

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF INFORMATION TECHNOLOGY



CBCS SYLLABUS

BACHELOR OF SCIENCE

PROGRAMME CODE - I

COURSE STRUCTURE

(w.e.f. 2021 – 2022 Batch onwards)



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CRITERION - I

1.2.2 Details of Programmes offered through Choice Based Credit System (CBCS) / Elective Course System

Syllabus copies with highlights of contents focusing on
Elective Course System



To be Noted:

HIGHLIGHTED	COURSE
	Elective

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.*(An Autonomous Institution – Affiliated to Madurai Kamaraj University)***Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC****CBCS****DEPARTMENT OF INFORMATION TECHNOLOGY – UG****(w.e.f. 2021– 2022 Batch onwards)****COURSE STRUCTURE - SEMESTER WISE**

Sem.	Part	Sub. Code	Title of the paper	Teaching hrs. (per week)	Exam Duration of (hrs)	Maximum Marks			Credits
						CIA	SE	Total	
V	III	21I51	Core 9: Programming in Java	5	3	25	75	100	4
	III	21I52	Core 10: Computer Graphics	5	3	25	75	100	4
	III	21I53	Core 11: Computer Networks	5	3	25	75	100	4
	III	21I5P	Core Lab 12: Programming in Java Lab	6	3	40	60	100	4
	III		Elective - I	5	3	25	75	100	5
	IV	21SEI5P	SBE: Multimedia Lab	2	3	40	60	100	2
	IV	214EV5	Environmental Studies	2	3	25	75	100	2
VI	III	21I61	Core 13: Software Engineering	5	3	25	75	100	4
	III	21I62	Core 14: Data Mining and Warehousing	5	3	25	75	100	4
	III	21I6P	Core Lab 15: Web Technology Lab	6	3	40	60	100	4
	III		Elective - II	5	3	25	75	100	5
	III	21IEPR6	Elective - III	5	3	20	80	100	5
	IV	21SEI61	SBE: Python Programming Lab	2	3	40	60	100	2
	IV	214VE6	Value Education	2	3	25	75	100	2
	V	215NS4/ 215PE4	Extension Activities N.S.S / Physical Education	-	3	25	75	100	1

Electives:**Semester - V****Elective- I (Choose any one)**

1. Client Server Computing - **21IE5A**
2. Android Programming - **21IE5B**
3. Pattern Recognition - **21IE5C**

Semester – VI**Elective - II (Choose any one)**

1. Cloud Computing - **21IE6A**
2. Digital Image Processing - **21IE6B**
3. Cyber Security - **21IE6C**

Elective - III

Project - **21IEPR6**

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DEPARTMENT OF INFORMATION TECHNOLOGY-UG

(w.e.f. 2021– 2022 Batch onwards)

Title of the Paper : Client Server Computing

Semester : V

Sub Code : 21IE5A

Contact Hours: 5

Credits : 5

Objectives:

1. Conceptualize the basics of Client Server Computing.
2. Identify the different types of Client and Server Operating Systems.
3. Familiarity with the Testing and Diagnostic Tools of Server Operating System.

Unit-I:

Introduction to Client/server computing: Overview of Client/Server Computing: Client Server Computing - Benefits of Client/Server Computing. **Evolution of Client/Server Computing:** Hardware Trends - Software Trends. **Overview of Client/Server Applications:** Components of Client/Server Applications - Classes of Client/Server Applications - Categories of Client/Server Applications.

Unit-II:

Understanding Client/Server Computing: Dispelling the Myths - Obstacles- Upfront and Hidden - Open Systems and Standards – Standards - Setting Organizations - Factors for Success. **The Client: Client Hardware and Software:** Client Components - Client Operating Systems - What is GUI - X Window Vs Windowing - Database Access - Application Logic. **Client Software Products:** GUI Environments - Converting 3270/5250 Screens - Database Access Tools.

Unit-III:

Client Requirements: GUI Design Standards - GUI Design Standards - Open GUI Standards - Interface Independence - Testing Interface - Development Aids. **The Server:** Server Hardware – Benchmarks - Categories of Servers - Features of Server Machines - Classes of Server Machines. **Server Environment:** Eight Layers of Software - Network

Management Environment - Network Computing Environment – Extensions -Network Operating System - Loadable Modules.

Unit-IV:

Server Operating Systems: OS/2 2.0 - Windows New Technology – UNIX -Based Operating Systems. **Server Requirements:** Platform Independence - Transaction Processing - Connectivity - Intelligent Database - Stored Procedures – Triggers - Load Leveling – Optimizer - Testing and Diagnostic Tools – Reliability - Backup and Recovery Mechanisms.

Unit-V:

Server Data Management and Access Tools: Data Manager Features - Data Management Software - Database Gateways. **Overview of Networking:** Layers, Interfaces, and Protocols-Standard Architecture - Network Characteristics - Network Management Standards - LAN Characteristics.

Text Book:

Dawna Travis Dewire, *Client/Server Computing*, McGraw Hill International Edition, New Delhi, First Edition, 2003.

Chapters:

Unit I	-	Chapters 1, 2 & 3
Unit II	-	Chapters 4, 5 & 6
Unit III	-	Chapters 7, 8 & 9
Unit IV	-	Chapters 10, 11
Unit V	-	Chapters 12, 13

Reference Books:

1. Bernard H.Boar, *Implementation client server computing*, McGraw Hill, New Delhi, First Edition, 1993.
2. Bruce R.Elbert, Boddy Martyna, *Client Server Computing*, Artech publisher, New Delhi, First Edition, 1994.
3. Patrick N.Smith, Steven L.Guengerich, *Client/Server Computing*, PHI Learning Private Limited, New Delhi, Second Edition, 2011.
4. William Marion, *Client/Server Strategies*, McGraw-Hill Professional, New Delhi, First Edition, 1994.
5. Ligon, Thomas Ligon, *Client server Communications Services*, McGraw-Hill Professional, NewDelhi, First Edition, 1997.

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Title of the Paper : Android Programming

Semester : V

Contact Hours: 5

Sub Code : 21IE5B

Credits : 5

Objectives:

1. To understand the basics of activities and multiple layouts.
2. To understand the usage of menus in designing widgets.
3. To acquire knowledge in handling database, files and notifications.

Unit-I:

Activities and Layout: Introduction-Declaring an Activity- Starting a new activity with an intent object-Switching between activities-Passing data to another activity-Returning a result from an activity-Saving an activity's state-Storing persistent activity data-Understanding the activity life cycle. **Layouts:** Introduction –Defining and inflating a layout- Using Relative layout- Using linear layout- Creating tables- Table Layout and Grid Layout-Recycler View replaces List View – Changing layout properties during runtime

Unit-II:

Views, Widgets and Styles: Introduction- Inserting a widget into a layout-Using Graphics to show button state-Creating a widget at runtime-Creating a custom component-Applying a style to a view-Turning a style into a theme-Selecting a theme based on the Android version. **Menus and Action Mode:** Introduction-Creating an options menu-Modifying menus and menu items during runtime-Enabling Contextual Action Mode for a view-Creating a pop-up menu.

Unit-III:

Fragments and System UI: Introduction-Creating and Using a Fragment-Adding and Removing Fragments during runtime-Passing data between Fragments. **Home Screen**

Widgets, Search and the System UI: Introduction- Creating a shortcut on the Home Screen-Creating a Home Screen widget- Adding Search to the Action Bar-Showing your App full-screen

Unit-IV:

Data Storage: Introduction-Storing simple data-Read and Write a text file to internal storage-Read and Write a text file to external storage-Including resource files in your project-Creating and Using an SQLite database-Accessing data in the background using a Loader-Accessing external storage with scoped directories in Android N. **Alerts and Notifications:** Displaying a message box with AlertDialog- Displaying a progress dialog-Making a Flashlight with a Heads-up Notification.

Unit-V:

Graphics and Animation: Using the Touchscreen and Sensors: Listening for click and long-press events- Pinch-to-zoom with multi-touch gestures- Reading sensor data-using Android Sensor Framework events- Reading device orientation. **Graphics and Animation:** Introduction-Scaling down large images to avoid Out of Memory exceptions- A transition animation-defining scenes and applying a transition- Creating a Compass using sensor data and RotateAnimation- Creating a slideshow with ViewPager-Creating a Card Flip Animation with Fragments-Creating a ZoomAnimation with a Custom Transition-Displaying Animated image (GIF/WebP) with the new ImageDecoder library- Creating a Circle image with the new ImageDecoder.

Text Book:

Rick Boyer Cookbook. (2018). “*Android 9 Development*”. Packet Publishing Ltd. 3rd Edition.

Chapters:

Unit I	: Chapter 1, 2
Unit II	: Chapter 3, 4
Unit III	: Chapter 5, 6
Unit IV	: Chapter 7, 8
Unit V	: Chapter 9, 10

Reference Books:

1. John Horton . “*Android Programming for Beginners*”. Packt Publishing. 1st Edition. 2015.
2. B.M.Harwan. “*Android Programming Unleashed*”. Pearson Education. 2013.
3. Bill Phillips, Chris Stewart. *Android Programming*. O’Reilly Media Publishers. Third Edition. 2013.
4. Ian Darwin, “*Android Cookbook: Problems and Solutions for Android Developers*, Second Edition (Grayscale Indian Edition), 1 January 2017.
5. Keith Makan, Scott Alexander-Bown. “*Android Security Cookbook Paperback* “, 24 December 2013.

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1. A good knowledge of Bayesian decision theory and Bayesian learning.
2. Fundamental understanding of classifiers such as linear discriminant function, quadratic discriminant function, nearest neighbor rule, neural network and SVM.
3. Ability to evaluate the performance of various classifiers on real-world datasets.

UNIT-I:

Pattern Classifier : Introduction - Data Sets for Pattern Recognition - Different Paradigms for Pattern Recognition - Representation -Data Structures for Pattern Representation - Patterns as Vectors- Patterns as Strings -Logical Descriptions -Fuzzy and Rough Pattern Sets -Patterns as Trees and Graphs - Representation of Clusters - Proximity Measures - Distance Measure - Weighted Distance Measure - Non-Metric Similarity Function - Edit Distance -Mutual Neighbourhood Distance (MND) - Conceptual Cohesiveness - Kernel Functions - Size of Patterns - Normalization of Data -Use of Appropriate Similarity Measures - Abstractions of the Data Set

UNIT-II:

Clustering : Introduction to Clustering- Hierarchical Algorithms - Divisive Clustering - Agglomerative Clustering - Partitional Clustering - k-Means Algorithm - Soft Partitioning- Clustering Large Data Sets - Possible Solutions - Incremental Clustering - Divide-and-Conquer Approach

UNIT-III:

Linear Classifiers: Introduction - Linear Discriminant Functions and Decision Hyper planes - The Perceptron Algorithm - Least Squares Methods –STOCHASTIC Approximation and LMS Algorithm -Mean Square Error Estimation - Mean Square Error Regression -The Bias-Variance Dilemma -Separable Classes –Non-separable Classes

UNIT-IV:

Hidden Markov Models And Support Vector Machine: Markov Models for Classification - Hidden Markov Models - HMM Parameters - Learning HMMs - Classification Using HMMs - Classification of Test Patterns-Linear Discriminant Functions- Learning the Linear Discriminant Function- Learning the Weight Vector - Multi-class Problems - Generality of Linear Discriminants- SVM for Classification - Linearly Separable Case - Non-linearly Separable Case

UNIT-V:

Feature Selection and Extraction: Feature selection - Feature selection criteria - Search algorithms for feature selection -Suboptimal search algorithms - Linear feature extraction - Principal components analysis –Karhunen–Loeve transformation -Factor analysis-Multidimensional scaling - Classical scaling -Metric multidimensional scaling -Ordinal scaling-Algorithms -Multidimensional scaling for feature extraction

Text Books:

1. M. Narasimha Murthy and V. Susheela Devi, “Pattern Recognition”, Springer 2011.
2. S.Theodoridis and K.Koutroumbas, “Pattern Recognition”, 4th Ed., Academic Press, 2009
3. Andrew Webb, “Statically Pattern Recognition”, Arnold publishers, London,1999.

UNIT I	-	Chapters 1,2 (Text Book 1)
UNIT II	-	Chapters 9 (Text Book 1)
UNIT III	-	Chapters 3 (Text Book 2)
UNIT IV	-	Chapter 5,7(Text Book 1)
UNIT V	-	Chapter 9 (Text Book 3)

Reference Books:

1. “Pattern Recognition Statistical, Structural and Neural Approaches” Robert J.Schalkoff, John Wiley & Sons Inc., New York, 1992.
2. Pattern Recognition and Machine Learning” C.M.Bishop, “, Springer, 2006.
3. “Pattern Classification” R.O.Duda, P.E.Hart and D.G.Stork, , John Wiley, 2001
4. “Stastical Pattern Recognition” Andrew Webb, Arnold publishers, London,1999.
5. K. Fukunaga, Introduction to Statistical Pattern Recognition, 2nd Ed. Academic Press, New York, 1990.

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Title of the Paper : Cloud Computing**Semester : VI****Sub Code : 21IE6A****Contact Hours : 5****Credits : 5****Objectives:**

1. Analyze the various Cloud concepts and Technologies.
2. Have to knowledge in Cloud based Services and Applications.
3. To learn the basic python programming for cloud services.

Unit: I

Introduction to Cloud Computing: Introduction – Characteristics of Cloud Computing – Cloud Models – Cloud-based Services & Applications. **Cloud Concepts & Technologies:** Virtualization – Load Balancing – Scalability & Elasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network Function Virtualization – MapReduce.

Unit: II

Cloud Services & Platforms: Compute Services – Storage Services – Database Services – Application Services – Content Delivery Services. **Hadoop & MapReduce:** Apache Hadoop – Hadoop MapReduce Job Execution – Hadoop Schedulers.

Unit: III

Cloud Application Design: Introduction – Design Considerations for Cloud Applications – Reference Architectures for Cloud Applications – Cloud Application Design Methodologies – Data Storage Approaches.

Unit: IV

Python Basics: Introduction – Python Data Types & Data Structures – Control Flow – Functions – Modules – Packages – File Handling – Date/Time Operations – Classes. **Python for Cloud:** Python for Amazon Web Services.

Unit: V

Cloud Security: Introduction – CSA Cloud Security Architecture – Authentication – Authorization – Identity & Access Management – Data Security.

Cloud for Industry, Healthcare & Education: Cloud Computing for Healthcare – Cloud Computing for Manufacturing Industry – Cloud Computing for Education.

Text Book:

Arshdeep Bahga, Vijay Madiseti, *Cloud Computing: A Hands-on Approach*, University Press(India) Private Limited, Hyderabad, 2th Edition, 2016.

Chapters:

Unit 1 - Chapters 1 (1.1-1.3, 1.5) & 2 (2.1 - 2.9)

Unit 2 - Chapters 3 (3.1 - 3.5) & 4 (4.1 - 4.3)

Unit 3 - Chapter 5 (5.1 - 5.5)

Unit 4 - Chapters 6 (6.1 - 6.10) & 7 (7.1)

Unit 5 - Chapters 12 (12.1 - 12.6) & 13 (13.1, 13.4, 13.5)

Reference Books:

1. John W.Rittinghouse and James F.Ransome, *Cloud Computing: Implementation, Management, and Security*, CRC Press, United States, 2010.
2. Katarina Stanoevska-Slabeva, Thomas Wozniak, *SantiRistol, Grid and Cloud Computing – A Business Perspective on Technology and Applications*, Springer, Chennai, 2010.
3. Kumar Saurabh, *Cloud Computing – insights into New-Era Infrastructure*, Wiley India, New Delhi, 2011.
4. Rajkumar Buyya, Christian Vecchiola, S.ThamaraiSelvi, *Mastering Cloud Computing*, Tata McGraw Hill Education Private Limited, New Delhi, 2013.
5. Ronald L. Krutz, Russell Dean Vines, *Cloud Security – A comprehensive Guide to Secure Cloud Computing*, Wiley – India, New Delhi, 2010.

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1. Identify the image fundamentals and mathematical transforms necessary for image processing.
2. Learn the functionalities of spatial and frequency filters for image enhancement.
3. To identify the requirements of various image segmentation methods and object recognition models for various real-time applications.
4. Get broad exposure to and understanding of color image processing models.
5. To analyze the functionalities of Morphological Image processing method.

Unit-I:

Digital Image Processing: Origins of Digital Image Processing, Steps in Digital Image Processing, Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships between Pixels, Mathematical Tools used in Digital Image Processing.

Unit-II:

Image Transformation & Filters: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filter, Sharpening Spatial Filters, Combining Spatial Enhancement methods, Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Sampling and the Fourier Transforms of Sampled Functions, The Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and using Frequency Domain Filters, Selective Filtering.

Unit-III:

Image Restoration, Reconstruction and Image Segmentation: Image Degradation/Restoration process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, estimating the Degradation Functions, Inverse Filtering, Wiener Square Error Filtering, Constrained Least Square Filtering, Geometric Mean Filter, Image Reconstruction from Projections. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation, Use of Motion in Segmentation

Unit-IV:

Color Image Processing: Color Fundamentals, Color Models, Pseudo color Image Processing, Full Color Image Processing, Color Transformation, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images. Wavelets and Multi resolution Processing: Multi resolution Expansion, Wavelet Transforms in One Dimension, The Fast Wavelet Transforms, Wavelet Transforms in Two Dimensions, Wavelet Packets. Image Compression: Fundamentals, Basic Compression Methods, Digital Image Watermarking

Unit-V:

Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology. Object Recognition: Patterns and Pattern Classes, Recognition Based on Decision-Theoretic Methods, Structural Methods.

Text Book:

Rafael C. Gonzalez, Richard E. Woods. (2008). *“Digital Image Processing”*. Third Edition, Pearson Education.

Chapters:

Unit I	:	Chapter 1 and 2
Unit II	:	Chapter 3 and 4(4.1, 4.3, 4.7, 4.8, 4.10)
Unit III	:	Chapter 5(5.1, 5.2, 5.3, 5.7 to 5.11) and 10 (10.2, 10.3, 10.4, 10
Unit IV	:	Chapter 6 and 7
Unit V	:	Chapter 9 and 12

Reference Books:

1. Chanda B, Dutta Majumdar.D. *Digital Image Processing and Applications*. Prentice Hall of India. New Delhi. Second Edition. 2007.
2. Jain A.K. *Fundamentals of Digital Image Processing*. Pearson education References, New Delhi.Second Edition. 2004.
3. Millman Sonka, Vaclav Hlavac, Roger Boyle & Broos Colic. *Image Processing Analysis and Machine Vision* . Thompson Learning, USA. Low Price Edition. 2002.
4. Rafael C Gonzalez, Richard E Woods. *Digital Image Processing*. Pearson Education . New Delhi. Second Edition. 2003.
5. William K Pratt. *Digital Image Processing*.John Willey & Sons Inc. New Delhi. Third Edition. 2002.

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1. To have knowledge on the use of cryptography and network security.
2. To explore the basic issues to be addressed by program security capabilities.
3. To develop an organizational security policies such as authentication, Reliability and Integrity.

Unit-I:

Cryptography: Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – The Uses of Encryption.

Unit-II:

Program Security: Secure programs – Non-malicious Program Errors – Viruses and other Malicious Code – Targeted Malicious code – Controls Against Program Threat.

Protection in General-Purpose Operating System: Protected Objects and Methods of Address Protection – Control of Access to General Objects – File Protection Mechanisms - User Authentication.

Unit-III:

Database and Data Mining Security: Introduction to Databases – Security Requirements – Reliability and Integrity – Sensitive Data – Inference – Multilevel Databases – Proposals for Multilevel Security – Data Mining.

Unit-IV:

Security in Networks: Threats in networks – Network Security Controls – Firewalls – Intrusion Detection Systems – Secure e-mail.

Unit-V:

Administering Security: Security Planning – Risk Analysis – Organizational Security Policies – Physical Security.

Text Book:

Charles P. Pfleeger, Shari Lawrence Pfleeger, *Security in Computing*, Pearson Education, New Delhi, Third Edition, 2011.

Chapters:

- Unit I : Chapter 2
- Unit II : Chapters 3, 4
- Unit III : Chapter 6
- Unit IV : Chapter 7
- Unit V : Chapter 8

Reference Books:

1. Mao.W, *Modern Cryptography – Theory and Practice*, Pearson Education, New Delhi, Second Edition, 2007.
2. Michael Whitman, Herbert J. Mattord, *Management of Information Security*, Course Technology, Boston US, Third Edition, 2010.
3. MY Rhee, *Network Security*, John Wiley and Sons, New York, Second | Edition, 2002.
4. Wade Trappe, Lawrence C Washington, *Introduction to Cryptography with coding*, Pearson Publication, New Delhi, Second Edition, 2007.
5. William Stallings, *Cryptography and Network security: Principles and Practices*, PHI Publication, New Delhi, Fifth Edition, 2010.

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1. The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
2. Each student should carry out the Project Work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea.

* Exam will be conducted as follows

- Viva-voce will be conducted at the end of VI semester for 100 marks.
- Both the Internal (Respective Guides) and External Examiners (20+80) should conduct the Viva-Voce Examination.
- For awarding a pass, a candidate should have obtained 40% of the Total 100 marks.