# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | B. Tech –IT | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DC | Subject Code: | IT 501 | Subject Name | | Mobile Application Development | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

**Prerequisites:**

Basic knowledge of programming skills.

**Course Objective:**

- To facilitate students to understand **Android SDK**.
- To help students to gain a basic understanding of **Android application development**.
- To inculcate working knowledge of **Android Studio development** tool.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file. | 8 |
| II | Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions. | 8 |
| III | Android User Interface Design Essentials include User Interface Screen Elements, Designing User Interfaces with Layouts, and Drawing and Working with Animation. | 8 |
| IV | Testing Android Applications, Publishing Android Applications, Using Android Preferences, Managing Application Resources in a Hierarchy, and Working with Different Types of Resources.. | 8 |
| V | Using Common Android APIs: Using Android Data and Storage APIs ,Managing data using SQLite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World. | 8 |
| Total Hours | | 40 |

**Course Outcomes:**

CO1: Identify various concepts of mobile programming that make it unique from programming for other platforms.

CO2: Critique mobile applications on their design, highlighting both pros and cons.

CO3: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.

CO4: Program mobile applications for the Android operating system that use both basic and advanced phone features.

CO5: Deploy applications to the Android marketplace for distribution.

**Text Books & Reference Books-**

1. T1.LaurenDarceyandShaneConder,"Android Wireless Application Development", Pearson Education, 2nd ed. (2011).
2. RetoMeier,"ProfessionalAndroid2ApplicationDevelopment",WileyIndiaPvtLtd.
3. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd.
4. Android Application Development All I none for Dummies by Barry Burd, Edition.

**List/Links of e-learning resource**

- https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination..

**CO-PO Mapping:**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO-1 |  | 2 |  |  | 2 |  |  |  |  |  |  | 2 | 1 | 2 |
| CO-2 | 2 | 3 |  | 2 | 1 |  |  |  |  |  | 1 | 2 | 3 | 3 |
| CO-3 | 2 | 3 | 3 | 2 |  |  |  |  |  |  |  | 2 | 2 | 2 |
| CO-4 | 2 | 2 |  | 2 |  |  |  |  |  |  |  | 2 | 3 | 3 |
| CO-5 | 2 | 2 | 2 |  |  |  |  |  |  |  |  | 2 | 3 | 3 |

**Suggestive list of experiments:**

- Develop an application that uses **GUI components, fonts, and colors**. *(CO1)*
- Develop an application that uses **Layout Managers and event listeners**. *(CO1)*
- Write an application that draws **basic graphical primitives** on the screen. *(CO2)*
- Develop an application that makes use of **databases**. *(CO2)*
- Develop an application that makes use of **Notification Manager**. *(CO2)*
- Implement an application that uses **Multi-threading**. *(CO3)*
- Develop a native application that uses **GPS location information**. *(CO3)*
- Implement an application that writes data to the **SD card**. *(CO4)*
- Implement an application that creates an **alert upon receiving a message**. *(CO4)*
- Write a mobile application that makes use of an **RSS feed**. *(CO5)*
- Develop a mobile application to **send an email**. *(CO5)*

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | Department of IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DC | Subject Code: | | IT502 | | Subject Category | Wireless & Mobile Computing | | | |
| Maximum Marks Allotted | | | | | | | Total Marks Quiz | Contact Hours | | | Total Credits |
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | Theory Quiz |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

**Prerequisites:**
- Basic concept of Communication systems.
- Basic knowledge of programming skills.

**Course Objective:**

1. To provide an overview of **wireless communication networks** and their applications in communication engineering.
2. To introduce various **standards of mobile communication**.
3. To explain the various **terminology, principles, devices, schemes, and concepts** used in wireless communication networks.
4. To introduce the concepts of **ad hoc networks and sensor networks**, along with their issues.
5. To introduce various **security threats in wireless networks** and the techniques for prevention and detection of such threats.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Antenna, radiation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access techniques – SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA. Cellular network organization, operations of cellular systems, mobile radio propagation effects, handoff, power control, sectorization, traffic engineering, infinite sources, lost calls cleared, grade of service, Poisson arrival process. | 8 |
| II | GSM – Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS – architecture, interfaces, channels, mobility management, DECT, TETRA, UMTS. | 8 |
| III | IEEE 802.11: LAN architecture, 802.11a, b and g, protocol architecture, physical layer, MAC layer, MAC management. HIPERLAN: protocol architecture, physical layer, access control sublayer, MAC sublayer. Bluetooth: user scenarios, physical layer, MAC layer. | 8 |
| IV | Mobile IP, DHCP, Ad hoc networks: Characteristics, Performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer : Indirect TCP, Snooping TCP, Mobile TCP, Timeout freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP. | 8 |
| V | Intruders, intrusion detection, password management, viruses and related threats, worms, Trojan horse defense, difference between biometrics and authentication systems, and firewall design principles. | 8 |

| Total Hours | | 40 |
|---|---|---|

## Course Outcomes:

- **CO1**: Explain the basic concepts of wireless networks and wireless generations.
- **CO2**: Demonstrate the different wireless technologies such as CDMA, GSM, GPRS, etc.
- **CO3**: Explain the design considerations for deploying wireless network infrastructure.
- **CO4**: Appraise the importance of ad hoc networks such as MANET and wireless sensor networks.
- **CO5**: Differentiate and support the security measures, standards, services, and layer-wise security considerations.

## Text Book & Reference Books-

1 J. Schiller, "Mobile Communication", Addision, Wiley.
2 William Stalling,"Wireless Communication and Network", Pearson Education.3UpenaDalal,
3 "Wireless Communication",OxfordHigher Education.
4 Dr. Kamilo Feher, "Wireless Digital communication", PHI.
5 William C.Y Lee, "Mobile Communication Design Fundamental", John Wiley.

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination..

## CO-PO Mapping:

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | |
| CO-2 | | 3 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 3 | 3 | 3 | 2 | | | | | | | | | |
| CO-4 | | 2 | 3 | 3 | | | | | | | | | | |
| CO-5 | | 3 | 2 | 3 | | | | | | | | | | |

## Suggestive list of experiments:

- To implement mobile networks using open-source software such as **NS2**, etc. **(CO1)**
- To implement **Code Division Multiple Access (CDMA)**. **(CO1)**
- To write a program to implement the concept of **frequency reuse** when given the size of a geographical area and the set of available frequencies. **(CO2)**
- To study the **OPNET tool** for modeling and simulation of different cellular standards. **(CO2)**
- To study and analyze **wired networks**. **(CO3)**
- To study and analyze **wireless networks**. **(CO3)**
- To study and analyze **Bluetooth**. **(CO4)**
- To study **Mobile IP**. **(CO4)**
- To write programs using **WML (Wireless Markup Language)**. **(CO5)**

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College),VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DC | Subject Code: | | IT 503 | | Subject Name | Artificial Intelligence | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks | L | T | P | |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

## Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics.

## Course Objective:

1. Identify problems that are amenable to solution by AI methods, and determine which AI methods may be suited to solving a given problem.
2. Review classical problem-solving approaches: search, forward chaining, and backward chaining.
3. Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, a constraint satisfaction problem, or a planning problem).

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Definitions – foundation and history of AI, evolution of AI, applications of AI, classification of AI systems with respect to environment. Artificial Intelligence vs. Machine Learning, Tic-Tac-Toe problem. Intelligent Agent – concept of rationality, nature of environment, structure of agents. | 8 |
| II | Heuristic Search Techniques: generate-and-test, hill climbing, properties of the $A$ algorithm, best-first search, and problem reduction. Constraint satisfaction problem: interference in CSPs, backtracking search for CSPs, local search for CSPs, and structure of CSP problems. Beyond classical search: local search algorithms and optimization problems, local search in continuous spaces, searching with nondeterministic action and partial observation, online search agents, and unknown environments.. | 8 |
| III | Game playing – knowledge representation, knowledge representation using predicate logic, introduction to predicate calculus, resolution, use of predicate calculus, knowledge representation using other logic, and structured representation of knowledge. | 8 |
| IV | Nonlinear planning using constraint posting, hierarchical planning, reactive systems, and other planning techniques. Natural language processing: syntactic processing, semantic analysis, discourse, and pragmatic processing. Hopfield network, learning in neural networks, applications of neural networks, recurrent networks, distributed representations, connectionist AI, and symbolic AI. | 8 |
| V | Developments Process, knowledge Acquisition. PROLOG Introduction, syntax and numeric functions Numeric, Function, Basic List Manipulation, Functions, Predicates and Conditional, input, output and Local Variables, iteration and Recursion, Property Lists and Arrays , LISP and other AI Programming Languages. | 8 |
| Total Hours | | 40 |

## Course Outcomes:

- **CO1**: Describe various searching methods and reasoning in AI.
- **CO2**: Explain the uses of knowledge representation techniques.
- **CO3**: Analyze the concepts of reasoning and planning.
- **CO4**: Illustrate the concepts of natural language processing (NLP) and neural networks (NN).
- **CO5**: Apply and evaluate AI techniques using PROLOG and LISP.

## Text Book & Reference Books-

1. Artificial Intelligence – by Elaine Rich and Kevin Knight (2nd Edition), Tata McGraw-Hill
2. Introduction to Prolog Programming – by Carl Townsend
3. Programming with PROLOG – by Klocksin and Mellish
4. Artificial Intelligence (Fifth Edition) – by George F. Luger, Pearson Education
5. Artificial Intelligence (Second Edition) – by Stuart Russell and Peter Norvig, Pearson Education
6. Artificial Intelligence Application Programming – by Tim Jones, Wiley India
7. Artificial Intelligence and Expert Systems – by D. W. Patterson

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluationa nd Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

## CO-PO Mapping:

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | |
| CO-2 | | 3 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 3 | 3 | 3 | 2 | | | | | | | 2 | 2 | 2 |
| CO-4 | | 2 | 3 | 3 | | | | | | | | 3 | 3 | 3 |
| CO-5 | | 3 | 2 | 3 | | | | | | | | 3 | 3 | 3 |

## Suggestive list of experiments:

1. Write a program to solve the **8 Queens problem**. **(CO1)**
2. Solve any problem using **Depth First Search (DFS)**. **(CO2)**
3. Solve any problem using **Best First Search**. **(CO2)**
4. Solve the **8-Puzzle problem** using Best First Search. **(CO3)**
5. Solve the **Travelling Salesman Problem (TSP)**. **(CO4)**
6. Write a program to solve the **Monkey Banana problem**. **(CO5)**
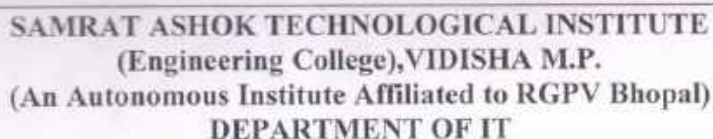
| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | Department of IT |

## SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
### (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
### DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-1 | Subject Code: | | IT504 (A) | Subject Name | | Block chain Technology | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 0 | 0 | 3 |

### Prerequisites:

Basic Knowledge of mathematics.

### Course Objective:

1) Technology behind blockchain
2) Emerging trends in blockchain.
3) Real-world applications of blockchain

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction to Blockchain Technology: basic ideas behind blockchain, how it is changing the landscape of digitalization, introduction to cryptographic concepts, hashing, public key cryptosystems, private vs. public blockchain and their use cases, and hash puzzles. | 8 |
| II | Blockchain Fundamentals: basic architecture of blockchain, different terminologies associated characteristics of blockchain, types of networks, and introducing the smart contract concept in blockchain. | 8 |
| III | Components of Blockchain: core components of blockchain, types of blockchains, blockchain protocol, permission and permission less blockchains., | 8 |
| IV | Digital Ledger: short history of money and trust, Bitcoin mechanics, introduction to Ethereum, introduction to Hyperledger, Hyperledger Fabric and its architecture, Hyperledger Composer. Emerging Trends in Blockchain: cloud-based blockchain, MultiChain, Geth, Stellar, Ripple, R3 Corda, blockchain API, and blockchain sandboxes. | 8 |
| V | Blockchain Use Cases: supply chain management, finance, healthcare, Internet of Things (IoT), remittance, land records, voting and election, loyalty programs, and Go Green (renewable energy). | 8 |
| Total Hours | | 40 |

### Course Outcomes:

CO1: Understand the basic concepts, principles, and applications of blockchain.
CO2: Understand the basic architecture of blockchain and the characteristics of blockchain.
CO3: Explain the core components of blockchain, types of blockchains, and blockchain protocols.
CO4: Compare the working of different blockchain platforms.

CO5: Analyze the importance of blockchain in finding solutions to real-world problems.

### Text Book & Reference Books-

1. Artemis Caro – *Blockchain: The Beginner's Guide to Understanding the Technology Behind Bitcoin & Cryptocurrency*
2. Scott Marks – *Blockchain for Beginners: Guide to Understanding the Foundation and Basics of the Revolutionary Blockchain Technology*, Create Space Independent Publishing Platform
3. Mark Watney – *Blockchain for Beginners*
4. Alwyn Bishop – *Blockchain Technology Explained*

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/ Assignments, termwork, end semester practical examination.

## CO-PO Mapping:

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | 1 |
| CO-2 | | 2 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 1 | 2 | 3 | 2 | | | | | | | | 1 | |
| CO-4 | | 2 | 3 | 2 | | | | | | | | 1 | | 2 |
| CO-5 | 2 | | 2 | | 2 | | | | 1 | | | | 1 | |

## Suggestive list of experiments:

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | Department of IT |

| Semester/Year | | VI/III | | Program | | | B. Tech– IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-1 | Subject Code: | IT504 (B) | Subject Name | | | Digital Image Processing | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | L | T | P | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | | | | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 0 | 0 | 3 |

### Prerequisites:

Knowledge of computer programming languages and MATLAB.

### Course Objective:

A) To study the image fundamentals and mathematical transforms necessary for image processing.
B) To study the image enhancement techniques.
C) To study image restoration procedures.
D) To study the image compression procedures.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Digital Image Fundamentals: a simple image model, sampling and quantization, relationship between pixels, imaging geometry, image acquisition systems, and different types of digital images. | 8 |
| II | Image Transformations: introduction to Fourier transforms, discrete Fourier transforms, fast Fourier transform, Walsh transformation, Hadamard transformation, and discrete cosine transformation. | 8 |
| III | Image Enhancement Filters in spatial and frequency domains: histogram-based processing, image subtraction, averaging, image smoothing, median filtering, low-pass filtering, and image sharpening by high-pass filtering. | 8 |
| IV | Image Encoding and Segmentation: encoding methods such as mapping, quantizer, and coder; error-free compression, lossy compression schemes, JPEG compression standard; detection of discontinuities by point detection, line detection, and edge detection; edge linking and boundary detection; local analysis and global processing via Hough transforms and graph-theoretic techniques. | 8 |
| V | Mathematical Morphology: binary operations, dilation, crosses, opening and closing, simple methods of representation, signatures, boundary segments, skeleton of a region, and polynomial approximation. | 8 |
| Total Hours | | 40 |

### Course Outcomes:

- **CO1**: Ability to apply principles and techniques of digital image processing in applications related to the design and analysis of digital imaging systems.
- **CO2**: Ability to analyze and implement image processing algorithms to solve real problems.
- **CO3**: Gain hands-on experience in using software tools for processing digital images.
- **CO4**: Interpret image segmentation and representation techniques.
- **CO5**: Apply mathematical morphology using polynomial approximation.

## Text Books & Reference Books-

1. Rafael C. Gonzalez & Richard E. Woods – *Digital Image Processing* (3rd Edition), Pearson
2. Sonka – *Digital Image Processing & Computer Vision*, Cengage Learning
3. Jayaraman – *Digital Image Processing*, TMH
4. Pratt – *Digital Image Processing*, Wiley India
5. Annadurai – *Fundamentals of Digital Image Processing*, Pearson Education

1.

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

## CO-PO Mapping:

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | 1 |
| CO-2 | | 2 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 1 | 2 | 3 | 2 | | | | | | | | 1 | |
| CO-4 | | 2 | 3 | 2 | | | | | | | | 1 | | 2 |
| CO-5 | 2 | | 2 | | 2 | | | | 1 | | | | 1 | |

## Suggestive list of experiments:

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | Department of IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)

## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | B.Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-1 | Subject Code: | IT504(C) | Subject Name | | Natural Language Processing | | | |

| Maximum Marks Allotted | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | Total Marks | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | L | T | P | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 0 | 0 | 3 |

## Prerequisites:

Basic knowledge of algorithms and discrete mathematics.

## Course Objective:

1. Natural language processing deals with written text.
2. Learn how to process written text from basic fundamental knowledge.
3. Regular expressions and probabilistic models with n-grams.
4. Recognizing speech and parsing with grammar.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction to NLP: history of NLP, advantages of NLP, disadvantages of NLP, components of NLP, applications of NLP, build an NLP pipeline, phases of NLP, NLP APIs, and NLP libraries. | 8 |
| II | Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical comparison of smoothing techniques, Applications of language modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition. | 8 |
| III | Words and Word Forms: Bag of Words, Skip-gram, Continuous Bag-of-Words, Embedding representations for words, Lexical Semantics, Word Sense Disambiguation, Knowledge-based and Supervised Word Sense Disambiguation. | 8 |
| IV | Text Analysis, Summarization and Extraction: Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in multilingual settings, NLP in Information Retrieval, Cross-Lingual IR. | 8 |
| V | Machine Translation (MT): Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translation, Rule-Based Machine Translation, Knowledge-Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models using EM), Encoder-Decoder Architecture, Neural Machine Translation. | 8 |
| Total Hours | | 40 |

## Course Outcomes:

- **CO1**: Understand and comprehend the key concepts of NLP and identify the challenges and issues.
- **CO2**: Develop language modeling for various text corpora across different languages.
- **CO3**: Illustrate computational methods to understand language phenomena such as word sense Disambiguation
- CO4 : Design and develop applications for text or information extraction/summarization/classification.
- CO5: Apply different Machine translation techniques for translating a source to target

## List/Links of e-learning resource
- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

## CO-PO Mapping

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁₀ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 2 | 3 | 1 |
| CO-2 |  | 2 | 3 | 2 | 3 |  |  |  |  |  |  |  |  |  |
| CO-3 | 2 | 1 | 2 | 3 | 2 |  |  |  |  |  |  |  | 1 |  |
| CO-4 |  | 2 | 3 | 2 |  |  |  |  |  |  |  | 1 |  | 2 |
| CO-5 | 2 |  | 2 |  | 2 |  |  |  | 1 |  |  |  | 1 |  |

| | | |
|---|---|---|
| Recommendation by Board of studies on | | |
| Approval by Academic council on | | |
| Compiled and designed by | | |
| Subject handled by department | | Department of IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College),VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | | V/III | | Program | | | B. Tech –IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-1 | Subject Code: | | IT505(A) | | Subject Name | | Mobile Application Development | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 0 | 0 | 3 |

**Prerequisites:**

Basic knowledge of programming skills.

**Course Objective:**

1. To facilitate students to understand Android SDK.
2. To help students gain a basic understanding of Android application development.
3. To inculcate working knowledge of Android Studio development tool.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | **Introduction to Android**: The Android Platform, Android SDK, Eclipse Installation, Android Installation, building your first Android application, understanding anatomy of an Android application, Android Manifest file. | 8 |
| II | **Android Application Design Essentials**: Anatomy of Android applications, Android terminologies, Application Context, Activities, Services, Intents, receiving and broadcasting Intents, Android Manifest file and its common settings, using Intent Filter, Permissions. | 8 |
| III | **Android User Interface Design Essentials**: User interface screen elements, designing user interfaces with layouts, drawing and working with animation. | 8 |
| IV | **Testing Android Applications and Publishing**: Testing Android applications, publishing Android applications, using Android preferences, managing application resources in a hierarchy, working with different types of resources. | 8 |
| V | **Using Common Android APIs**: Using Android Data and Storage APIs, managing data using SQLite, sharing data between applications with Content Providers, using Android Networking APIs, using Android Web APIs, using Android Telephony APIs, deploying Android applications to the world. | 8 |
| **Total Hours** | | 40 |

- **CO1**: Identify various concepts of mobile programming that make it unique from programming for other platforms.
- **CO2**: Critique mobile applications on their design pros and cons.
- **CO3**: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
- **CO4**: Program mobile applications for the Android operating system that use basic and advanced phone features.
- **CO5**: Deploy applications to the Android marketplace for distribution.

**Text Books & Reference Books-**

- Lauren Darcey and Shane Conder – *Android Wireless Application Development*, Pearson Education, 2nd Edition (2011).
- Reto Meier – *Professional Android 2 Application Development*, Wiley India Pvt. Ltd.
- Mark L. Murphy – *Beginning Android*, Wiley India Pvt. Ltd.
- Barry Burd – *Android Application Development All-in-One For Dummies*, Edition.

## List/Links of e-learning resource
- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

## CO-PO Mapping:

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|--|
| CO-1 |     | 2   |     |     | 2   |     |     |     |     |     |      | 2    | 1    | 2    |  |
| CO-2 | 2   | 3   |     | 2   | 1   |     |     |     |     |     | 1    | 2    | 3    | 3    |  |
| CO-3 | 2   | 3   | 3   | 2   |     |     |     |     |     |     |      | 2    | 2    | 2    |  |
| CO-4 | 2   | 2   |     | 2   |     |     |     |     |     |     |      | 2    | 3    | 3    |  |
| CO-5 | 2   | 2   | 2   |     |     |     |     |     |     |     |      | 2    | 3    | 3    |  |

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-1 | Subject Code: | | IT505(B) | Subject Name | | Analog and Digital Communication | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 0 | 0 | 3 |

## Prerequisites:

Basic Knowledge of Signals and Systems, probability.

## Course Objective:

1. Understanding analog communication systems with design and analysis of various basic modulation systems.
2. Understanding digital communication systems with design and analysis of various basic digital modulation systems.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction to Communication Systems – Modulation – Types – Need for Modulation. Theory of Amplitude Modulation (AM). Evolution and Description of Single Sideband (SSB) Techniques. Theory of Frequency Modulation (FM) and Phase Modulation (PM). Comparison of Analog Communication Systems. Generation and Detection of AM and FM. | 8 |
| II | **Pulse Communication**: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse Code Modulation (PCM) – Comparison of various pulse communication systems. **Data Communication**: History of data communication – Standards and organizations for data communication – Data communication circuits – Data communication codes – Data communication hardware (serial and parallel interfaces). Experiments on PAM, PPM, PWM, Sampling, PCM | 8 |
| III | Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) – Phase Shift Keying (PSK) – Binary Phase Shift Keying (BPSK) – Quadrature Phase Shift Keying (QPSK) – Quadrature Amplitude Modulation (QAM) – 8QAM – 16QAM – Bandwidth Efficiency – Comparison of various Digital Communication Systems – Experiments on ASK, FSK, and PSK. | 8 |
| IV | Entropy, Source Encoding Theorem, Shannon–Fano Coding, Huffman Coding, Mutual Information, Channel Capacity, Error Control Coding, Linear Block Codes, Cyclic Codes, ARQ Techniques, Simulation of error control coding schemes. | 8 |
| V | Global System for Mobile Communications (GSM) – Code Division Multiple Access (CDMA) – Cellular Concept and Frequency Reuse – Channel Assignment and Handover Techniques – Overview of Multiple Access Schemes – Satellite Communication. Communication–Bluetooth. Simulation of Communication link | 8 |
| **Total Hours** | | 40 |

## Course Outcomes:

- **CO-1**: Analyze analog communication techniques.
- **CO-2**: Describe data and pulse communication systems.
- **CO-3**: Demonstrate various digital communication techniques.
- **CO-4**: Design and implement error control coding schemes.
- **CO-5**: Utilize multi-user radio communication.

## Text Books & Reference Books-

1. Simon Haykin – *Communication Systems*, 4th Edition, John Wiley & Sons, 2004.
2. Rappaport T. S. – *Wireless Communications: Principles and Practice*, 2nd Edition, Pearson Education, 2007.
3. H. Taub, D. L. Schilling, and G. Saha – *Principles of Communication*, 3rd Edition, Pearson Education, 2007.
4. Blake – *Electronic Communication Systems*, Thomson Delmar Publications, 2002.
5. B. Sklar – *Digital Communication Fundamentals and Applications*, 2nd Edition, Pearson Education, 2007.

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

## CO-PO Mapping:

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | 1 |
| CO-2 | | 2 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 1 | 2 | 3 | 2 | | | | | | | | 1 | |
| CO-4 | | 2 | 3 | 2 | | | | | | | | 1 | | 2 |
| CO-5 | | 1 | 2 | 3 | | | | | | | | | 2 | |

## Suggestive list of experiments:

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

| Semester/Year | | V/III | | Program | | | B. Tech IT | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-1 | Subject Code: | | IT505(C) | | Subject Name | Communication System | | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks | L | T | P | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 0 | 0 | 3 |

**Prerequisites:**

Knowledge of calculus.

**Course Objective:**

- The purpose of the course is to teach the fundamental principles of communications.
- To equip students with various issues related to analogue communication such as modulation, demodulation, transmitters, receivers, and noise performance.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | **Signals Analysis:** Review of Fourier Transformation, signal transformation and its properties through linear systems, signal distortion in transmission, bandwidth and rise time, energy and power density, Parseval's theorem for energy and power signals, convolution and correlations. | 8 |
| II | **Linear Modulation:** Necessity of modulation, principle of amplitude modulation, generation and detection of DSB-SC, SSB-SC and VSB-SC, AM-LC, comparison of various AM systems, Frequency Division Multiplexing (FDM) and Time Division Multiplexing (TDM). | 8 |
| III | **Angle Modulation:** Definition and relationship between PM and FM frequency deviation, Bessel's function, spectrum and transmission bandwidth of FM, Narrowband FM (NBFM), Wideband FM (WBFM), phase diagram of FM signals in FM systems, comparison of AM and FM systems.<br><br>**Digital Modulation:** Block diagram of PCM system, inter-symbol interference, companding, Delta Modulation (DM), limitations of DM, Adaptive Delta Modulation (ADM), comparison between PCM and DM, Differential PCM (DPCM). | 8 |
| IV | **Radio Transmitter and Receiver:** Different types of AM and FM transmitters and receivers, AM and FM standard broadcast, calculation of noise for signal and cascaded stages, noise performance of analog communication systems (SNR, Noise figure), line codes. **Data Transmission:** Generation and detection of ASK, FSK, PSK, DPSK, QPSK. | 8 |
| V | **Information Theory:** Unit of Information, Entropy, Rate of Information, Joint & Conditional Entropy, Mutual Information, Channel Capacity, Shannon's Theorem, Shannon–Hartley Theorem, Coding Efficiency, Shannon–Fano Coding, Huffman Coding, Block Codes. | 8 |
| **Total Hours** | | 40 |

**Course Outcomes:**

CO-1: Explain the fundamentals of analog and digital Signals and Communication System
CO-2: Apply Fourier Transform to communication signals and derive the power spectral density of signals.
CO-3: Define, formulate and analyze various techniques for amplitude and angle modulation.
CO-4: Analyze different techniques for digital data transmission and analyze the performance of spread spectrum communication systems.
CO-5: Understand the fundamentals of Information Theory.

Text Books

- Taub and Schilling – *Principles of Communication Systems*, TMH.

- Simon Haykin – *Digital Communication*, John Wiley.

### Reference Books

- G. Kennedy – *Electronic Communication Systems*, TMH.
- J. G. Proakis – *Digital Communications*, MGH.

**CO-POMapping:**

| COs | PO$_1$ | PO$_2$ | PO$_3$ | PO$_4$ | PO$_5$ | PO$_6$ | PO$_7$ | PO$_8$ | PO$_9$ | PO$_1$ | PO$_{11}$ | PO$_{12}$ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 1 | 1 | 2 | | | | | | | | | | 1 | 2 |
| CO-2 | 2 | 2 | 2 | | | | | | | | | | 1 | 2 |
| CO-3 | 2 | 1 | 2 | | | | | | | | | | 1 | 2 |
| CO-4 | 2 | 1 | 2 | | | | | | | | | | | 2 |
| CO-5 | 2 | 2 | 1 | | | | | | | | | | 1 | 2 |

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | Department of IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DLC | Subject Code: | IT-506 | Subject Category | | IT Workshop(Matlab / Scilab ) | | | |

| Maximum Marks Allotted | | | | | | | Total Marks Quiz | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | Theory Quiz |
| - | - | - | - | 30 | 10 | 10 | 50 | 0 | 0 | 4 | 2 |

**Prerequisites:**

Nil

**Course Objective:**

The student should be made:

- Familiar with the MATLAB GUI and basic toolboxes
- Exposed to vector and matrix operations
- Familiar with arithmetic, logical, and relational operations on matrices
- Practice script writing, function files, graph plotting, conditional statements, and iterative statements in MATLAB

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | **Introductory Sessions of MATLAB Training Course**: Why MATLAB, MATLAB Interface, Introduction to Arrays and Matrices, MATLAB File Types, Basics of MATLAB Programming, Handling Data and Data Flow in MATLAB, Data Types, Creating Variables, Scalars, Vectors, and Matrix Operations & Operators. | 8 |
| II | Define and writing of **Script Files**, Define and writing of **Function Files**. | 8 |
| III | **MATLAB Graphics**: Simple graphics & types, plotting functions. **Creating and Editing Plots** (2D & 3D), handling graphics. | 8 |
| IV | **MATLAB Programming**: Conditional statements, iterative statements, flow control | 8 |
| V | Efficient Coding Practices, Linear Algebra, Polynomials, Curve Fitting, Differentiation & Integration, Introduction to MATLAB Toolboxes. | 8 |
| **Total Hours** | | 40 |

**Course Outcomes:**

The students will be able to:

- Learn and understand about basic data types, variables, scalars in MATLAB
- Write script and function files in MATLAB
- Plot and handle different kinds of graphs in MATLAB
- Program conditional and iterative statements
- Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

**Text Book & Reference Books-**

Text Books:- Rudra Pratap Singh – *Getting Started with MATLAB*, Seventh Edition, Oxford

## Reference Books

1. Holly Moore – *MATLAB for Engineers*, Third Edition, Pearson Publications
2. Stephen J. Chapman – *MATLAB Programming for Engineers*, Fourth Edition, Thomson Learning

## List/Links of e-learning resource

https://onlinecourses.nptel.ac.in/noc22_ma31/preview

- Learn and understand about basic data types, variables, scalars in MATLAB.
- Write script and function files in MATLAB.
- Plot and handle different kind of graphs in MATLAB.
- Program conditional and iterative statements
  Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in Quiz, term work, end semester practical examination.

## CO-PO Mapping:

| COs | PO$_1$ | PO$_2$ | PO$_3$ | PO$_4$ | PO$_5$ | PO$_6$ | PO$_7$ | PO$_8$ | PO$_9$ | PO$_1$ | PO$_{11}$ | PO$_{12}$ | PSO1 | PSO2 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| CO-1 | 3 | 1 | 3 |  | 3 |  |  |  |  |  |  |  |  |  |
| CO-2 | 3 | 1 | 3 |  | 3 |  |  |  |  |  |  |  |  |  |
| CO-3 | 3 | 1 | 3 |  | 3 |  |  |  |  |  |  |  |  |  |
| CO-4 | 3 | 1 | 3 |  | 3 |  |  |  |  |  |  |  |  |  |
| CO-5 | 3 | 1 | 3 | 1 | 3 |  |  |  |  |  |  |  |  |  |

## Suggestive list of experiments:

1. Introduction to SDK of MATLAB. CO1
2. Basic Syntax and scalar arithmetic operations and calculations. CO1
3. Working with formulas. CO1
4. Arithmetic operations in matrix data. CO2
5. Matrix operations (Inverse, Transpose). CO2
6. Reading an image file. CO2
7. Reading from and writing to a text file. CO3
8. Introduction to tool boxes CO3
9. Data visualization and plotting CO4
10. Relational operators in data CO4
11. Logical operation in data CO4
12. Loops in MATLAB. CO5
13. Computing Eigen value for a matrix. CO5
14. Random number generation-Monte carlo methods. CO5

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech –IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DC | Subject Code: | IT601 | | Subject Name | | Data Mining and Warehousing | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks | L | T | P | |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

**Prerequisites:**

Basic knowledge of programming skills and data structures.

**Course Objective:**

1. To introduce data warehouse and its components,
2. To introduce knowledge discovery process, data mining and its functionalities,
3. To develop understanding of various algorithms for association rule mining and their differences,
4. To introduce various classification techniques,
5. To introduce various clustering algorithms.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Data Warehousing: Need for data warehousing , Basic elements of data warehousing, Data Mart, Data Warehouse Architecture, extract and load Process, Clean and Transform data, Star ,Snowflake and Galaxy Schemas for Multidimensional databases, Fact and dimension data, Partitioning Strategy-Horizontal and Vertical Partitioning, Data Warehouse and OLAP technology, Multidimensional data models and different OLAP Operations, OLAP Server: ROLAP, MOLAP, Data Ware house implementation, Efficient Computation of Data Cubes, Processing of OLAP queries, Indexing data. | 8 |
| II | Data Mining: Data Preprocessing, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Basics of Data Mining, Data Mining Techniques, KDP (Knowledge Discovery Process), Applications and Challenges of Data Mining. | 8 |
| III | **Mining Association Rules in Large Databases**: Association Rule Mining, Single Dimensional Boolean Association Rules, Multi-Level Association Rule, A priori Algorithm, FP-Growth Algorithm, Time Series Mining Association Rules, Latest Trends in Association Rules Mining.. | 8 |
| IV | **Classification and Clustering**: Distance Measures, Types of Clustering Algorithms, K-Means Algorithm, Decision Tree, Bayesian Classification, Other Classification Methods, Prediction, Classifier Accuracy, Categorization of Methods, Outlier Analysis. | 8 |
| V | Introduction of Web Mining and its Types, Spatial Mining, Temporal Mining, Text Mining, Security Issues, Privacy Issues, Ethical Issues. | 8 |
| **Total Hours** | | 40 |

**Course Outcomes:**

CO1: Demonstrate an understanding of the importance of data warehousing and OLAP technology.
CO2: Organize and prepare the data needed for data mining using preprocessing techniques.
CO3: Implement the appropriate data mining methods like classification, clustering, or frequent pattern mining on various datasets.
CO4: Define and apply metrics to measure the performance of various data mining algorithms.
CO5: Demonstrate an understanding of data mining on various types of data like web data and spatial data..

## Text Book & Reference Books-

1. Arunk Pujari – *Data Mining Technique*, University Press
2. Han, Kamber – *Data Mining Concepts & Techniques*
3. M. Kaufman, P. Ponnian – *Data Warehousing Fundamentals*, John Wiley
4. M. H. Dunham – *Data Mining: Introductory & Advanced Topics*, Pearson Education
5. Ralph Kimball – *The Data Warehouse Lifecycle Toolkit*, John Wiley
6. E. G. Mallach – *The Decision Support & Data Warehouse Systems*, TMH

## List/Links of e-learning resource

- https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

## CO-PO Mapping:

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 |     | 2   |     |     | 2   |     |     |     |     |     |      | 2    | 1    | 2    |
| CO-2 | 2   | 3   |     | 2   | 1   |     |     |     |     |     | 1    | 2    | 3    | 3    |
| CO-3 | 2   | 3   | 3   | 2   |     |     |     |     |     |     |      | 2    | 2    | 2    |
| CO-4 | 2   | 2   |     | 2   |     |     |     |     |     |     |      | 2    | 3    | 3    |
| CO-5 | 2   | 2   | 2   |     |     |     |     |     |     |     |      | 2    | 3    | 3    |

## Suggestive list of experiments:

1. Data Processing Techniques: (i) Data Cleaning (ii) Data Transformation – Normalization (iii) Data Integration. CO1
2. Data Warehouse Schemas: Star, Snowflake, Fact Constellation. CO1
3. Data Cube Construction – OLAP operations. CO2
4. Data Extraction, Transformations, Loading operations. CO2
5. Implementation of Apriori Algorithm. CO3
6. Implement an application that uses Multi-threading. CO3
7. Implementation of FP-Growth Algorithm. CO4
8. Implementation of Decision Tree Induction. CO4
9. Classification of data using Bayesian approach. CO5
10. Classification of data using K-Nearest Neighbor approach. CO5
11. Implementation of K-Means Algorithm. CO5

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B.Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DC | Subject Code: | | IT602 | Subject Category | | Web Application Development | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total Marks Quiz | L | T | P | Theory Quiz |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | | | | |
| 60 | 20 | 10 | 10 | 30 | 10 | 10 | 150 | 3 | 0 | 2 | 4 |

**Prerequisites:**

**Course Objective:**

1. To introduce concepts of designing web pages using HTML, CSS, and JavaScript.
2. 2. To familiarize with JSP programming and XML.
3. 3. To impart PHP programming and master database access using PHP and MySQL.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | **Introduction:** Concept of WWW, Internet and WWW. **HTTP Protocol:** Request and Response, Web Browser and Web Servers. **Features of Web 2.0 Web Design:** Concepts of effective web design, web design issues including browser, bandwidth and cache, display resolution, look and feel of the website, page layout and linking, user-centric design, sitemap, planning and publishing website, designing effective navigation. | 8 |
| II | **HTML:** Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, meta tags, character entities, frames and framesets, browser architecture and website structure, overview and features of HTML5. | 8 |
| III | **Style Sheets:** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, overview and features of CSS3. **JavaScript:** Client-side scripting with JavaScript, variables, functions, conditions, loops and repetition, pop-up boxes. **Advanced JavaScript:** JavaScript and objects, JavaScript own objects, the DOM and web browser environments, manipulation using DOM, forms and validations. **DHTML:** Combining HTML, CSS and JavaScript, events and buttons. | 8 |
| IV | **XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and schemas, using XML with application, transforming XML using XSL and XSLT. **PHP:** Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, arrays, functions, browser control and detection, string, form processing, files. **Advanced Features:** Cookies and sessions, object-oriented programming with PHP. | 8 |
| V | **PHP and MySQL:** Basic commands with PHP examples. | 8 |

| | Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs. | |
|---|---|---|
| **Total Hours** | | 40 |

## Course Outcomes:

CO1: The students will be able to understand the concept of WWW, Internet and planning, designing and publishing of website;

CO2 understand and apply concepts of HTML;

CO3: design dynamic web pages using HTML, CSS and JavaScript;

CO4: understand and apply concepts of XML;

CO5: Connect to MySQL using PHP and perform various operations

## Text Books & Reference Books-

### Text Book

1. Web Technologies, Uttam K. Roy, Oxford University Press.
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill.

### Reference Books:

1. Web Programming: Building Internet Applications, Chris Bates, 2nd Edition, Wiley Dream tech.
2. Java Server Pages – Hans Bergsten, SPD O'Reilly.
3. JavaScript, D. Flanagan, O'Reilly, SPD.
4. Beginning Web Programming – Jon Duckett, WROX.
5. Programming the World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to Program, Dietel and Nieto, Pearson.

## List/Links of e-learning resource

https://nptel.ac.in/courses/106106156

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quiz/assignments, term work, and end-semester practical examination.

## CO-PO Mapping:

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 2 | 3 | 1 | | | | | | | | | | |
| CO-2 | 3 | | 3 | | 3 | | | | | | | | | |
| CO-3 | 3 | 2 | 3 | | 3 | | | | | | | | | |
| CO-4 | 3 | 2 | 3 | | 3 | | | | | | | | | |
| CO-5 | 3 | 2 | 3 | | 3 | | | | | | | | | |

## Suggestive list of experiments:

1. Design the following static web pages required for an online book store web site.
   i. Home Page ii. Login Page iii. Catalogue Page

2. Design the following static web pages required for an online book store web site.
   i. Registration Page ii. Cart Page

3. Design a web page using CSS which includes the following:
   i. Use different font and text styles
   ii. Set a background image for both the page and single element on the page.
   iii. Define styles for links
   iv. Working with layers
   v. Adding a Customized cursor

4. i. Write a JavaScript to validate the fields of the login page.
   ii. Write a JavaScript to validate the fields of the Registration page

5. Write an XML file which will display the Book information which includes the following: Title of the book, Author Name, ISBN number, Publisher name, Edition and Price. Validate the above document using DTD and XML Schema.

6. i. Write a PHP program to validate the fields of the login page.
   ii. Write a PHP program to validate the fields of the Registration page

7. Write a JSP to connect to the database and extract data from the tables and display them to the

user.

8. Design a JSP to insert the details of the users who register through the registration page and store the details in to the database.

9. Write a PHP program to connect to MySQL database which retrieves the data from the tables and display them to the user.

10. Write a PHP program to insert the details entered by the user in the Registration form into MySQL database.

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

22/12/20

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College),VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | | Program | | B.Tech – Information Technology | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-2 | Subject Code: | | IT 603(A) | | Subject Name | Cloud Computing | | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS⁷ | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 1 | 0 | 4 |

**Prerequisites:**

• Basic Knowledge of algorithms, Discrete Mathematics Computer Networks.

**Course Objective:**

• To learn how to use Cloud Services.
• To implement Virtualization.
• To implement Task Scheduling algorithms.
• To apply Map-Reduce concepts to applications.
• To build a Private Cloud.
• To broadly educate students to understand the impact of engineering on legal and social issues Involved.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction to Cloud Computing: Cloud Types and Models – NIST model, Cloud Cube model, Deployment models, Service models, Reference model. Characteristics, Benefits, and Advantages of cloud computing. Cloud Architecture – Infrastructure, Platforms, Virtual appliances, Communication protocols, Applications. Connecting to the Cloud – Client services, Applications, Types of connections. | 8 |
| II | Abstraction and Virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D), Load Balancing, Network resources, Application Delivery Controller and Application Delivery Network, Google Cloud. Hypervisors: Virtual machine technology and types, VMware vSphere, Machine Imaging. Distinction between SaaS and PaaS.. | 8 |
| III | Application frameworks, Google Web Services, Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and services, AdWords, Google Analytics, Google Translate, Google Toolkit, features of Google App Engine service, Amazon Web Service components and services: Amazon Elastic Cloud, Amazon Simple Storage System, Amazon Elastic Block Store. | 8 |
| IV | Windows Azure platform: Microsoft's approach, architecture, and main elements, AppFabric, Content Delivery Network, SQL Azure, and Windows Live services, types of services, consulting, configuration, customization and support, cloud management, network management systems, vendors, monitoring cloud computing deployment stack, lifecycle management of cloud services. | 8 |
| V | Cloud security concerns, service boundary, security of data, brokered cloud storage access, storage location and tenancy, encryption, auditing and compliance, identity management. Service-Oriented Architecture, message-based transactions, protocol stack for an SOA architecture, event-driven SOA, system abstraction, cloud bursting. applications, APIs. | 8 |
| **Total Hours** | | 40 |

**Course Outcomes:**

CO1: Describe the principles of cloud computing from existing technologies.
CO2: Implement different types of Virtualization technologies and Abstraction.
CO3: Elucidate the concepts of Google Cloud Computing architecture.
CO4: Analyze the issues in Resource provisioning and Security governance in clouds.
CO5: Choose among various cloud technologies and Service Oriented Architecture.

**Text Book**

| 1. Cloud Computing–Second Edition by Dr. Kumar Saurabh, Wiley India |
|---|
| 2.Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt.Ltd,2013. |

**Reference Books-**

1.Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited, 2013.

2. Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill.

3. Cloud Computing, Miller, Pearson.

4. Building applications in cloud: Concept, Patterns and Projects, Moyer, Pearson.

**List/Links of e-learning resource**

* https://nptel.ac.in/courses/117103063/

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

**CO-PO Mapping:**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO-1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | |
| CO-2 | | 3 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 3 | 3 | 3 | 2 | | | | | | | | | |
| CO-4 | | 2 | 3 | 3 | | | | | | | | | | |
| CO-5 | | 3 | 2 | 3 | | | | | | | | | | |

**Suggestive list of experiments:**

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech– IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-2 | Subject Code: | IT603 (B) | Subject Category | | | Sensor Network | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total Marks | L | T | P | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | | | | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 1 | 0 | 4 |

## Prerequisites:

- Basic knowledge of Data Communication Networks.

## Course Objective:

- To make students understand the basics of Wireless Sensor Networks.
- To familiarize students with learning the architecture of WSN.
- To understand the concepts of networking and networking in WSN.
- To study the design considerations of topology control and solutions to various problems.
- To introduce the hardware and software platforms and tools in WSN.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Overview of Wireless Sensor Networks – Single Node Architecture, Hardware Components, Network Characteristics, Unique Constraints and Challenges, Enabling Technologies for Wireless Sensor Networks, Types of Wireless Sensor Networks. | 9 |
| II | Architectures – Network Architecture, Sensor Networks Scenarios, Design Principles, Physical Layer and Transceiver Design Considerations, Optimization Goals and Figures of Merit, Gateway Concepts, Operating Systems and Execution Environments, introduction to Tiny OS and nes C, Internet to WSN Communication.. | 9 |
| III | Networking Sensors – MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols and Wakeup Concepts – SMAC, BMAC Protocol, IEEE 802.15.4 standard and Zig Bee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols, Energy-Efficient Routing, Geographic Routing.. | 8 |
| IV | Infrastructure Establishment – Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control. | 8 |
| V | Sensor Network Platforms and Tools – Sensor Node Hardware (Berkeley Motes), Programming Challenges, Node-level Software Platforms, Node-level Simulators, State-centric Programming. | 8 |
| Total Hours | | 40 |

## Course Outcomes:

- **CO1:** Understand challenges and technologies for wireless networks.
- **CO2:** Understand architecture and sensors.
- **CO3:** Describe the communication, energy efficiency, computing, storage, and transmission.
- **CO4:** Establish infrastructure and simulations.
- **CO5:** Explain the concept of programming in the WSN environment..

## Text Books & Reference Books-

1 Holger Karl & Andreas Willig, *Protocols and Architectures for Wireless Sensor Networks*, John Wiley, 2005

2 Feng Zhao & Leonidas J. Guibas, *Wireless Sensor Networks: An Information Processing Approach*, Elsevier, 2007.

3 Waltenegus Dargie & Christian Poellabauer, *Fundamentals of Wireless Sensor Networks: Theory and Practice*, John Wiley & Sons Publications, 2011.

4Kazem Sohraby, Daniel Minoli & Taieb Znati, *Wireless Sensor Networks: Technology, Protocols, and Applications*, John Wiley, 2007.

5Anna Hac, *Wireless Sensor Network Designs*, John Wiley, 2003.

**List/Links of e-learning resource**

*   https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid-semester tests, quiz/assignments, term work, end-semester practical examination.

**CO-POMapping:**

| COs | PO$_1$ | PO$_2$ | PO$_3$ | PO$_4$ | PO$_5$ | PO$_6$ | PO$_7$ | PO$_8$ | PO$_9$ | PO$_1$ | PO$_{11}$ | PO$_{12}$ | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO-1 | 1 | 2 | 3 | 3 | | | | | | | | | 2 | 3 |
| CO-2 | 2 | 1 | 1 | 2 | | | | | | | | | 1 | 2 |
| CO-3 | | | | | | | | | | | | | | |
| CO-4 | | | | | | | | | | | | | | |
| CO-5 | | | | | | | | | | | | | | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/II | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE | Subject Code: | IT603(C) | | Subject Name | | Soft Computing | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | L | T | P | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | | | | |
| 60 | 20 | 10 | 10 | | | | 100 | 3 | 1 | 0 | 4 |

## Prerequisites:
- Basic Knowledge of programming and data structures.

## Course Objective:
- To introduce soft computing concepts and techniques and foster students' abilities in designing appropriate techniques for real-world problems.
- To provide adequate knowledge of non-traditional technologies and fundamentals of artificial neural networks, back propagation networks, fuzzy sets, fuzzy logic, and genetic algorithms in solving social and engineering problems.
- To provide comprehensive knowledge of associative memory networks and adaptive resonance theory.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction to Soft Computing – Soft computing vs. hard computing, evolution of soft computing, features and types of soft computing, applications of soft computing, basics of machine learning. | 8 |
| II | Neural Networks and Back propagation Networks – Basic concepts of neural networks, model of artificial neuron, neural network architectures, characteristics of neural networks, learning methods, early neural network architectures, application domains, back propagation network (BPN), back propagation learning, applications of BPN, parameter selection, variations of back propagation algorithms. | 8 |
| III | Associative Memory Networks – Auto correlators, hetero correlators, Kosko's discrete Bi-directional Associative Memory (BAM), Exponential BAM, application of character recognition. Unsupervised Learning – Adaptive Resonance: Adaptive Resonance Theory (ART), classical ART networks, simplified ART architecture, features, algorithms, illustration of ART1 and ART2 models, related applications.. | 8 |
| IV | Fuzzy Sets and Fuzzy Relations – Fuzzy versus Crisp, Crisp Sets, Fuzzy Sets, Membership Functions, Fuzzy Set Operations, Properties of Fuzzy Sets, Crisp Relations, Fuzzy Relations – Fuzzy Cartesian Product, Operations of Fuzzy Relations. Fuzzy Logic and Inference – Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Quantifiers, Fuzzy Inference, Fuzzy Knowledge and Rule-Based System, Fuzzy Decision Making, Defuzzification, Application of Fuzzy Logic. | 8 |
| V | Genetic Algorithms – History of Genetic Algorithm, basic concepts, creation of offspring, working principles, encoding, fitness function, reproduction, genetic modeling: inheritance operator, crossover, inversion & deletion, mutation operator. | 8 |

Bitwise Operator, Generational Cycle, Convergence of GA, Applications and Advances in GA, Differences and Similarities between GA and other Traditional Methods, Hybrid Systems, Evolutionary Computing, Genetic Algorithm based on Back propagation Networks – Implementation and Comparison on Performance of Traditional Algorithms with Genetic Algorithm.

| Total Hours | 40 |
|---|---|

## Course Outcomes:

CO-1: Apply neural networks, bidirectional associative memories and adaptive resonance theory for solving different engineering problems.

CO-2: Identify and describe soft computing techniques and build supervised learning and unsupervised learning networks.

CO-3: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.

CO-4: Apply genetic algorithms to combinatorial optimization problems.

CO-5: Evaluate and compare solutions by various soft computing approaches for a given problem.

## Text Books & Reference Books-

1. S, Rajasekaran & G. A. Vijayalakshmi Pai, "Neural Networks, Fuzzy systems and evolutionary algorithms: Synthesis and Applications", PHI Publication, 2nd Ed. 2017.

2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", John Wiley and Sons, 3rd ed, 2011.

3. S. N. Sivanandam & S. N. Deepa, "Principles of Soft Computing", Wiley Publications, 3rd ed, 2018.

4. Jang, Jyh-Shing Roger, Chuen-Tsai Sun, and Eiji Mizutani. "Neuro-fuzzy and soft computing: a computational approach to learning and machine intelligence" Pearson, 1997.

## List/Links of e-learning resource

* https://archive.nptel.ac.in

## Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quiz/assignments, term work, end-semester practical examination.

## CO-PO Mapping:

| Cos | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 1 | 3 |  | 2 |  |  |  |  |  |  |  |  |  |  |
| CO-2 | 2 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| CO-3 | 2 | 1 | 3 |  |  |  |  |  |  |  |  |  |  |  |
| CO-4 | 1 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| CO-5 | 3 | 3 |  | 2 |  |  |  |  |  |  |  |  |  |  |

## Suggestive list of experiments:

| Recommendation by Board of studies on |  |
|---|---|
| Approval by Academic council on |  |
| Compiled and designed by |  |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
## (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | | B. Tech– IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-3 | Subject Code: | | IT604(A) | Subject Name | | Information Security | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks | L | T | P | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 1 | 0 | 4 |

## Prerequisites:
Basic knowledge of programming and data structures.

## Course Objective:
1. Explain the objectives of information security.
2. Explain the importance and application of each of confidentiality, integrity, authentication and availability.
3. Understand various cryptographic algorithms.
4. Understand the basic categories of threats to computers and networks.
5. Describe public-key crypto system.
6. Describe the enhancements made to IPv4 by IPSec.
7. Understand Intrusions and intrusion detection.
8. Discuss the fundamental ideas of public-key cryptography.
9. Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail and message.
10. Discuss Web security and Firewalls.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography: Concepts and Techniques: Introduction, plaintext and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks. | 8 |
| II | Symmetric key Ciphers: Block Cipher principles & Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms (RSA, Diffie-Hellman, ECC), Key Distribution. | 8 |
| III | Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm. Authentication Applications: Kerberos, X.509 Authentication Service, Public-Key Infrastructure, Biometric Authentication. | 8 |
| IV | E-Mail Security: Pretty Good Privacy, S/MIME. IP Security: IPSec. | 8 |

| | | Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management. | |
|---|---|---|---|
| V | | Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction. Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls. Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections. | 8 |

| Total Hours | 40 |
|---|---|

**Course Outcomes:**

CO1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.

CO-2: Understand Symmetric key Ciphers and Asymmetric key Ciphers.

CO-3: Analyze Message Authentication Algorithms and Hash Functions.

CO-4: Ability to identify information system requirements for both of them such as client and server.

CO-5: Ability to understand the current legal issues towards information security.

**Text Books & Reference Books-**

1. Cryptography and Network Security: CK Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.

2. Cryptography and Network Security: Forouzan Mukhopadhyay, McGraw Hill, 2nd Edition.

3. Information Security, Principles and Practice: Mark Stamp, Wiley India.

4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH.

5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.

6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.

**List/Links of e-learning resource**

- https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

**CO-PO Mapping:**

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | | | | | | | | | | | | | | |
| CO-2 | | | | | | | | | | | | | | |
| CO-3 | | | | | | | | | | | | | | |
| CO-4 | | | | | | | | | | | | | | |
| CO-5 | | | | | | | | | | | | | | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-3 | Subject Code: | | IT604 (B) | Subject Name | | Data Science Analytics | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total Marks | L | T | P | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | | | | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 1 | 0 | 4 |

## Prerequisites:

Data Science, Machine Learning

## Course Objective:

Course Outcomes: After completion of this course students will be able to

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Statistical Analysis System (SAS): Collection of Data, Sample Measurement and Scaling Techniques, Statistical Derivatives and Measures of Central Tendency, Measures of Variation and Skewness, Correlation and Simple Regression, Time Series Analysis, Index Numbers, Probability and Probability Rules, Probability Distributions, Tests of Hypothesis – I, Tests of Hypothesis – II, Chi-Square Test | 8 |
| II | Apache Spark: Introduction, Features, Spark built on Hadoop, Components of Spark: Apache Spark Core, Spark SQL, Spark Streaming, MLlib (Machine Learning Library), GraphX BigML: Web Interface, Command Line Interface, API, Creating a deep learning model with BigML | 8 |
| III | Data-Driven Documents (D3.js): Introduction, Web Standards: Hyper Text Markup Language (HTML), Document Object Model (DOM), Cascading Style Sheets (CSS), Scalable Vector Graphics (SVG), JavaScript. MatLab: Matlab Environment Setup, Syntax, Variables, Commands, M-files, Data types and Operators. | 8 |
| IV | Natural Language Toolkit (NLTK): Tokenizing Text, Training Tokenizer & Filtering Stopwords, Looking up words in Wordnet, Stemming & Lemmatization, Natural Language Toolkit-Word Replacement, Synonym & Antonym Replacement. TensorFlow: Convolutional Neural Networks, Tensor Board Visualization, Tensor Flow-Word Embedding, Tensor Flow-Linear Regression | 8 |
| V | Tableau: Design Flow, File Types, Data Types, Data Terminology, Data source, worksheet and calculations. Scikit-learn: Introduction, Modelling Process, Data Representation, Estimator API, Conventions, Linear Modeling. | 8 |
| Total Hours | | 40 |

## Course Outcomes:

CO-1: Student will be able to understand various forms of learning and data representation.
CO-2: .Understand the concepts of CNN, Back propagation and deconvolution method.
CO-3: Understand various CNN's apply the set detection and segmentation problems.

**CO-4:** Understand various Attention models in Vision.

**CO-5:** Understand various generative models, Self supervised and reinforcement Learning in vision.

**Text Books & Reference Books-**

**List/Links of e-learning resource**
- https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

**CO-PO Mapping:**

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| CO-1 | | | | | | | | | | | | | | | |
| CO-2 | | | | | | | | | | | | | | | |
| CO-3 | | | | | | | | | | | | | | | |
| CO-4 | | | | | | | | | | | | | | | |
| CO-5 | | | | | | | | | | | | | | | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech– IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DE-3 | Subject Code: | IT604(C) | Subject Name | | | Robotics Process Automation | | | |

| Maximum Marks Allotted | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Total Marks | L | T | P | Total Credits |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 1 | 0 | 4 |

## Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics.

## Course Objective:

1. Understand RPA and differentiate it from other types of automation.

2. Model the sequences and the nesting of activities.

3. Experiment with workflow in a manner to get the optimized output from a Bot.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Automation: RPA vs. Automation - Processes & Flowcharts - Programming Constructs - Types of Bots - Workloads Automated - RPA Advanced Concepts - Standardization of Processes - RPA Development Methodologies (SDLC) - Robotic Control Flow Architecture - RPA Business Case - RPA Team - Process Design Document / Solution Design Document - Risks & Challenges with RPA - RPA and Emerging Ecosystem | 8 |
| II | User Interface - Variables - Managing Variables - Naming Best Practices - Variables Panel - The Arguments Panel - Importing New Namespaces - Control Flow - Control Flow Introduction - Control Flow Activities - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data. | 8 |
| III | Basic and Desktop Recording, Web Recording, Input/Output Methods - Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval. | 8 |
| IV | Monitoring system event triggers - Hotkey trigger - Mouse trigger - System trigger - Monitoring image and element triggers - An example of monitoring email - Example of monitoring a copying event and blocking it - Launching an assistant bot on a keyboard event - EXCEPTION HANDLING: Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors. | 8 |
| V | DEPLOYING AND MAINTAINING THE BOT: Publishing using publish utility - Creation of Server - Using Server to control the bots - Creating a provision Robot from the Server - Connecting a Robot to Server - Deploy the Robot to Server - Publishing and managing updates - Managing packages - Uploading packages - Deleting packages. | 8 |
| Total Hours | | 40 |

**Course Outcomes:**

CO1: Describe RPA, where it can be applied and how it's implemented.

CO2: Shows the different types of variables, Control Flow and data manipulation techniques.

CO3: Identify and understand Image, Text and Data Tables Automation.

CO4: Describe how to handle the User Events and various types of Exceptions and strategies.

CO5: Understand the Deployment of the Robot and to maintain the connection.

**Text Books & Reference Books-**

1. Alok Mani Tripathi, "Learning Robotic Process Automation", Packt Publishing, 2018.

2. Frank Casale, Rebecca Dilla, Heidi Jaynes, Lauren Livingston, "Introduction to Robotic Process Automation: a Primer", Institute of Robotic Process Automation, 1st Edition 2015.

3. Richard Murdoch, "Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant", Independently Published, 1st Edition 2018.

4. Srikanth Merianda, "Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation", Consulting Opportunity Holdings LLC, 1st Edition 2018.

5. Lim Mei Ying, "Robotic Process Automation with Blue Prism Quick Start Guide: Create software robots and automate business processes", Packt Publishing, 1st Edition 2018.

**List/Links of e-learning resource**

- https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

**CO-PO Mapping:**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | 1 |
| CO-2 | | 2 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 1 | 2 | 3 | 2 | | | | | | | | 1 | |
| CO-4 | | 2 | 3 | 2 | | | | | | | | 1 | | 2 |
| CO-5 | 2 | | 2 | | 2 | | | | 1 | | | | 1 | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-2 | Subject Code: | | IT605(A) | Subject Category | | Web Application Development | | | |
| **Maximum Marks Allotted** | | | | | | | | **Contact Hours** | | Total Credits |
| Theory | | | | Practical | | | Total | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks Quiz | L | T | P |
| 60 | 20 | 10 | 10 | | | | 100 | 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objective:**

1. To introduce concepts of designing web pages using HTML, CSS and Javascript.

2. To familiarize with JSP programming and XML.

3. To impart PHP programming and master database access using PHP and MySQL.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction: Concept of WWW, Internet and WWW HTTP Protocol: Request and Response, Web browser and Web servers, Features of Web 2.0 Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation. | 8 |
| II | HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and framesets, Browser architecture and Website structure. Overview and features of HTML5 | 8 |
| III | Style sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2 Overview and features of CSS3 JavaScript: Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations DHTML: Combining HTML, CSS and Javascript, Events and buttons | 8 |
| IV | XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT PHP: Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files Advance Features: Cookies and Sessions, Object Oriented Programming with PHP | 8 |
| V | PHP and MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs. | 8 |

| **Total Hours** | 40 |
| --- | --- |

**Course Outcomes:**

The students will be able to

- Understand the concept of WWW, Internet and Planning, designing and publishing of website.
- Understand and applying concepts of HTML.
- Design dynamic web pages using HTML, CSS and JavaScript.
- Understanding and Applying concept of XML.
- Connect to MySQL using PHP and perform various operations.

**Text Books & Reference Books-**

**Text Book**

**Web Technologies**, Uttam K. Roy, Oxford University Press

**The Complete Reference: PHP** – Steven Holzner, Tata McGraw-Hill

**ReferenceBooks-**

1. **Web Programming**, Building Internet Applications, Chris Bates, 2nd edition, Wiley Dreamtech
2. **Java Server Pages** – Hans Bergsten, SPD O'Reilly
3. **JavaScript**, D. Flanagan, O'Reilly, SPD
4. **Beginning Web Programming** – Jon Duckett, WROX
5. **Programming World Wide Web**, R.W. Sebesta, Fourth Edition, Pearson
6. **Internet and World Wide Web – How to Program**, Deitel and Nieto, Pearson

**List/Links of e-learning resource**

https://nptel.ac.in/courses/106106156

**Modes of Evaluation and Rubric**

TheevaluationmodesconsistofperformanceintwomidsemesterTests,Quiz/Assignments, term work, end semester practical examination.

**CO-PO Mapping:**

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSOI | PSO2 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO-1 | 3 | 2 | 3 | 1 | | | | | | | | | | |
| CO-2 | 3 | | 3 | | 3 | | | | | | | | | |
| CO-3 | 3 | 2 | 3 | | 3 | | | | | | | | | |
| CO-4 | 3 | 2 | 3 | | 3 | | | | | | | | | |
| CO-5 | 3 | 2 | 3 | | 3 | | | | | | | | | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
| --- | --- |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College),VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
# DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-2 | Subject Code: | | IT605 (B) | Subject Name | | Big Data Analytics | | | |

| Maximum Marks Allotted | | | | | | | Total Marks | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 0 | 0 | 3 |

## Prerequisites:

- Knowledge of one **Programming Language**
- Practice of **SQL** (queries and subqueries)
- Exposure to **Linux Environment**

## Course Objective:

- Understand the Big Data Platform and its Use cases
- Provide an overview of Apache Hadoop
- Provide HDFSC oncepts and Interfacing with HDFS
- Understand Map Reduce Jobs
- Provide handson Hodoop Eco System
- Apply analytics on Structured, Unstructured Data.
- Exposure to Data Analytics with R.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | INTRODUCTION TO BIG DATA AND HADOOP Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and BigSheets. | 8 |
| II | HDFS (Hadoop Distributed File System) The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures. | 8 |
| III | MapReduce Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, MapReduce Types and Formats, MapReduce Features.. | 8 |
| IV | Hadoop EcoSystem Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. HBase: HBasics, Concepts, Clients, Example, HBase Versus RDBMS. Big SQL: Introduction. | 10 |
| V | Data Analytics with R Machine Learning: Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with Big R. | 8 |
| **Total Hours** | | 42 |

## Course Outcomes:

The students will be able to:

- Identify Big Data, list the components of Hadoop and Hadoop Eco-System.
- Understand Hadoop Distributed File System.
- Understand and manage MapReduce, Job Execution, task execution
- Understand and Develop Big Data Solutions using Hadoop EcoSystem.
- Understand and apply Machine Learning Techniques using R.

## Text Books & Reference Books-

### Text Book
- Tom White "Hadoop: The Definitive Guide" ThirdEditon,O'reilyMedia,2012.
- Seema Acharya, Subhasini Chellappan,"BigDataAnalytics"Wiley2015.

### Reference Books-
- • Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- • Jay Liebowitz, "Big Data and Business Analytics", Auerbach Publications, CRC Press (2013).
- • Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle Press.
- • Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- • Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & Sons, 2012.
- • Glen J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007.
- • Pete Warden, "Big Data Glossary", O'Reilly, 2011.
- • Michael Minelli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
- • Arvind Sathi, "Big Data Analytics: Disruptive Technologies for Changing the Game", MC Press, 2012.
- • Paul Zikopoulos, Dirk DeRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, "Harness the Power of Big Data: The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.

### List/Links of e-learning resource
- https://www.shiksha.com/online-courses/big-data-hadoop-courses-certification-training-by-nptel-st367

### Modes of Evaluation and Rubric
TheevaluationmodesconsistofperformanceintwomidsemesterTests,Quiz/Assignments,termwork.

### CO-PO Mapping:

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| CO-1 | 3 | | | | | | | | | | | | | |
| CO-2 | 3 | 2 | | | | | | | | | | | | |
| CO-3 | 3 | 2 | 3 | 3 | | | | | | | | | | |
| CO-4 | 3 | 2 | 3 | 3 | | | | | | | | | | |
| CO-5 | 3 | 2 | 3 | 3 | | | | | | | | | | |

### Suggestive list of experiments:

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal) DEPARTMENT OF IT

| Semester/Year | | VI/III | | Program | | | B. Tech– IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | OE-2 | Subject Code: | IT605(C) | | Subject Name | | Deep Learning | | | |
| Maximum Marks Allotted | | | | | | | Contact Hours | | | Total Credits |
| Theory | | | | Practical | | | Total Marks | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | | L | T | P | |
| 60 | 20 | 10 | 10 | - | - | - | 100 | 3 | 0 | 0 | 3 |

## Prerequisites:

Basic knowledge of Machine learning and Programming language.

## Course Objective:

1. Explain the Machine learning with deep learning techniques.
2. Understand the concept of CNN and transfer learning techniques, to apply it in the classification problems.
3. Use RNN for language modelling and time series prediction..
4. Use auto encoder and deep generative models to solve problems with high dimensional data including text, image and speech.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | Introduction and Overview: Course overview and motivation. Introduction to Image Formation, Capture and Representation. Linear Filtering, Correlation, Convolution. Visual Features and Representations: Edge, blobs, corner detection; scale space and scale selection; SIFT, SURF; HoG, LBP, etc. Visual Matching: Bag-of-words, VLAD; RANSAC, Hough transform; pyramid matching. Optical Flow. | 8 |
| II | Deep Learning Review: Review of deep learning, multi-layer perceptrons, and backpropagation. Convolutional Neural Networks (CNNs): Introduction to CNNs and the evolution of CNN architectures including AlexNet, ZFNet, VGG, Inception Nets, ResNets, and DenseNets. Visualization and Understanding CNNs: Visualization of kernels, backprop-to-image and deconvolution methods, DeepDream, hallucination, neural style transfer, CAM, Grad-CAM, and Grad-CAM++. Recent Methods: Integrated Gradients (IG), Segment-IG, and Smooth Grad. | 8 |
| III | CNNs for Recognition and Verification: Covers Siamese Networks, Triplet Loss, Contrastive Loss, and Ranking Loss. CNNs for Detection: Background of object detection, R-CNN, Fast R-CNN, Faster R-CNN, YOLO, SSD, and RetinaNet. CNNs for Segmentation: FCN, SegNet, U-Net, and Mask R-CNN. | 8 |
| IV | Recurrent Neural Networks (RNNs): Review of RNNs. CNN + RNN Models for Video Understanding: Spatio-temporal models and action/activity recognition. Attention Models: Introduction to attention models in vision. Vision and Language: Image captioning, visual question answering (Visual QA), and visual dialog. Spatial Transformers. Transformer Networks. | 8 |

| | | |
|---|---|---|
| V | Deep Generative Models: Review of popular deep generative models including GANs and VAEs. Other Generative Models: PixelRNNs, NADE, and normalizing flows. Recent Trends: Zero-shot, one-shot, and few-shot learning; self-supervised learning; reinforcement learning in vision. Other Recent Topics and Applications. | 8 |
| **Total Hours** | | 40 |

**Course Outcomes:**

CO-1: Students will be able to understand various forms of learning and data representation.

CO-2: Students will understand the concepts of CNN, back propagation, and deconvolution methods.

CO-3: Students will understand various CNN architectures and apply them to detection and segmentation problems.

CO-4: Students will understand various attention models in vision.

CO-5: Students will understand various generative models, self-supervised learning, and reinforcement learning in vision.

**Text Books & Reference Books-**

1. Ian Goodfellow, Yoshua Bengio, and Aaron Courville, *Deep Learning*, MIT Press, 2017.
2. Umberto Michelucci, *Applied Deep Learning: A Case-based Approach to Understanding Deep Neural Networks*, Apress, 2018.
3. Kevin P. Murphy, *Machine Learning: A Probabilistic Perspective*, MIT Press, 2012.
4. Ethem Alpaydin, *Introduction to Machine Learning*, MIT Press and Prentice Hall of India, Third Edition, 2014.
5. Giancarlo Zaccone, Md. Rezaul Karim, and Ahmed Menshawy, *Deep Learning with TensorFlow: Explore Neural Networks with Python*, Packt Publishing, 2017..

**List/Links of e-learning resource**

* https://archive.nptel.ac.in

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

**CO-POMapping:**

| COs | PO$_1$ | PO$_2$ | PO$_3$ | PO$_4$ | PO$_5$ | PO$_6$ | PO$_7$ | PO$_8$ | PO$_9$ | PO$_1$ | PO$_{11}$ | PO$_{12}$ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | | | | | | | | | | | | | | |
| CO-2 | | | | | | | | | | | | | | |
| CO-3 | | | | | | | | | | | | | | |
| CO-4 | | | | | | | | | | | | | | |
| CO-5 | | | | | | | | | | | | | | |

**Suggestive list of experiments:**

| | |
|---|---|
| Recommendation by Board of studies on | |
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)
## DEPARTMENT OF IT

| Semester/Year | | V/III | | Program | | B.Tech–Information Technology | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subject Category | DLC | Subject Code: | IT-606 | Subject Name | | Android Programming | | | |

| Maximum Marks Allotted | | | | | | | Contac tHours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | Practical | | | Total Marks | | | | |
| ES | MS | Assignment/Quiz | ES | LW | Quiz | | L | T | P | |
| - | - | - | 30 | 10 | 10 | 50 | 0 | 0 | 2 | 1 |

## Prerequisites:

Building an Android app comes down to two major skills/languages: **Java** and **Android**.

## Course Objective:

- Explain different techniques for developing applications for mobile devices.
- Understand the Android OS architecture.
- Understand the operation of applications, including the application lifecycle, configuration files, intents, activities, services, and receivers.
- Install and use appropriate tools for Android development, including IDEs, device emulators, and profiling tools.

| UNITs | Descriptions | Hrs. |
|---|---|---|
| I | **Introduction to Android:** A little background about mobile technologies. **Overview of Android:** An open platform for mobile development and the role of the Open Handset Alliance. **Developing for Android:** Creating the first Android application and setting up the Android development environment. **Android Development Framework:** Android SDK, Eclipse, emulators, creating and setting up custom Android emulators, and the Android project framework.. | 6 |
| II | Android Activities and UI Design: Understanding intents, activities, the activity lifecycle, and the manifest. Application Development: Creating applications and new activities, using expressions and flow control, and working with the Android manifest. Simple UI: Layouts and layout properties, fundamental Android UI design, introducing layouts, and creating new layouts. Resources: Drawable resources, resolution and density independence (px, dip, dp, sip, sp). XML and GUI Objects: Introduction to GUI objects such as PushButton, Text/Labels, Edit Text, Toggle Button, Weight Sum, Padding, and Layout Weight. | 10 |
| III | Advanced UI Programming: Covers event-driven programming in Android (e.g., text edit, button click events) and creating splash screens. Event-driven Programming in Android: Understanding the Android activity lifecycle and creating threads for gaming requirements. Exception Handling: Using exception handlers effectively in Android applications. UI Components: Toasts, menus, dialogs, lists, and adapters; differences between custom and system menus; creating and using the handset menu button (hardware). Android Themes and Dialogs: Working with Android themes, creating alert dialogs, and using toast notifications. Lists and Adapters: Implementing lists with adapters for dynamic content. Manifest.xml File Update: | 12 |
| IV | Multimedia Programming using Android: Covers multimedia audio formats, creating and playing audio, and memory management (kill/releasing audio in applications). Video Playback: Implementing video playback with event handling. Database – SQL Lite: Introduction to SQL Lite, using SQL Lite Open Helper, creating a database, opening and closing a database, and working with cursors for inserts, updates, and deletes. | 8 |

| | | Location-Based Services and Google Maps: Using location-based services and integrating applications with Google Maps. | |
|---|---|---|---|
| V | | Notifications: Notification Manager, pending intent notifications (show and cancel). Custom Web Browser: Using the Web View object in XML and implementing methods associated with navigation such as 'Go', 'Back', and 'Forward'. Android Development Using Other Tools: Exploring alternative ways to develop Android applications. Graphics/ Game Development using : Installation of APK, installing it, and deploying it onto an Android mobile device. | 7 |

| Total Hours | | 40 |
|---|---|---|

## Course Outcomes:

**CO-1:** Explain the purpose of different development tools for Android.
**CO-2:** Utilize Android Studio to design simple and complex graphical user interfaces.
**CO-3:** Develop algorithms to manage simple and complex event handling.
**CO-4:** Develop and design database structures for storage-based applications.
**CO-5:** Plan, prepare, build, and publish an application to the Android Market.

### TextBook

1. Android Developer Tools Essentials by Mike Wolfson-O'ReillyMedia Publication

### Reference Books

1. Jeff Friesen, *Learn Java for Android Development*, 2nd Edition, Apress Publications.
2. Kevin Brothaler, *OpenGL ES 2 for Android*, The Pragmatic Programmers..

### List/Links of e-learning resource

* https://nptel.ac.in/courses/106106147

### Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

### CO-POMapping:

| COs | PO₁ | PO₂ | PO₃ | PO₄ | PO₅ | PO₆ | PO₇ | PO₈ | PO₉ | PO₁ | PO₁₁ | PO₁₂ | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 1 | 1 | 2 | | | | | | | | | | 1 | 2 |
| CO-2 | 1 | 1 | 1 | | | | | | | | | | 1 | 2 |
| CO-3 | 1 | 1 | 1 | | 1 | | | | | | | | 1 | 2 |
| CO-4 | 2 | 1 | 1 | | | | 1 | | | | | | | 2 |
| CO-5 | 2 | 1 | | | | | | | | | | | 1 | |

### Suggestive list of experiments:

1. Introduction to Android Operating System – **CO1**
2. Program for First Android Application – **CO1**
3. Program for building a simple user interface using XML for UI layout – **CO1**
4. Program for developing an Android application using a Linear Layout – **CO2**
5. Program for developing an Android application using a Relative Layout – **CO2**
6. Program for developing an Android application using a Table Layout – **CO2**
7. Program for developing an Android application using an Absolute Layout – **CO3**
8. Program for developing an Android application using a Frame Layout – **CO3**
9. Developing an Android application using Relative Layout to display date and time – **CO3**
10. Study of Android lifecycle and demonstration of it – **CO4**
11. Study of intents and types of intents – **CO4**
12. Study of List Views and adapters – **CO4**
13. Study of dialog interfaces in Android – **CO5**
14. Study of sensors in Android – **CO5**
15. Study of services in Android – **CO5**
16. Study of touch in Android – **CO5**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |

# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
## (Engineering College), VIDISHA M.P.
### (An Autonomous Institute Affiliated to RGPV Bhopal)DEPARTMENT OFIT

| Semester/Year | | VI/III | | Program | | | B.Tech–IT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subject Category | | Subject Code: | IT-607 | Subject Name | | | Minor Project | | | |

| Maximum Marks Allotted | | | | | | | | Contact Hours | | | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Theory | | | | Practical | | | Total | | | | |
| ES | MS | Assignment | Quiz | ES | LW | Quiz | Marks | L | T | P | |
| - | - | - | - | 50 | 50 | - | 100 | - | - | 4 | 2 |

**Prerequisites:**

Knowledge of Computer Programming Language and MATLAB

**Course Objective:**

| UNITs | Descriptions | Hrs. |
|---|---|---|
| | A minor project may be carried out in one or more of the following forms: product preparation, working/non-working models, prototype development, fabrication of set-ups, laboratory experiment development, process modification/development, simulation, software development, integration of software and hardware, statistical data analysis, survey, creating awareness in society. The student is required to submit a report based on the work. The evaluation of the project shall be on a continuous basis. Guidelines: A project must be developed based on database management at the backend and any other application development at the front end. | 40 |
| **Total Hours** | | 40 |

**Course Outcomes:**

After successful completion of the course, students will be able to practice acquired knowledge within the chosen area of technology for project development.

**CO-1:** Identify, discuss, and justify the technical aspects of the chosen project with a comprehensive approach.

**CO-2:** Apply a systematic approach to reproduce, improve, and refine technical aspects for engineering projects.

**CO-3:** Work as an individual or in a team in the development of technical projects.

**CO-4:** Communicate and report effectively on project-related activities and findings.

**Text Books & Reference Books-**

**List/Links of e-learning resource**

**Modes of Evaluation and Rubric**

The evaluation modes consist of performance in two mid-semester tests, quizzes/assignments, term work, and the end-semester practical examination.

**CO-POMapping:**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 2 | 3 | 1 | | | | | | | 2 | 3 | 1 |
| CO-2 | | 2 | 3 | 2 | 3 | | | | | | | | | |
| CO-3 | 2 | 1 | 2 | 3 | 2 | | | | | | | | 1 | |
| CO-4 | | 2 | 3 | 2 | | | | | | | | 1 | | 2 |
| CO-5 | 2 | | 2 | | 2 | | | | 1 | | | | 1 | |

**Suggestive list of experiments:**

| Recommendation by Board of studies on | |
|---|---|
| Approval by Academic council on | |
| Compiled and designed by | |
| Subject handled by department | DEPARTMENT OF IT |