

SYLLABUS

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12

UG - COURSES – AFFILIATED COLLEGESCourse Structure for **B.Sc. Computer Science**

(Choice Based Credit System)

(with effect from the academic year 2017- 2018 onwards)

Semester-VI				
Part	Subject Status	Subject Title	Subject Code	Credit
III	Core	Operating Systems	SMCS61	4
	Core	Computer Graphics and Visualization	SMCS62	4
	Core	Data Warehousing and Data Mining	SMCS63	4
	Major Practical - VII	Computer Graphics	SMCSP7	2
	Major Practical- VIII	Oracle	SMCSP8	2
	Project	Project	SMCS6P	2
	Major Elective - III	Big Data Analytics	SECS6B	4



Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. Scheme for internal Assessment:

Maximum marks for written test: **20 marks**

3 internal tests, each of **1 hour** duration shall be conducted every semester.

To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:

Written test- 20 marks; Assignment -5 marks Total - 25 marks

B. Scheme of External Examination

3 hrs. examination at the end of the semester

A – Part : 1 mark question two - from each unit

B – Part : 5 marks question one - from each unit

C – Part : 8 marks question one - from each unit

➤ **Conversion of Marks into Grade Points and Letter Grades**

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

➤ **Cumulative Grade Point Average (CGPA)**

$$CGPA = \frac{\Sigma (GP \times C)}{\Sigma C}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➤ **Classification**

- First Class with Distinction : $CGPA \geq 7.5^*$
- First Class : $CGPA \geq 6.0$
- Second Class : $CGPA \geq 5.0$ and < 6.0
- Third Class : $CGPA < 5.0$



OPERATING SYSTEMS

OBJECTIVES:

- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Unit I

Introduction:

What Operating system do – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation.

System Structures: Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.

Unit II

Process Concept:

Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system.

Process Scheduling : Basic concept-Scheduling criteria- Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation.

Unit III

Synchronization:

Background - The Critical section problem-Peterson's solution - Semaphores – Classic problems of Synchronization.

DeadLocks: System models-Deadlock Characterization-Methods for handling deadlock - Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.

Unit IV

Memory Management:

Background – Swapping - Contiguous Memory allocation – Segmentation – paging.

Virtual Memory Management : Background - Demand paging - Copy and Write-page replacement-Allocation of Frames – Thrashing



Unit V

File System :

File Concept-Access Method-Directory and Structure--File Sharing-Protection.

Implementing File System: File System Structure - File System implementation-Directory implementation-Allocation Methods - Free Space Management. **Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management.

Text Book:

1. Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange.
2. Addison Wesley Publishing Company – Ninth Edition.

Reference Books:

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systes: Ida M.Flynn ,Ann McIverMcHoes.



Computer Graphics and Visualization

Objectives:

To develop skills and knowledge about computer graphics and Visualization and to understand 2D, 3D transformations.

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives:** Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham's line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives.

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two- Dimensional Geometric Transformation:** Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations.

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations:** Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

Unit IV

Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods. **Three Dimensional Geometric and Modeling Transformations:** Translation - Rotation - Scaling

Unit V

Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods:** Back- face deduction – Depth buffer method- A-Buffer Method – Scanline Method.

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Reference Books

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Sтивен Harrington-Mc Graw Hill Education Private Limited.
3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI



DATA WAREHOUSING AND DATA MINING

OBJECTIVES:

- To understand and implement classical models and algorithms in data warehousing and data mining.
- To analyze the data, identify the problems and choose the relevant models and algorithms to apply.
- To assess the strength and weaknesses of various methods and algorithms and analyze the behaviour.

UNIT I :

DATA WAREHOUSING – Data warehousing Components: Overall Architecture - Datawarehouse Database- Sourcing, Acquisition, Cleanup, and Transformation tools – Metadata - Access Tools - Data Marts - Data Warehouse Administration and Management - Information Delivery System – **Building a Data warehouse:** Business Considerations : Return on Investment - Design Considerations - Benefits of Data Warehousing.

UNIT II :

BUSINESS ANALYSIS -Tools categories - The Need for Applications - Need of OLAP - Multidimensional Data Model - OLAP Guidelines - Multidimensional versus Multirelational OLAP - Categorization of OLAP Tools - OLAP Tools and the Internet.

UNIT III :

DATA MINING - Introduction – What is Data Mining? – Kinds of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives –Integration of a Data Mining System with a Data Warehouse – Issues –Data **Preprocessing:** Why Preprocess the Data?- Data Cleaning-Data Integration and Transformation.

UNIT IV

ASSOCIATION RULE MINING AND CLASSIFICATION - Mining Frequent Patterns, Associations and Correlations – Basic Concepts:- **Frequent Itemset Mining Methods** – The Apriori Algorithm – Mining Various Kinds of Association Rules – **Classification and Prediction** - What Is Classification? What Is Prediction? - Classification by Decision Tree Induction : Decision Tree Induction - Bayesian Classification : Bayes' Theorem - Naïve Bayesian Classification – Rule Based Classification : Using IF-THEN Rules for Classification - Rule Extraction from a Decision Tree –Classification by Backpropagation : A Multilayer Feed-Forward Neural Network - Defining a Network Topology – Backpropagation – Prediction : Linear Regression - Nonlinear Regression.



UNIT V

CLUSTER ANALYSIS: What Is Cluster Analysis? - Categorization of Major clustering Methods – Partitioning Methods : K means –Hierarchical Methods : Agglomerative and Divisive Hierarchical Clustering-- Density-Based Methods- DBSCAN- Data Mining Applications.

TEXT BOOKS

1. Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

REFERENCE BOOKS

1. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education 2007.
2. Insight into Data Mining Theory and Practice – K.P.Soman, Shyam Diwakar, V.Ajay, Prentice Hall of India, 2008.
3. Introduction to Data Mining with Case Studies by G.K.Gupta, PHI 3rd Edition, 2015.



Computer Graphics and Multimedia Lab Listing

Objective:

1. To acquire skills in programming computer graphics
2. To acquire skills in multimedia concepts

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham's algorithm.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user's option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced and again it should be reduced and so on and finally the image should disappear.



Oracle Lab Listing

Objective:

1. To acquire skills in SQL statements with various constructs
2. To acquire skills in PL/SQL Programming

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the existing tables.
4. Develop queries to retrieve information from more than one table.
5. Develop summary queries to retrieve relevant information from the tables.
6. Write a PL/SQL program to print multiplication table
7. Write a PL/SQL program to check whether given string is palindrome or not
8. Write a PL/SQL program to find factorial of numbers using function and procedure.



Project

Students are to take up sample project development activities with the guidelines given below

- Preparing a project - brief proposal including
- Problem Identification
- Developing a model for solving the problem
- A statement of system /process specification proposed to be developed (Data Flow Diagram)
- List of possible solution including alternatives and constraints
A presentation including the following
- Implementation phase (Hardware/Software/both)
- Testing & Validation of the developed system
- Learning outcomes from the project

Consolidated report preparation



BIG DATA ANALYTICS

OBJECTIVES:

- Learn about Big Data.
- To explore novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

UNIT I

What Is Big Data and Why Is It Important? - A Flood of Mythic “Start-Up” Proportions - Big Data Is More Than Merely Big - Why Now? - A Convergence of Key Trends - Relatively Speaking - A Wider Variety of Data - The Expanding Universe of Unstructured Data. Industry Examples of Big Data: Digital Marketing and the Non-line World - Don’t Abdicate Relationships - Is IT Losing Control of Web Analytics? - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Consumers Have Changed. So Must Marketers. - The Right Approach: Cross-Channel Lifecycle Marketing - Social and Affiliate Marketing - Empowering Marketing with Social Intelligence

UNIT II

Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Crunching Through Complex Interrelated Data - Intraday Risk Analytics, a Constant Flow of Big Data - Calculating Risk in Marketing - Other Industries Benefit from Financial Services’ Risk Experience - Big Data and Advances in Health Care - “Disruptive Analytics” - A Holistic Value Proposition - BI Is Not Data Science - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Big Data Feeds the Modern-Day Donald Draper - Reach, Resonance, and Reaction - The Need to Act Quickly (Real-Time When Possible) - Measurement Can Be Tricky - Content Delivery Matters Too - Optimization and Marketing Mixed Modeling - Beard’s Take on the Three Big Data Vs in Advertising - Using Consumer Products as a Doorway.

UNIT III

Big Data Technology : The Elephant in the Room: Hadoop’s Parallel World - Old vs. New Approaches - Data Discovery: Work the Way People’s Minds Work - Open-Source Technology for Big Data Analytics - The Cloud and Big Data - Predictive Analytics Moves into the Limelight - Software as a Service BI - Mobile Business Intelligence is Going Mainstream - Ease of Mobile Application Deployment - Crowdsourcing Analytics - Inter- and Trans-Firewall Analytics - R&D Approach Helps Adopt New Technology - Adding Big Data Technology into the Mix - Big Data Technology Terms - Data Size 101.

UNIT IV

Information Management : The Big Data Foundation - Big Data Computing Platforms (or Computing Platforms That Handle the Big Data Analytics Tsunami) - Big Data Computation - More on Big Data Storage - Big Data Computational



Limitations - Big Data Emerging Technologies. Business Analytics : The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let's Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications.

UNIT V

The People Part of the Equation : Rise of the Data Scientist - Learning over Knowing - Agility - Scale and Convergence - Multidisciplinary Talent - Innovation - Cost Effectiveness -Using Deep Math, Science, and Computer Science - The 90/10 Rule and Critical Thinking - Analytic Talent and Executive Buy-in - Developing Decision Sciences Talent - Holistic View of Analytics - Creating Talent for Decision Sciences - Creating a Culture That Nurtures Decision Sciences Talent - Setting Up the Right Organizational Structure for Institutionalizing Analytics. Data Privacy and Ethics : The Privacy Landscape -The Great Data Grab Isn't New - Preferences, Personalization, and Relationships - Rights and Responsibility - Playing in a Global Sandbox - Conscientious and Conscious Responsibility - Privacy May Be the Wrong Focus - Can Data Be Anonymized? - Balancing for Counterintelligence – Now What?

TEXT BOOK

Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today's businesses" John Wiley , 2014.

REFERENCE BOOKS

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services.
2. Bill Franks, Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley, 2012.
3. Arvind Sathi, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press, 2012.

