** Critically evaluate use of BI for supporting decision making in an organization.
**CO3:** Understand and use the technologies and tools that make up BI (OLAP).
**CO4:** Understand and design the technological architecture that underpins BI systems.
**CO5:** Plan the implementation of a BI system.

### MODULE 1

**Entrepreneurial Perspectives:** Introduction to Entrepreneurship – Evolution – Concept of Entrepreneurship – Types of Entrepreneurs -Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods – Entrepreneurial Motivations – Models for Entrepreneurial Development – The process of Entrepreneurial Development.
***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 2

**Directing and controlling:** Meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

### MODULE 3

**Management of MSMEs and Sick Enterprises:** Challenges of MSMEs, Preventing Sickness in Enterprises – Specific Management Problems; Industrial Sickness; Industrial Sickness in India – Symptoms, process and Rehabilitation of Sick Units. Preparation of project and ERP: meaning of

project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report,

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 4

**Managing Marketing and Growth of Enterprises:** Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing, Branding, New Techniques in Marketing, International Trade. Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation.

***Teaching Methodology****: Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

## MODULE 5

**Micro and Small Enterprises:** Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study (Captain G R Gopinath), case study (N R Narayana Murthy & Infosys),

***Teaching Methodology:*** *Chalk and talk using PPT and Demo to explain the Concept.*

**9 Hours**

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems/ Case study | Regular Mode of Assessment | 15 |
| 2 | One Open Book Written Exam at the end of the Module 4 | Regular Mode of Assessment | 10 |
| 3 | Assignments on Advanced Topics (group of size 2/individual) | Regular Mode of Assessment | 10 |
| 4 | MCQ based Test at the end of each Module | 2 Marks for each Module | 10 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Scheme of Examination for End Semester Examination of 50 Marks:**

**PART A: TEN** Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

**PART B: TWO** questions to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

## Text Books:


1. Entrepreneurship Development and Small Business Enterprises, Poornima M. Charantimath, 2e, Pearson, 2014.
2. Entrepreneurship, a South – Asian Perspective, D.F. Kuratko and T. V. Rao, 3e, Cengage, 2012.
3. Entrepreneurship, Arya Kumar, 4 e, Pearson 2015.
4. The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2015.
5. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
6. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
7. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017


## Reference Books:


1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003
4. http://en.wikipedia.org/wiki/Business_intelligence.
5. http://www.webopedia.com/TERM/B/Business_Intelligence.html.
6. Http://www.cio.com/article/40296/Business_Intelligence_Definition_and_Solutions.

## WEB TECHNOLOGY LAB

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS66** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **(2+1)** | **Exam Hours :** | **3** |
| **Credits :** | **2** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **42** |

**Course Objectives:**

- Design and develop static and dynamic webpages.
- Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.
- Learn Database Connectivity to web applications.

**Course Outcomes:**

**CO1**: Design and develop dynamic web pages with good aesthetic sense of designing and Latest technical know-how's.
**CO2**: Have a good understanding of Web Application Terminologies, Internet Tools other Web services.
**CO3**: Learn how to link and publish websites.

### Laboratory Experiments

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 to5pt.
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 x as. Store this word in element 0 of a list named states List.
b. Search for a word in states that begins with k and ends in s. Perform a case- insensitive comparison. [Note: Passing re.Ias a second parameter to method compile performs a case-insensitive comparison.] Store this word in element1 of states List.
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.

**Continuous Internal Assessment (CIA) Method**

| **Sl.no** | **Type of Assessment** | **Mode of assessment** | **Marks** |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems | Regular Mode of Assessment | 10 |
| 2 | Assessment in each Lab session for 2 marks (10 Lab Sessions) | Regular Mode of Assessment | 20 |
| 3 | Maintaining the Record Note Book | Regular Mode of Assessment | 10 |
| 4 | MCQ /Viva at the end of each lab session | 2 Marks for each Module | 5 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Conduction of Practical Examination:**

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script
- Marks distribution: Procedure + Conduction + Viva:**12+28+10=50** Marks
- **Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.**

## FUNDAMENTALS OF IOT LAB

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SCS67** | **IA Marks :** | **50** |
| **Hrs/ Week :** | **(2+1)** | **Exam Hours :** | **3** |
| **Credits :** | **2** | **Exam Marks:** | **50** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **42** |

**Course Objectives:**

This course will enable students to

- Students will be explored to the interconnection and integration of the physical world and the cyber space.
- They are also able to design & develop IOT Devices.
- Understand IOT applications and design Techniques
- Working with IoT system involving prototyping, programming and data analysis.
- Learn real time intrusion detection in smart homes,

**Course Outcomes:**

**CO1**: Able to understand the application areas of IOT ·
**CO2**: Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
**CO3**: Able to understand building blocks of Internet of Things and characteristics.
**CO4**: To create an environment for research, design, development and testing of IoT Solutions.
**CO5**: Provide students unique interdisciplinary learning and innovation experiences with IoT technologies.

### Laboratory Experiments

1. Arduino basic setup, how to install it and use it, shields to extend the functionality of an Arduino based system.
2. Blinking LED sketch with Arduino.
3. Spinning a Stepper Motor and Motor Speed Control Sketch
4. Getting started with Raspberry Pi, Install Raspbian on your SD card.
5. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch.
6. Understanding the connectivity of Arduino with IR sensor. Write an application to detect obstacle and notify user using LEDs.
7. How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device.
8. Understanding connectivity of Raspberry-Pi /Beagle board with camera.
9. Interfacing Arduino with Cloud (Things peak API).

**Continuous Internal Assessment (CIA) Method**

| Sl.no | Type of Assessment | Mode of assessment | Marks |
|---|---|---|---|
| 1 | Mini Project / Solving Challenging Problems | Regular Mode of Assessment | 10 |
| 2 | Assessment in each Lab session for 2 marks (10 Lab Sessions) | Regular Mode of Assessment | 20 |
| 3 | Maintaining the Record Note Book | Regular Mode of Assessment | 10 |
| 4 | MCQ /Viva at the end of each lab session | 2 Marks for each Module | 5 |
| 5 | Attendance | As per the Guidelines given in the Regulations | 5 |
| | | **Total** | **50** |

**Conduction of Practical Examination:**

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script
- Marks distribution: Procedure + Conduction + Viva:**12+28+10=50** Marks
- **Change of experiment is allowed only once and marks allotted to the procedure part to be made zero**.

**MOOC-2**

| | | | | |
|---|---|---|---|---|
| **Sub Code :** | **21SCSS02** | **IA Marks :** | | **50** |
| **Self-Study/ Hrs/ Week :** | **02** | **Credits :** | | **01** |
| **Mode of Delivery:** | **RM** | | | |

**Course Objectives:**

- To improve learnability
- Acquire additional knowledge in the field of study
- Skill development
- Industry readiness
- Increased confidence level

**Course Outcomes:**

On completion of this course, students will be able to:
**CO1**: Improve learnability
**CO2**: Acquire additional knowledge in the field of study
**CO3**: Develop the skill
**CO4**: Industry ready
**CO5**: Have more confidence level

**About the Course:**

- A common Online MOOC/SWAYAM/COURSERA Course is offered in Blended mode.
- The MOOC Coordinator will recommend a department specific common course in MOOC/SWAYAM/COURSERA to all the students of the batch.
- The assessment will be taken by the MOOC Coordinator for 25 Marks at the end of the Course and the remaining 25 marks will be awarded for the Course Completion.
- The student must attend all continuous assessment taken by the MOOC/COURSERA Course Faculty.

**Assessment Method for MOOC/SWAYAM/COURSERA Course:**

The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course has to recommend a common course for the students to register the MOOC/SWAYAM/COURSERA Course for a Specific Title.

- The students have to take all continuous assessment as recommended by the Course Faculty in the MOOC/SWAYAM/COURSERA Course for the internal assessment of 50 Marks.
- The Department Faculty Coordinator for the MOOC/SWAYAM/COURSERA Course is responsible to conduct Assessment (MCQs) for 25 Marks in the Internal Assessment of 50 Marks.

**Continuous Internal Assessment (CIA) Method**

| Sl. No | Type of Assessment | Marks | Weight-Age |
|---|---|---|---|
| 1 | Continuous Assessment taken by the MOOC/ Course era Faculty | 25 | 25 |
| 2. | MOOC/ SWAYAM/COURSEERA Faculty Coordinator has to conduct Assessment (MCQ's & Assignments) | 25 | 25 |
| Total | | | 50 |

**EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME-4**

| | | | |
|---|---|---|---|
| **Sub Code :** | **21SQA68** | **IA Marks :** | **50** |
| **Self-Study Hrs/ Week :** | **2** | **Exam Hours :** | |
| **Credits :** | **2** | **Exam Marks:** | **---** |
| **Mode of Delivery:** | **RM** | **Total Hours :** | **25** |

**PART - A**

**Clocks, calendars, Direction Sense -** "a. Concepts on Clocks b. angles between the hand of a clock c. concept of Calendar d. Concept of Leap year, days and date e. Basic concept and Problem-solving technic for various types of problem in Direction sense"
**Critical reasoning-** "a. Argument – Identifying the Different Parts (Premise, assumption, conclusion) b. Types of Questions"
**Surds, Indices and Simplification -** "a. Surds b. Indices c. Simplification exercises"
**Set Theory -** "a. Set definition and formulas b. Power set c. Sub set d. Set multiplication"
**Functions -** "a. Roots of a function b. Domain and range c. Problems involving multiple functions"
**Cryptarithmetic -** Problem solving technique on cryptarithmetic
**Trigonometry -** "a. Heights and distance problems b. Identities, angles c. Simplification"
**Letter and Symbol Series, Visual Sequence, Alpha numeric problems -** "a. Problem solving tactic for Letter and Symbol series visual Sequence C. Alpha numeric problems"
**Analogy -** "a. Synonyms/Antonyms b. Object/Purpose.c. Source/Product. d. Part/Whole. e. Animal/Habitat. f. Characteristics. "
**Letter and Email Writing -** "a. Types (Formal, Informal, Semi-Formal). b. Formats. c. Samples.d. Practice using the right salutations, greetings, subject line, addresses, conciseness and preciseness."

**PART – B**

**Python Pseudocodes**

**Course Objectives:**
This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

**Course Outcomes:**
After studying this course, students will be able to:
- Understand the basic concepts of QUANTITATIVE ABILITY

- Understand the basic concepts of LOGICAL REASONING Skills

- Acquire satisfactory competency in use of VERBAL REASONING

- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability

- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

**Question paper pattern:**

• 10 assessment tests will be conducted based on Multiple choice questions.

• Final marks are based on the test marks conducted during the semester.

**Reference Books**

- Quantitative abilities by Arun Sharma

- Quantitative Aptitude for Competitive Examinations by R S Agrawal

- Verbal and Non-Verbal reasoning by R S Agrawal

## INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS

| | | | | | |
|---|---|---|---|---|---|
| **Sub Code** | **:** | **21SCS60** | **IA Marks** | **:** | **00** |
| **Hrs/ Week** | **:** | | **Credits** | **:** | **01** |

**Course Objectives:**

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

**Course Outcomes:**

On completion of this course, students will be able to:

**CO1**: Have exposure on the latest development
**CO2**: Acquire new skills
**CO3**: Become Industry ready
**CO4**: Have more confidence
**CO5:** Get additional knowledge

**About the Course:**

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.