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:		IT 601	Subject Name	Data Mining and Warehousing			

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	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 Warehouse implementation, Efficient Computation of Data Cubes, Processing of OLAP queries, Indexing data.	8
II	Data Mining: Data Preprocessing, Data Integration and Transformation, Data Reduction, Discretizaion and Concept Hierarchy Generation, Basics of data mining, Data mining techniques, KDP (Knowledge Discovery Process), Application 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, Apriori 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 Issue, Privacy Issue, Ethical Issue.	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 pre preprocessing techniques.
CO3: Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on various data sets
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. Arun k Pujari "Data Mining Technique" University Press
2. Han,Kamber, "Data Mining Concepts & Techniques",.
3. M.Kaufman., P.Ponnian, "Data Warehousing Fundamentals", JohnWiley.
4. M.H.Dunham, "Data Mining Introductory & Advanced Topics", PearsonEducation.
5. Ralph Kimball, "The Data Warehouse Lifecycle Tool Kit", JohnWiley.
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	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		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

2. Data Warehouse Schemas: Star, Snowflake, Fact Constellation

3. Data Cube Construction-OLAP operations.

4. Data Extraction, Transformations, Loading operations.

5. Implementation of Apriori algorithm

6. Implement an application that uses Multi-threading.

7. Implementation of FP-Growth algorithm.

8. Implementation of Decision Tree Induction.

9. Classification of data using Bayesian approach.

10. Classification of data using K-Nearest Neighbor approach 8.

11. Implementation of K-Means algorithm.

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

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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT			
Subject Category	DC	Subject Code:		IT 602	Subject Category	Web Application Development			

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical						
ES	MS	Assignment	Quiz	ES	LW	Quiz	Total Marks Quiz	L	T	P	Theory 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. 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 Web site, 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 frame sets, Browser architecture and Web site 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,	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:

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 Book & 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 Dremtech
2. Java Server Pages – Hans Bergsten, SPD O'Reilly
3. Java Script, 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, 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, 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

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DEPARTMENT OF IT

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

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

Prerequisites:

Basic Knowledge of computer network and data structures.

Course Objective:

1) Discuss the concepts, characteristics, delivery models and benefits of cloud computing.
2) Explore the key technical, organisational and compliance challenges of cloud computing.
3) Grasp the concepts of virtualization efficiently.
4) Explore the security issues that arise from cloud computing architectures intended for delivering Cloud based enterprise IT services.

UNITs	Descriptions	Hrs.
I	Introduction, Cloud Infrastructure: Cloud computing, Cloud computing delivery models and services, Ethical issues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Opensource software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. Exercises and problems	8
II	Cloud Computing: Application Paradigms.: Challenges of cloud computing, Architectural styles of cloud computing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: The Zookeeper, The Map Reduce programming model, A case study: The Gre The Web application, Cloud for science and engineering, Highperformance computing on a cloud, Cloud computing for Biology research, Social computing, digital content and cloud computing.	8
III	Cloud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual Machines, Performance and Security Isolation, Full virtualization and paravirtualization, Hardware support for virtualization, Case Study: Xen a VMM based paravirtualization, Optimization of network virtualization, vBlades, Performance comparison of virtual machines, The dark side of virtualization, Exercises and problems.	8
IV	Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Application of control theory to task scheduling on a cloud, Stability of a twolevel resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers, A utility-based model for cloud-based Web services, Resourcing bundling: Combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling MapReduce applications subject to deadlines, Resource management and dynamic scaling, Exercises and problems	8
V	Cloud Security, Cloud Application Development: Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security	8

	risks posed by a management OS, A trusted virtual machine monitor, Amazon web services: EC2 instances, Connecting clients to cloud instances through firewalls, Security rules for application and transport layer protocols in EC2, How to launch an EC2 Linux instance and connect to it, How to use S3 in java, Cloud-based simulation of a distributed trust algorithm, A trust management service, A cloud service for adaptive data streaming, Cloud based optimal FPGA synthesis .Exercises and problems.	
Total Hours		40

Course Outcomes:

CO-1: Compare the strengths and limitations of cloud computing.

CO2: Identify the architecture, infrastructure and delivery models of cloud computing.

CO-3: Demonstrate the working of VM and VMM on any cloud platforms(public/private), and run a software service on that.

CO-4: Identify the known threats, risks, vulnerabilities and privacy issues associated with Cloud based IT services.

Text Book & Reference Books-

1. Cloud Computing: Theory and Practice, Dan C Marinescu Elsevier (MK), 2013.
2. Computing Principles and Paradigms, Rajkumar Buyya , James Broberg, Andrzej Goscinsk,i Willey, 2014.
3. Cloud Computing Implementation, Management and Security John W Rittinghouse, James F Ransome, CRC Press, 2013.

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	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	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

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
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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT			
Subject Category	DE-2	Subject Code:	IT 603 (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	0	0	3

Prerequisites:
- Basic knowledge of Data Communication Networks.

Course Objective:
- To make students understand the basics of Wireless sensor Networks.
- To familiarize with learning of the Architecture of WSN.
- To understand the concepts of Networking and Networking in WSN.
- To study the design consideration of topology control and solution to the various problems.
- To introduce the hardware and software platforms and tool in WSN.

UNITs	Descriptions	Hrs.
I	OVERVIEW OF WIRELESS SENSOR NETWORKS- SingleNode 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 Principle, Physical Layer and Transceiver Design Considerations, Optimization Goals and Figures of Merit, Gateway Concepts, Operating Systems and Execution Environments introduction to Tiny OS and nesC 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 ZigBee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols EnergyEfficient 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, Nodelevel software platforms, Node level Simulators, Statecentric programming.	8
Total Hours		40

Course Outcomes:
CO 1: Understand challenges and technologies for wireless networks.
CO 2: Understand architecture and sensors.
CO 3:   Describe the communication, energy efficiency, computing, storage and transmission
CO 4: Establishing infrastructure and simulations.
CO 2: Explain the concept of programming the in WSN environment.

Text Book & 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

4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor NetworksTechnology, Protocols, and Applications", John Wiley, 2007.

5. Anna 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-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	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
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DEPARTMENT OF IT

Semester/Year		VI/III		Program			B.Tech – IT			
Subject Category	DE-2	Subject Code:		IT 603 (C)	Subject Name		Pattern Recognition			

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

Prerequisites:

Knowledge of Management Information System.

Course Objective:

A) To provide a Classifiers Based on Bayes Decision Theory.
B) To focus on Linear and Non Linear Classifiers
c) To enhance skills of features engineering.

UNITs	Descriptions	Hrs.
I	Classifiers Based on Bayes Decision Theory: Introduction , Bayes Decision Theory, Discriminant Functions and Decision Surfaces , Bayesian Classification ,Maximum Likelihood Parameter Estimation , Maximum a Posteriori Probability Estimation, Bayesian Inference , Maximum Entropy Estimation , Mixture Models , Nonparametric Estimation ,The Naive-Bayes Classifier , The Nearest Neighbor Rule, Bayesian Networks.	8
II	Linear Classifiers: Linear Discriminant Functions and Decision Hyperplanes, The Perceptron Algorithm, Least Squares Methods, Mean Square Estimation Revisited: , Logistic Discrimination, Support Vector Machines.	8
III	Non Linear Classifiers: XOR Problem, Two-Layer and Three Layer Perceptrons, Backpropagation Algorithm , Hyperparameters, Generalized Linear Classifiers, Capacity of the l-Dimensional Space in Linear Dichotomies, Polynomial Classifiers, Radial Basis Function Networks, Universal Approximators, Nonlinear SVM, Decision Trees, Boosting Approach to Combine Classifiers.	8
IV	Feature Selection:Preprocessing, Statistical Hypothesis Testing, The Receiver Operating Characterisitcs (ROC) Curve, Class Separability Measures, Feature Subset selection, Optimal Feature Generation, Neural Networks and Feature Generation / Selection, The Bayesian Information Criterion.	8
V	Feature Generation: Linear Transforms, Regional Features, Features for Shape and Size Characterization, Typical Features for Speech and Audio Classification Template Matching: Introduction, Similarity Measures Based on Optimal Path Searching Techniques, Measures Based on Correlations, Deformable Template Models.	8
Total Hours		40

Course Outcomes:

CO1 Determine classifiers based on Bayes theory for pattern recognition.
CO2 Use linear classifiers to identify the patterns of data.
CO3 Categorize the data using nonlinear classifier algorithms.
CO4 Employ statistical analysis to select optimal feature set.
CO5 Develop template matching module to recognize the patterns.

Text Book & Reference Books-

1 S Theodoridis and K Koutroumbas – Pattern Recognition, 4th Edition, Academic Press, 2009.

2 C Bishop – Pattern Recognition and Machine Learning – Springer, 2006.

3 R. O. Duda and P. E. Hart, D. G. Stork, "Pattern Classification", Wiley Interscience, Second Edition, 2007.

4 R. O. Duda and P. E. Hart, D. G. Stork, "Pattern Classification", Wiley Interscience, Second Edition, 2007.

5 J. P. Marques de Sá, "Pattern Recognition", Springer Science & Business Media , 2001.

List/Links of e-learning resource

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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	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	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	Subject Code:	IT 604 (A)	Subject Name		Information Security		

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

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 cryptosystem.
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, plain text 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: IP	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:

CO-1: 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 issuestowards information security.

Text Book & Reference Books-

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lst Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGELearning
6. Network Security and Cryptography: Bernard Menezes, CENGAGELearning

List/Links of e-learning resource

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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	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

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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT			
Subject Category	DE-3	Subject Code:	IT 604 (B)	Subject Name		Modern Tools for Data Science			

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	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 (MachineLearning Library), GraphX BigML: WebInterface, 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), ScalableVectorGraphics (SVG), JavaScript. MatLab: Matlab Environment Setup, Syntax, Variables, Commands, M-files, Data types and Operators.	8
IV	NaturalLanguageToolkit(NLTK):TokenizingText, Training Tokenizer & Filtering Stopwords, Looking up words in Wordnet Stemming & Lemmatization, Natural Language Toolkit - Word Replacement, Synonym & Antonym Replacement. Tensor Flow: Convolutional Neural Networks, Tensor Board Visualization, Tensor Flow-Word Embedding, Tensor Flow-Linear Regression	8
V	Tableau: DesignFlow, File Types, Data Types, Data Terminology, Datasource,worksheetandcalculations. Scikit-learn: Introduction, Modelling Process, Data Representation, Estimator API, Conventions, LinearModeling.	8
Total Hours		40

Course Outcomes:

CO-1: Student will be able 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 these 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 Book & 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	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

Semester/Year		VI/III		Program		B.Tech – IT			
Subject Category	DE-3	Subject Code:		IT 604 (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
60	20	10	10	-	-	-	100	3	1	0

(Total Credits: 4)

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics.

Course Objective:

1 Understand the RPA and the ability to 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:

CO 1: Describe RPA, where it can be applied and how it's implemented.

CO 2: Shows the different types of variables, Control Flow and data manipulation techniques.

CO 3: Identify and understand Image, Text and Data Tables Automation.

CO 4: Describe how to handle the User Events and various types of Exceptions and strategies.

CO 5: Understand the Deployment of the Robot and to maintain the connection.

Text Book & 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	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	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-3	**Subject Code:**	IT 604 (A)	**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	-	-	-	3	1	0	4

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, Backpropagation Convolutional Neural Networks (CNNs): Introduction to CNNs; Evolution of CNN Architectures: AlexNet, ZFNet, VGG, InceptionNets, ResNets, DenseNets. Visualization and Understanding CNNs: Visualization of Kernels; Backprop-to-image/Deconvolution Methods; Deep Dream, Hallucination, Neural Style Transfer; CAM,Grad-CAM, Grad-CAM++; Recent Methods (IG, Segment-IG, SmoothGrad).	8
III	CNNs for Recognition, Verification, Detection, Segmentation: CNNs for Recognition and Verification (Siamese Networks, Triplet Loss, Contrastive Loss, Ranking Loss); CNNs for Detection: Background of Object Detection, R-CNN, Fast R-CNN, Faster R-CNN, YOLO, SSD, RetinaNet; CNNs for Segmentation: FCN, SegNet, U-Net, Mask-RCNN.	8
IV	Recurrent Neural Networks(RNNs): Review of RNNs; CNN + RNN Models for Video Understanding: Spatio-temporal Models, Action/Activity Recognition Attention Models: Introduction to Attention Models in Vision; Vision and Language: Image Captioning, Visual QA, Visual Dialog; Spatial Transformers; Transformer Networks.	8

		Deep Generative Models: Review of (Popular) Deep Generative Models: GANs, VAEs; Other Generative Models: PixelRNNs, NADE, Normalizing Flows, etc Recent Trends: Zero-shot, One-shot, Few-shot Learning; Self-supervised Learning; Reinforcement Learning in Vision; Other Recent Topics and Applications.	
V			8
Total Hours			40

Course Outcomes:

CO-1: Student will be able 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 these 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 Book & 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", The MIT Press, 2012.

4. Ethem Alpaydin,"Introduction to Machine Learning", MIT Press, Prentice Hall of India, Third Edition 2014.

5. Giancarlo Zaccone, Md. Rezaul Karim, Ahmed Menshawy "Deep Learning with TensorFlow: Explore neural networks with Python", Packt Publisher, 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, Quiz/Assignments, 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															
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	OC-4	Subject Code:	IT 605 (B)	Subject Name		Digital Image Processing		

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

Prerequisites:

Knowledge of Computer Programming Language 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, Different types of digital images.	8
II	Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8
III	Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8
IV	Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8
V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
Total Hours		40

Course Outcomes:

CO-1: Ability to apply principles and techniques of digital image processing in applications related to design and analysis of digital imaging systems. CO-2: Ability to analyze and implement image processing algorithms to real problems. CO-3: Gaining of hands-on experience in using software tools for processing digital images. CO-4: Interpret image segmentation and representation techniques. CO-5: Apply Mathematical Morphology using Polynomial approximation.

Text Book & Reference Books-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing 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.

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

Semester/Year		VI/III		Program			B.Tech – IT		
Subject Category	OC-4	Subject Code:		IT 605 (C)	Subject Name		Soft Computing		

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

Prerequisites:
- Basic Knowledge of programming and data structures.

Course Objective:

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for real-world problems.
2. To provide adequate knowledge of non-traditional technologies and fundamentals of artificial neural networks, back propagation networks, fuzzy sets, fuzzy logic, geneticalgorithms in solving social and engineering problems.
3. 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-direction associative memory (BAM), Exponential BAM, Application of Character Recognition. Unsupervised learning: Adaptive Resonance: Adaptive Resonance Theory (ART), Classical ART Networks, Simplifies ART Architecture, Features, algorithms and Illustration of ART1 and ART2 model, 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 & advances in GA, Differences & similarities between GA & other traditional method, Hybrid systems, evolutionary computing, Genetic Algorithm based on Backpropagation 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 Book & Reference Books-

1. S, Rajasekaran& G.A. VijayalakshmiPai, "Neural Networks, Fuzzy systems and evolutionary algorithms: Synthesis and Applications", PHI Publication, 2 ndEd. 2017.

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

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

4. Jang, Jyh-Shing Roger, Chuen-Tsai Sun, and EijiMizutani. "Neuro-fuzzy and soft computinga 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 CS & 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						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
ES	MS	Assignment/Quiz	ES	LW					
-	-	-	50	-	50	0	0	4	2

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 the application, application lifecycle, configuration files, intents, and activities, services & Receivers.
- Install and use appropriate tools for Android development, including IDE, device emulator, 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, Open Handset Alliance Developing for Android: First Android Application, setup Android Development Environment. Android development Framework - Android-SDK, Eclipse Emulators, Creating & setting up custom Android emulator Android Project Framework.	6
II	Android Activities and UI Design, Understanding Intent, Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Expressions and Flow control, Android Manifest Simple UI - Layouts and Layout properties, Fundamental Android UI Design, introducing Layouts, Creating new Layouts, Drawable Resources, Resolution and density independence (px ,dip, dp, sip, sp) XML Introduction to GUI objects viz. Push Button, Text / Labels, Edit Text, Toggle Button, Weight Sum Padding, Layout Weight.	10
III	Advanced UI Programming , Event driven Programming in Android(Text Edit, Button clicked etc.),Creating splash screen, Event driven Programming in Android, Android Activity Lifecycle, Creating threads for gaming requirement, Understanding the Exception handler, Toast, Menu, Dialog, List and Adapters, Custom Vs. System Menus Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Manifest.xml File Update.	12
IV	Multimedia Programming using Android, Multimedia audio formats - Creating and Playing, Multimedia audio formats - Kill / Releasing (Memory Management),e audio in any application video playback with an event, Database - SQLite, SQLite Open Helper and creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes, Location Based Services and Google Maps, Using Location Based Services, Working with Google Maps	8

V	Notifications Notification Manager, Pending Intent Notifications (Show and Cancel), custom made Web browser, Web View object in XML, Methods for associated with 'Go', 'Back', 'Forward' etc. Android Development using other Tools, Other ways to Develop Android Applications, Graphics / Game development using, Installation of .apk, install .apk into your Android Mobile.		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 interface
CO-3: Develop the algorithm to manage simple and complex Event handle
CO-4: Develop and design the database design for storage based application
CO-5: Plan, prepare, build and Publish an application to the Android Market

Text Book

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

Reference Books

1. Learn Java for Android Development,2nd Edition- Jeff Friesen- Apress Publications
2. OpenGL ES 2 for Android - Kevin Brothaler - 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, Quiz/Assignments, 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	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
2. Program for First Android Application.
3. Program for building a simple user interface using a XML for UI layout.
4. Program for developing an Android Application using a linear layout.
5. Program for developing an Android Application using a Relative layout.
6. Program for developing an Android Application using a Table layout.
7. Program for developing an Android Application using a Absolute layout.
8. Program for developing an Android Application using a Frame layout.
9. Developing an android application using Relative layout to display Date and time.
10. Study of android lifecycle and demonstration of it.
11. Study of intents and types of intents
12. Study of list views and adapters
13. Study of dialog interfaces in android
14. Study of Sensors in android
15. Study of Services in android
16. Study of touch in android

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		Subject Code:		Subject Name	Minor Project				

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

Prerequisites:

Knowledge of Computer Programming Language and MATLAB

Course Objective:

Minor project may be carried out in one or more form of following: product preparations, 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 continuous basis. Guidelines: A project to be developed based on database management at the back end and any other application development at the front end.

UNITs	Descriptions	Hrs.
I	Digital Image Fundamentals: A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.	8
II	Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8
III	Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8
IV	Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8
V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
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.

CO-2: Systematic approach reproduce, improve and refine technical aspects for engineering projects.

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

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

Text Book & Reference Books-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing 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. |

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	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	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