



**Shri Vaishnav Vidyapeeth Vishwavidyalaya**

**B.Tech. (Computer Science and Engineering - Mobile Applications - Apple Authorized Training Center)**

**Choice Based Credit System (CBCS) 2019-20**

**SEMESTER -V**

COURSE CODE	CATEG ORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment	END SEM University Exam	Teachers Assessment*				
<b>BTCS511</b>	<b>UG</b>	<b>Artificial Intelligence</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

\*Teacher Assessment shall be based on the following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**COURSE OBJECTIVES**

The student will have ability to:

1. Know how computer system adapts, evolves and learns.
2. To gain expertise in one of fastest growing areas of Computer Science that covers topics related to human intelligence and its applications in industry, defense, healthcare, agriculture and many other areas.
3. Provides a rigorous, advanced and professional graduate-level foundation in Artificial Intelligence

**COURSE OUTCOMES**

Upon completion of the course, students will be able to:

1. Build intelligent agents for search and games
2. Solve AI problems through programming with Python
3. Learning optimization and inference algorithms for model learning
4. Design and develop programs for an agent to learn and act in a structured environment.

**SYLLABUS**

**UNIT-I**

**Introduction:** Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.

**UNIT-II**

**Search Algorithms:** Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A\* algorithm, Game Search.

**UNIT-III**

**Probabilistic Reasoning:** Probability, conditional probability, Bayes Rule, Bayesian Networks-

  
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representation, construction and inference, temporal model, hidden Markov model.

**UNIT-IV**

**Markov Decision process:** MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

**UNIT-V**

**Reinforcement Learning:** Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

**TEXT BOOKS:**

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Prentice Hall.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill.
3. Trivedi, M.C., “A Classical Approach to Artificial Intelligence”, Khanna Publishing House, Delhi.
4. Saroj Kaushik, “Artificial Intelligence”, Cengage Learning India, 2011.
5. David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010.

**WEBSITES FOR REFERENCE:**

1. <https://nptel.ac.in/courses/106105077>
2. <https://nptel.ac.in/courses/106106126>
3. <https://aima.cs.berkeley.edu>
4. [https://ai.berkeley.edu/project\\_overview.html](https://ai.berkeley.edu/project_overview.html) (for Practicals)

**List of Practical's:**

1. Write a programme to conduct uninformed and informed search.
2. Write a programme to conduct game search.
3. Write a programme to construct a Bayesian network from given data.
4. Write a programme to infer from the Bayesian network.
5. Write a programme to run value and policy iteration in a grid world.
6. Write a programme to do reinforcement learning in a grid world.
7. Mini Project work.

  
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BTCS504	UG	Software Engineering and Project Management	60	20	20	30	20	3	0	2	4

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**COURSE OBJECTIVES**

The student will have ability to:

1. Get the knowledge of basic software engineering methods and practices.
2. Define software requirements and requirement engineering.
3. Apply approaches for various designs and their principle.
4. Explore testing in various domains.
5. Development of significant teamwork and project based experience.

**COURSE OUTCOMES**

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

1. Compare various software process models and identify where these models are applicable.
2. Define and analyze software project management, the framework and the dimensions of software project management.
3. Comprehend System modeling using UML.
4. Identify software testing strategies by using testing tools.
5. Analyze software risks and risk management strategies.

**SYLLABUS**

**UNIT-I**

**Nature of Software:** Software Engineering, Software Process, A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models- Waterfall Model, Incremental Models, Evolutionary Models, Concurrent Models, Specialized Process Model, Unified Process, Personal and Team process Models, Process technology, Agile development.

  
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### SEMESTER -V

#### **UNIT-II**

**Functional and Non-functional Requirements:** Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented Software Development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

#### **UNIT-III**

**The Software Design Process:** Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics.

#### **UNIT-IV**

**Software Testing Strategies-Approach:** Issues, Validation Testing and Their Criteria, System Testing, Alpha-Beta Testing, Debugging, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web Applications.

#### **UNIT-V**

**Need and Types of Maintenance:** Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA). Project Metrics.

#### **TEXT BOOKS:**

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Tata McGraw-Hill, Seventh edition, 2009.
2. Richard Fairley, "Software Engineering Concepts" –, Tata Mcgraw Hill, 2008.
3. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Pub, 2005.
4. Richard H.Thayer, "Software Engineering & Project Managements", Willey India

#### **REFERENCES:**

1. Bernd Bruegge, Allen H. Dutoit, "Object-Oriented Software Engineering" Using UML, Patterns, and Java, PEARSON Third Edition, 2017.
2. Waman S.Jawadekar, "Software Engineering", TMH
3. Ian Sommerville, "Software Engineering", Seventh Edition, Pearson Education Asia, 2007.
4. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.

#### **List of Practical:**

Select a topic of the project, and then make the report on following points

1. System Analysis
  - 1.1. Identification of Need
  - 1.2. Preliminary Investigation
2. Feasibility Study
  - 2.1. Technical Feasibility

  
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- 2.2. Economical Feasibility
- 2.3. Operational Feasibility
- 3. Literature Survey
  - 3.1. Work done by other
  - 3.2. Benefits
  - 3.3. Proposed Solution
  - 3.4. Technology used
- 4. Software Engineering Approach
  - 4.1. Software Engineering paradigm Applied
    - 4.1.1. Description
    - 4.1.2. Advantage & Disadvantages
    - 4.1.3. Reasons for use
  - 4.2 Requirement Analysis
    - 4.2.1 Software Requirement Specification
      - 4.2.1.1 Glossary
      - 4.2.1.2 Supplementary Specifications
      - 4.2.1.3 Use Case Model
      - 4.2.1.4 Comparative analysis documents
    - 4.2.2 Conceptual Level Activity Diagram
  - 4.3 Planning Managerial Issues
    - 4.3.1 Planning Scope
    - 4.3.2 Project Resources
    - 4.3.3 Team Organization
    - 4.3.4 Project Scheduling
    - 4.3.5 Estimation
    - 4.3.6 Risk Analysis
    - 4.3.7 Security Plan
  - 4.4 Design
    - 4.4.1. Design Concept
    - 4.4.2. Design Technique
    - 4.4.3. Modeling
      - 4.4.3.1. ER Model
      - 4.4.3.2. DFD Model
        - 4.4.3.2.1. DFD Model Level-0 and 1
        - 4.4.3.2.2. DFD Model Level 2 and 3
      - 4.4.3.3. Data Dictionary
      - 4.4.3.4. Activity Diagram
      - 4.4.3.5. Software Architecture
  - 4.5 Implementation Phase
    - 4.5.1. Language Used Characteristics
    - 4.5.2. Coding
  - 4.6 Testing
    - 4.6.1. Testing Objectives
    - 4.6.2. Testing Methods & Strategies used along with test data and the error listed for each test case for each function provided by the system.



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<b>BTCS701</b>	<b>UG</b>	<b>Cloud Computing</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

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### **COURSE OBJECTIVES**

The student will have ability to:

1. Analyze the SAAS, PAAS IAAS services of Cloud Computing to represent how engineering agility in an organization can be created.
2. Assess the exploitation of web services from cloud computing.
3. Configure essential infrastructural components used for implementing Cloud.
4. Significantly study case studies to derive the most excellent practice model to be appropriate when deploying cloud based applications.

### **COURSE OUTCOMES**

Upon completion of the course, students will be able to:

1. Investigate the trade-offs among deploying applications in the cloud and over the local infrastructure.
2. Compute the real-world problems security, privacy issues using cloud computing through group collaboration.
3. Development and Deployment applications over commercial cloud computing infrastructures.
4. Analyze and investigation of application & hardware performance, scalability, and availability of the underlying cloud technologies and software.

### **SYLLABUS**

#### **UNIT-I: Overview of Cloud Computing**

Introduction- Evolution, Shift from distributed computing to cloud computing; principles and characteristics of cloud computing- IaaS, PaaS, SaaS; service oriented computing and cloud environment, Advantages, Service & Deployment Models, Infrastructure, and Consumer View, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

  
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### **UNIT-II :Cloud Computing Technology-**

Client systems, Networks, server systems and security from services perspectives, security and privacy issues; accessing the cloud with platforms and applications; Cloud storage.

### **UNIT-III: Working with Cloud**

Infrastructure as a Service – conceptual model and working, Platform as a Service – conceptual model and functionalities. Software as a Service – conceptual model and working. Trends in Service provisioning with clouds. Working on Microsoft Azure & IBM Smart Cloud.

### **UNIT-IV: Using Cloud Services-**

Cloud collaborative applications and services – case studies with calendars, schedulers and event management; cloud applications in project management. Amazon Web Services & applications, AWS EC2, S3, Cloud Analytics, Cloud Open Stack

**UNIT-V: Case studies-** Microsoft Azure, Google App Engine, IBM Smart Cloud and Open source clouds, -Open-Nebula, Sales force and Eucalyptus, Cloud Simulation

### **TEXT BOOKS:**

1. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, RobertElsenpeter, 2010 by The McGraw-Hill.
2. Buyya, Selvi ,” Mastering Cloud Computing “,TMH Pub.
3. Michael Miller, Cloud computing – Web based Applications, Pearson Publishing, 2011

### **REFERENCES:**

1. Kumar Saurabh, “Cloud Computing”, Wiley Pub,2012.
2. Krutz , Vines, “Cloud Security , Wiley Pub,2013.
3. Sosinsky, “ Cloud Computing”, Wiley Pub,2012.
4. Murray Woodside; John Chinneck ; Marin Litiou on “Adaptive Cloud Deployment Using Persistence Strategies and Application Awareness”IEEEExplore, Year: 2017, Page(s):277 – 290.

### **LIST OF PRACTICALS:**

1. Service deployment & Usage over cloud using Virtual Box.
2. Performance evaluation of services over cloud using VMware tool.
3. Working of Goggle Drive to make spreadsheet.
4. Working on Heroku for Cloud application deployment.
5. Working on Anekasevices for Cloud application.
6. Working on services of Google App Engine.
7. Working on Application deployment & services of Microsoft Azure.
8. Working on Application deployment & services of IBM Smart Cloud.
9. Working and configuration of Euceliptus.
10. Deployment & Services of Amazon Web Services.



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<b>BTMACS 501</b>	<b>UG</b>	<b>Design Pattern &amp; UI Testing in IOS</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

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#### Course Objectives:

1. To impart knowledge of Swift and Apple iOS application Design and Development.
2. To provide students with the skills necessary to develop an iOS App from scratch to deploying it on the Apple Store.
3. To provide UI test tests a specific user interaction with the application's UI. Automated testing.

#### Course Outcomes:

At the end of the course the students will be able to :-

1. With iOS as the platform, students will learn Object- oriented programming, Design Patterns.
2. With iOS as the platform, students will learn Type Systems, Functional Language features, user interface design, best practices in programming, and problem analysis.
3. With UI test tests a specific user interaction with the application's UI. Automated testing can, and should, be performed at both the unit test and UI test levels.

#### Syllabus:

##### UNIT I

Understanding design patterns, getting used to Xcode, creating the sports Store app, creating design pattern: object template pattern, prototype pattern, singleton pattern, object pool pattern, builder pattern, Target Action patten in Swift/iOS.

##### UNIT II

**The Structural Pattern:** Adapter pattern, Bridge pattern, Decorator pattern, Composition pattern, Facade pattern, Fly weight pattern, Proxy pattern, Delegation pattern.

##### UNIT III

**Architecture Pattern:** The Model/View/Controller Pattern, MVVM, MVP, VIPER.

  
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### **UNIT IV**

**Testing:** Testing basics, Performance testing, UI testing, app and Library tests, XCTest—the Xcode Testing Framework. Writing Test Classes and Methods, Running Tests and Viewing Results.

### **UNIT V**

**Debugging Tests:** Test Debugging Workflow, Test Specific Debugging Tools, Code Coverage, Enable Code Coverage, Automating the Test Process.

### **Text Books:**

1. “Pro Design pattern in Swift” Adam Freeman. 2019
2. Design Patterns in Swift 5: Learn How to Implement the Gang of Four Design Patterns Using Swift 5. Karoly Nyisztor. 2018
3. App Architecture: iOS Application Design Patterns in Swift, Chris Eidhof, Matt Gallagher, 2019
4. IOS Unit Testing by Example Book by Jon Reid. 2018
5. Test-Driven IOS Development with Swift Book by Dominik Hauser.

### **Reference Books:**

1. Design Patterns in Swift: A Different Approach to Coding with Swift - iOS. Vamshi Krishna.
2. Advanced iOS App Architecture, René Cacheaux & Josh Berlin, 2019
3. Test iOS Apps with UI Automation, O’Reilly 2019

### **List of experiment:**

1. Create the sample project in Xcode.
2. Create a clone app Similar to SportStore app.
3. Develop the project using object template pattern.
4. Develop the project using prototype pattern.
5. Develop the project using singleton pattern.
6. Create an app following the Adapter pattern, Bridge pattern.
7. Create an app following the Facade pattern, FLYweight pattern.
8. Create Target & Action design Pattern in iOS.
9. Create Delegation Pattern in iOS.
10. Experiments with MVC (Model/View/Controller) approach for design pattern.
11. Create MVVM, MVP Pattern design view.
12. Create Viper Pattern design view.
13. LeaICT International Conference Brochure on how XCTest manages test cases.
14. Learn to enable code coverage and generate the results.
15. Add test for existing code



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<b>BTCS407</b>	<b>UG</b>	<b>Programming with Python</b>	-	-	-	<b>60</b>	<b>40</b>	-	-	<b>4</b>	<b>2</b>

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**COURSE OBJECTIVES**

1. To develop proficiency in creating based applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to use generators for generating series like fibonacci.

**COURSE OUTCOMES**

Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:

1. Ability to create robust applications using the Python programming language.
2. Ability to test and debug applications written using the Python programming language.
3. Ability to create applications for solving computational problems using the Python Programming Language.

**SYLLABUS**

**UNIT-I**

**Introduction to Python:** The basic elements of Python, Branching programs, Strings and Input, Iteration. Functions, Scoping and Abstraction: Functions and Scoping, Specifications, Recursion, Global variables, Modules, Files.

**UNIT-II**

**Testing and Debugging:** Testing, Debugging. Structured Types, Mutability and Higher order Functions: Tuples, Lists and Mutability, Functions as Objects, Strings, Tuples and Lists, Dictionaries.

  
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### **UNIT-III**

**Exceptions and assertions:** Handling exceptions, Exceptions as a control flow mechanism, Assertions. Classes and Object oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding.

### **UNIT-IV**

**Some simple Algorithms and Data Structures:** Search Algorithms, Sorting Algorithms, Hashtables. Plotting and more about Classes: Plotting using PyLab, Plotting mortgages and extended examples.

### **UNIT-V**

**Dynamic Programming:** Fibonacci sequence revisited, Dynamic programming and the 0/1 Knapsack algorithm, Dynamic programming and divide and conquer.

### **TEXT BOOKS:**

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press.
3. Mark Lutz "Learning Python" O'Reilly Media; 5 edition.
4. David Beazley "Python Cookbook, Third edition" O'Reilly Media

### **REFERENCES:**

1. Python Essential Reference, 4th Edition Addison-Wesley Professional.
2. Mark Lutz "Programming Python: Powerful Object-Oriented Programming "David Beazley "Python Cookbook" Third edition, O'Reilly Media

### **List of Practical's:**

1. Write a Python Program to Print Hello world!
2. Write a Program to Add Two Numbers.
3. Write a Program to Find the Square Root.
4. Write a Program to Calculate the Area of a Triangle.
5. Write a Program to Solve Quadratic Equation.
6. Write a Program to Swap Two Variables.
7. Write a Program to Generate a Random Number.
8. Write a Program to Convert Kilometers to Miles.
9. Write a Program to Convert Celsius To Fahrenheit.
10. Write a Program to check if a number is positive, negative or zero.
11. Write a Program to Check if a Number is Odd or Even.
12. Write a Program to Check Leap Year.
13. Write a Program to Find the Largest Among Three Numbers.
14. Write a Program to Check Prime Number.
15. Write a Program to Print all Prime Numbers in an Interval.
16. Write a Program to Find the Factorial of a Number.
17. Write a Program to Display the multiplication Table.
18. Write a Program to Print the Fibonacci sequence.
19. Write an English sentence with understandable semantics but incorrect syntax. Write another English



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sentence which has correct syntax but has semantic errors.

20. Create a program that prompts the user for a number of gallons of gasoline. Reprint that value along with its conversion equivalent number of liters.
21. Write a program that allows a user to enter his or her two favorite foods. The program should then print out the name of a new food by joining the original food names together.
22. Write a Tipper program where the user enters a restaurant bill total. The program should then display two amounts: a 15 percent tip and a 20 percent tip.
23. Write a Car Salesman program where the user enters the base price of a car. The program should add on a bunch of extra fees such as tax, license, dealer prep, and destination charge. Make tax and license a percent of the base price. The other fees should be set values. Display the actual price of the car once all the extras are applied.
24. Create a program with a function that calculates the area of a circle by taking a radius from the user.
25. Write your own sum function called mySum that takes a list as a parameter and returns the accumulated sum.

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<b>BTCSMOB 501</b>	<b>UG</b>	<b>Mobile Application Development-V</b>	-	-	-	<b>60</b>	<b>40</b>	-	-	<b>4</b>	<b>2</b>

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**Course Objectives:**

1. To describe the advance tools and techniques to develop an iOS application.
2. To illustrate the advance concepts of application development for iOS with Swift programming language.
3. To design complex applications and user’s interaction for iOS application.
4. To learn Best practices of App designing and prototyping.

**Course Outcomes:**

At the end of the course the students will be able to :-

1. Implement applications based on MVC.
2. Implement Protocols, Extensions and Clousers in iOS applications.
3. Create complex applications using ScrollView and TableView.
4. Implement Web based applications.
5. Demonstrate programming best practices in Swift and able to select the appropriate human interface, App Icon, launch screen, color to develop the working iOS application from the concept.

**Syllabus:**

**UNIT-I**

**Protocols and Model-View-Controller**

**Protocols:** CustomStringConvertible, Equatable, Comparable, Codable, Creating a protocol, Delegation.

**Model-View-Controller:** Pattern, Model objects, Model object Communication, Views, Views Communication,

**Controllers:** View controllers, Model controllers, Helper controllers; Controller Communication, Project organization.

**UNIT-II**

**Scroll Views and Table Views**

**Scroll Views:** UIScrollView, Scroll views Scroll views in Interface Builder: Define scroll view frame, Add constraints,

  
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B.Tech. (Computer Science and Engineering - Mobile Applications - Apple Authorized Training Center)

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### SEMESTER -V

Define content view using stack view, Programmatic constraints, Keyboard issues, Content insets, Scroll indicator, Scroll View family.

**Table Views:** UITableView, Types, Table view controllers, Table view styles, Table view cells, UITableViewCell properties, Index paths, Arrays and table views, Cell dequeuing, Table view protocols, Table view data source, Table view delegate, Reload data, Intermediate Table Views.

#### **UNIT-III**

##### **System View Controllers**

**System View Controllers:** Apple system view controllers, Activity view controller, SFSafariViewController, Alert controllers. Access the camera: UIImagePickerController, Permission; Send email: Verify whether mail can be sent, MFMailComposeViewController, mailComposeController.

#### **UNIT-IV**

##### **Closures, Extensions and App Personality**

**Closures:** Passing closures as arguments, Syntactic sugar, Collection functions using closures: Map, Filter, Reduce; Extensions: Adding computed properties, Adding instance or type methods, Organizing code.

**App Personality:** The human interface, App icon design, App in locations, App icon size, App icon files, Best practices: Launch screen, Color, Animation, Typography, Branding and styling.

Prototyping: Simple is best, Define the problem, Create a user persona, Create a feature set, Make, show, learn, workflows and visuals, Formalize a prototype, user interviews, Iterate.

#### **UNIT-V**

##### **Saving Data and Working with the Web, Decoding JSON**

**Saving Data:** Encoding and decoding with Codable, App sandbox, Writing data to a file, Documents directory, Reading the data, Saving and reading an array of model data.

**Working with the Web:** HTTP and URLSession, The Basics, Query parameters, HTTP methods, HTTP headers, HTTP body, Create a URL, Create and execute a network request, Work with an API, Modify a URL with URL components.

**Working with the Web -Decoding JSON:** JSON, The basics, Convert JSON data to Swift types, Decoding into custom model objects, Update the request completion handler, Concurrency.

##### **Text Books:**

1. Develop in Swift Data Collections. (as available on Apple Book Store)
2. Develop in Swift Fundamentals.
3. Jon Hoffman ,Mastering Swift 5: Deep dive into the latest edition of the Swift programming language, 5th Edition
4. Matthew Mathias, John Gallagher, Swift Programming: The Big Nerd Ranch Guide 2nd edition, 2015.
5. Matt Neuberg , iOS 12 Programming Fundamentals with Swift, O'Reilly; 5<sup>th</sup> edition.

##### **Reference Books:**

1. Paris Buttfield-Addison, Jonathon Manning , Tim Nugent Learning Swift: Building Apps for macOS, iOS, and Beyond, O'Reilly Media, Inc., 3rd ed, 2018.
2. Vandad Nahavandipoor. iOS 11 Swift Programming Cookbook, O'Reilly Media, 2020

  
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**SEMESTER -V**

**List of Practicals:**

Complete All the Lab Exercises, playgrounds and projects given in student material of Develop in swift Data Collections.

1. Write a program to implement different protocols.
2. Create an App by following MVC guidelines.
3. Create an App to demonstrate Scrollview and its features
4. Create an App to demonstrate Tableview and its features.
5. Create different Apps featuring different System View.
6. Write a program to demonstrate Closures.
7. Write a program to demonstrate Extensions.
8. Create an App to store and read data from a file.
9. Create an App to demonstrate HTTP request and response.
10. Create an App to demonstrate JSON encoding and decoding.

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**SEMESTER -V**

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment	END SEM University Exam	Teachers Assessment*				
<b>BTIT712</b>	<b>UG</b>	<b>ENTERPRISE RESOURCE PLANNING</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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**COURSE OBJECTIVES:**

The objective of this course is to help students to understand the basics of ERP, its uses and its application.

**COURSE OUTCOMES:**

Students to understand the basics of ERP, its uses and its application in present business scenario.

**Syllabus**

**Unit I: Introduction to ERP**

1. Enterprise Resource Planning –Introduction
2. Need of ERP
3. Advantages of ERP
4. Growth of ERP

**Unit II: ERP and Related Technologies**

1. Business process Reengineering (BPR)
2. Management Information System (MIS)
3. Decision Support Systems (DSS) Executive Support Systems (ESS)
4. Data Warehousing
5. Data Mining
6. Online Analytical Processing (OLTP)
7. Supply Chain Management (SCM)
8. Customer Relationship Management (CRM)

**Unit III: Modules of ERP**

1. ERP modules & Vendors Finance Production planning, control & maintenance Sales & Distribution Human Resource Management (HRM)

  
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**SEMESTER -V**

2. Inventory Control System.
3. Quality Management ERP Market

**Unit IV: ERP Implementation**

1. ERP Implementation Life Cycles Evaluation and selection of ERP package
2. Project planning Implementation
3. Team training & testing
4. End user training & Going Live
5. Post Evaluation & Maintenance.

**Unit V: Post implementation of ERP**

ERP Case Studies Post implementation review of ERP Packages in Manufacturing Services

**REFERENCES:**

1. Leon, A. (2008). Enterprise Resource Planning. New Delhi; Tata McGraw-Hil Education
2. Kumar, V., Venkitakrishna, N. K. (1998). ERP - Concepts and Practice. New Delhi; PHI
3. Garg, Venkitakrishnan (2003).ERP Concepts and Planning. New Delhi; PHI Learning.

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			END SEM University Exam	Two Term Exam	Teachers Assessment	END SEM University Exam	Teachers Assessment*				
<b>BTIT513</b>	<b>UG</b>	<b>MANAGEMENT INFORMATION SYSTEM</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

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**COURSE OBJECTIVES:**

1. To Understand types of MIS applications in organizations
2. To Discuss the development of management information systems in organizations.
3. To Select and design MIS systems appropriate to meet management requirements.
4. To Critically evaluate MIS contributions to the strategic management of organizations

**COURSE OUTCOMES:**

1. To understand MIS in both the wider managerial context and in the narrower confines of the selection, support, design and development of computer applications
2. To focus on the concepts a manager's needs to understand, in order to make effective use of, computerized information systems

**SYLLABUS**

**UNIT-I**

**Organizations and Computing:** Introduction, Modern Organization-IT enabled- Networked-Dispersed-Knowledge Organization, Information Systems in Organizations- what are information systems?, Brief history of computing- ENIAC: Way to commercial computers- Advent of artificial intelligence- advent of personal computing-Free Software Movement- Advent of Internet, The role of internet- Internet and Web: they are different-the internet changes everything

**UNIT-II**

**Managing Information Systems in Organizations:** Introduction, Managing in the Internet Era, Managing Information Systems in Organization-the IT interaction model, Challenges for the manager-what information to build?-how much to spend on information systems?-what level of capabilities should be created with information systems?-how centralized should the services be?-what security levels are required?-what is technology road map for the organization?

  
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**SEMESTER -V**

**UNIT–III**

**Data and Information:** Introduction, data and information- measuring data, information as a resource, information in organizational functions, types of information technology, types of information systems-transaction processing systems-management information system.

**UNIT–IV**

**Decision making and communication:** Introduction, Decision making with MIS-Tactical decisions-operational decisions-strategic decisions, communication in organizations- types of communication-examples of communications in organizations- decision making with communication technology.

**UNIT–V**

**Strategy:** Introduction, Information goods-properties-technology lock-in and switching costs-network externalities-positive feedback-tippy markets, information systems and competitive strategy- value chain, the Role of CIO-information system's plan-vendor coordination-technology updates-return on investment on technology.

**TEXT BOOKS:**

1. Kenneth C. Laudon & Jane P. Laudon, Essentials of Management Information Systems, Tenth Edition, Pearson Prentice, Hall, 2012
2. Terry Lucey, Management Information Systems, Ninth Edition, 2005, Thompson.

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**SEMESTER -V**

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<b>BTIT611</b>	<b>UG</b>	<b>INFORMATION STORAGE AND MANAGEMENT</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

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\***Teacher Assessment** shall be based on the following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**COURSE OBJECTIVES:**

1. An ability to understand various storage architecture & technologies.
2. An ability to understand various technologies used to provide backup & recovery.
3. An ability to understand various techniques used to provide security.
4. Ability to identify information storage system requirements.
5. An ability to develop policy for information storage system.
6. An ability to develop policy for backup& recovery.

**COURSE OUTCOMES:**

On completion of the course students will be able to:

1. Describe & apply storage technologies.
2. Identify storage technologies that provide cost effective IT solution for medium to large scale businesses & data centers.
3. Manage Virtual Server & Storage between Remote locations.
4. Design analysis and manage clusters of resources.

**Syllabus**

**Unit-I:**

**Introduction:** Digital data and its types, Information storage, Key characteristics of data center, Evolution of computing platforms. Introduction to storage technology: Data Proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information life Cycle Management, Data categorization.

**Unit-II:**

**Storage System Architecture:** Intelligent disk subsystems overview, Contrast of integrands modular

  
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array, Component Architecture of Intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

**Unit-III:**

**Introduction to network storage:** JBOD, DAS, NAS, SAN & CAS evolution and comparison, Applications, Elements, Connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

**Unit-IV:**

**Hybrid storage solutions and virtualization:** memory, network, server, storage & appliances. Data centre concepts & requirements, Backup and disaster recovery. Industry Management standards, standard framework applications, Key management metrics.

**Unit-V:**

**Information storage on clouds:** concept of cloud, cloud computing, storage on cloud, Cloud benefits, Cloud computing evolution. Application & services on cloud, cloud service providers, cloud deployment models, Essential characteristics of cloud computing.

**TEXT BOOK:**

1. G.Somasundaram & Alok Shrivastava editors, ISM: Storing, Managing, and Protecting Digital Information; Wiley India

**REFERENCES:**

1. Saurabh; Cloud Computing : Insight into New era Infrastructure; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained: Basic and application of fiber channels, SAN, NAS, ISESI, INFINIBAND and FCOE, Wiley India.
3. Sosinsky, Cloud Computing Bible, Wiley India.

  
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**SEMESTER -V**

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<b>BTIT511</b>	<b>UG</b>	<b>WIRELESS COMMUNICATION NETWORKS</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>3</b>

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**COURSE OBJECTIVES:**

The student will have ability to:

1. Understand the fundamental of wireless communication system.
2. Describes radio propagation models and wireless channel effects.
3. Knows fundamental concept of cellular radio concepts.
4. Explains various wireless communication network systems, standards and applications.

**COURSE OUTCOMES:**

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

1. Demonstrate wireless communication systems design and working.
2. Investigate various advanced techniques for wireless communications.
3. Constructs design architectures for different Wireless Systems.
4. Evaluates the emerging trends in Wireless communication.

**SYLLABUS**

**UNIT-I**

**Introduction to Wireless Communication System:** Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks ,Wireless Local Loop(WLL),Wireless Local Area network(WLAN),

  
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### SEMESTER -V

#### **UNIT-II**

**The Cellular Concept- System Design Fundamentals:** Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Hand off Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters.

#### **UNIT-III**

**Mobile Radio Propagation Model, Small Scale Fading and diversity:** Large scale path loss:-Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design, Max. Distance Coverage formula, Empirical formula for path loss, Indoor and outdoor propagation models, Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Feher's delay spread, Types of small scale Fading, Rayleigh and rician distribution.

#### **UNIT-IV**

**Multiple Access Techniques:** Introduction, Comparisons of multiple Access Strategies TDMA, CDMA, FDMA, OFDM, CSMA Protocols.

Mobile Network And Transport Layers :Mobile IP , Dynamic Host Configuration Protocol, Mobile Ad Hoc Routing Protocols, Multicast routing, TCP over Wireless Networks , Indirect TCP , Snooping TCP , Mobile TCP .Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, CDMA forward channels, CDMA reverse channels, Soft hand off, CDMA features, Power control in CDMA, Performance of CDMA System, GPRS system architecture.

#### **UNIT-V**

Introduction to Wi-Fi, WiMAX, Zig-Bee Networks, Software Defined Radio, UWB Radio, Wireless Adhoc Network and Mobile Portability, Security issues and challenges in a Wireless network. Application Layer :WAP Model, Mobile Location based services ,WAP Gateway ,WAP protocols wireless bearers for WAP , WML ,WMLScripts.

#### **TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education,
2. William Stallings, "Wireless Communications and Networks", Pearson Education.
3. William D Stanley : Network Analysis with Applications, Pearson Education.
4. Roy Choudhary D: Network and systems, New Age Publication.
5. Wireless Communication, Theodore S. Rappaport, Prentice hall

#### **REFERENCES:**

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2000 UNIT III.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2000 UNIT III.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
4. Wireless digital communication, Kamilo Feher, PH.

  
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