MANNAR THIRUMALAI NAICKER COLLEGE

PASUMALAI, MADURAI– 625 004

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)

B.Sc., Computer Science

SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2018-2019 and after)

Eligibility for Admission

Candidates seeking admission to the B.Sc Degree course must have the Higher Secondary Education, (should have studied Computer Science and Mathematics in HSC) of the Government of Tamil Nadu or any other state or its equivalent qualification.

Duration of the course

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subject of Study

Part   I: Tamil

Part   II: English

Part   III:

1. Core Subjects
2. Allied Subjects
3. Electives

Part   IV :

1. Non Major Electives
2. Skill Based Subjects
3. Environmental Studies
4. Value Education

Part V   :

Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two   tests and their average   --15 marks

Seminar /Group discussion   --5 marks

Assignment   --5 marks

Total   --25 marks

Pattern of the questions paper for the continuous Internal Assessment

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The components for continuous internal assessment are:
Part –A
Six multiple choice questions (answer all)   6 x01= 06 Marks
Part –B
Two questions ('either …. or 'type)   2 x 07=14 Marks
Part –C
One question out of two   1 x 10 =10 Marks

                                    Total   30 Marks

Pattern of the question paper for the Summative Examinations:
Note: Duration- 3 hours
Part –A
Ten multiple choice questions   10 x01   = 10 Marks
(No Unit shall be omitted; not more than two questions from each unit.)
Part –B
Five Paragraph questions ('either …. or 'type)   5 x 07   = 35 Marks
(One question from each Unit)
Part –C
Three Essay questions out of five   3 x 10   =30 Marks
(One question from each Unit)

                                    Total   75 Marks

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--10 marks*
Total	--25 marks

** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)

Part –A

(Answer is not less than 150 words)

Four questions ('either …. or 'type)   4 x 05=20 Marks

Part –B

(Answer is not less than 400 words)

One question ('either …. or 'type)   1 x 10=10 Marks

                        Total   30 Marks

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

Part –A

(Answer is not less than 150 words)

Five questions (either or type)   5 x 06   =30 Marks

(One question from each Unit)

Part –B

(Answer is not less than 400 words)

Three questions out of Five   3 x 15   = 45 Marks
each unit (One question from each Unit)   -----------------
                        Total   75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

PROGRAMME EDUCATION OUTCOMES (PO)

PEO1: Effectively communicating computing concepts and solutions to bridge the gap between computing industry experts and business leaders to create and initiate innovation.

PEO2: Effectively utilizing their knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.

PEO3: Graduates are trained to demonstrate creativity, develop innovative ideas and to work in teams to accomplish a common goal.

PEO4: Showing continuous improvement in their professional career through lifelong learning, appreciating human values and ethics.

PROGRAMME OUTCOMES (PO)

The computer Science graduate will be able to

PO1: Apply knowledge of computing and mathematics appropriate to the discipline and to provide effective solution in the area of computing.

PO2: Function effectively on teams to accomplish shared computing design, evaluation, or implementation goals.

PO3: Capable of adapting to new technologies and constantly upgrade their skills with an attitude towards independent and problem solving.

PO4: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.

PO5: Understand and commit to professional ethics and cyber regulations, responsibilities and norms of professional computing practice.

PO6: Demonstrate knowledge and understanding of the management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO7: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PROGRAMME SPECIFIC OUTCOMES

PSO1 : To understand the principles and working of computer systems. Students can assess the hardware and software aspects of computer systems.

PSO2 : To understand the structure and development methodologies of software systems. Possess professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms.

PSO3 : To apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.

PSO4 : To investigate and evaluate new technologies and make recommendations with respect to their application. Appreciate the importance of new and emerging technologies, and the strategies available for life-long learning.

DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)
COURSE PATTERN

Study Component	I Sem	II Sem	III Sem.	IV Sem.	V Sem	VI Sem	Total Hrs/week	Total Credit	No.of Papers	Total Marks
Part – I Tamil	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part - II English	6(3)	6(3)	6(3)	6(3)	-	-	24	12	4	400
Part – III										
Core Subjects/	5(4) 5(4)	5(5) 5(5)	5(5) 5(5)	5(4) 5(4)	6(5) 6(5) 6(4)	6(5) 6(4) 6(4)	76	63	14	1400
Elective					5(4) 5(4)	5(4) 5(4)	20	16	4	400
Allied Subject	4(4)	4(4)	4(4)	4(4)			16	16	4	400
Part – IV										
Skill Based Subjects/	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)	12	12	6	600
EVS/VE/	2(2)	2(2)					4	4	2	200
NME			2(2)	2(2)			4	4	2	200
Part – V										
Extension Activities				0(1)			0	1	1	100
Total	30 (22)	30 (24)	30 (24)	30 (23)	30 (24)	30 (23)	180	140	41	4100

Subject Code	Title of the Paper	No. of Papers	Hours / week	Credits	Maximum Marks		
SEMESTER – I					Internal	External	Total
18UTAG11	பகுதி-**I**தமிழ் தற்கால கவிதையும் உரைநடையும்	1	6	3	25	75	100
18UENG11	English-I: Exploring Language ThroughLiterature-I	1	6	3	25	75	100
18UCSC11	**Part III: Core Subject** Programming in C	1	5	4	25	75	100
18UCSCP1	Programming in C - Lab	1	5	4	40	60	100
18UCSA11	**Part III: Allied Subject** Discrete Mathematics	1	4	4	25	75	100
18UCSSP1	**Part IV : Skill Subject** PC Software - Lab	1	2	2	40	60	100
18UEVG11	**Part IV: Mandatory Subject** Environmental Studies	1	2	2	25	75	100
	Total	**6**	**30**	**22**	**205**	**495**	**700**

Subject Code	Title of the Paper	No. of Papers	Hours / week	Credits	Maximum Marks		
					Internal	External	Total
18UTAG21	பகுதி-I தமிழ் பக்தி இலக்கியமும் நாடகமும்	1	6	3	25	75	100
18UENG21	English-II: Exploring Language Through Literature-II	1	6	3	25	75	100
18UCSC21	**Part III: Core Subject** Data Structuresand C++ Programming	1	5	5	25	75	100
18UCSCP2	Data Structuresand C++ Programming - Lab	1	5	5	40	60	100
18UCSA21	**Part III: Allied Subject** Statistical and Numerical Methods	1	4	4	25	75	100
18UCSSP2	**Part IV : Skill Subject** Photoshop- Lab	1	2	2	40	60	100
18UVLG21	**Part IV: Mandatory Subject** Value Education	1	2	2	25	75	100
	Total	**7**	**30**	**24**	**205**	**495**	**700**

SEMESTER - II

Subject Code	Subject	No.of Papers	Hours/ Week	Credits	Maximum Marks		
					Int	Ext.	Tot.
18UTAG31	**Part I: Tamil** காப்பிய இலக்கியமும் சிறுகதையும்	1	6	3	25	75	100
18UENG31	**Part II: English** Exploring Language Through Literature-III	1	6	3	25	75	100
18UCSC31 18UCSCP3	**Part III: Core Subject** Programming in Java Programming in Java – Lab	1 1	5 5	5 5	25 40	75 60	100 100
18UCSA31	**Part III: Allied Subject** Operations Research	1	4	4	25	75	100
18UCSSP3	**Part IV: Skill Subject** Android Application Development– Lab	1	2	2	40	60	100
18UCSN31	**Part IV: Non-Major Elective** Web Programming- Lab	1	2	2	40	60	100
	Total	**7**	**30**	**24**	**220**	**480**	**700**

SEMESTER – III

SEMESTER – IV

Subject Code	Subject	No.of Papers	Hours / Week	Credits	Maximum Marks		
					Int.	Ext.	Tot.
18UTAG41	**Part I: Tamil** பழந்தமிழ் இலக்கியமும் புதினமும்	1	6	3	25	75	100
18UENG41	**Part II: English** Exploring Language Through Literature-IV	1	6	3	25	75	100
18UCSC41 18UCSCP4	**Part III: Core Subject** Programming in PHP Programming in PHP – Lab	1 1	5 5	4 4	25 40	75 60	100 100
18UCSA41	**Part III: Allied Subject** Numerical Aptitude	1	4	4	25	75	100
18UCSSP4	**Part III: Skill Subject** Web Designing – Lab	1	2	2	40	60	100
18UCSN41	**Part IV: Non-Major Elective** Multimedia- Lab	1	2	2	40	60	100
18UEAG40-18UEAG49	Extension Activities	1	0	1	-	100	100
	Total	**8**	**30**	**23**	**320**	**480**	**800**

SEMESTER – V

Subject Code	Title of the Paper	No. Of Courses	Hrs / Week	Credits	Maximum Marks		
					INT.	EXT.	TOT
18UCSC51	**Part –III Core Subject** Computer Networks	1	6	5	25	75	100
18UCSC52	Relational Data Base Management System	1	6	5	25	75	100
18UCSCP5	Relational Data Base Management System - Lab	1	6	4	40	60	100
	Core Elective –I						
18UCSE51	Operating System	1	5	4	25	75	100
18UCSE52	Data Mining	1	5	4	25	75	100
18UCSE53	System Software	1	5	4	25	75	100
	Core Elective –II						
18UCSE54	Cryptography and Network Security	1	5	4	25	75	100
18UCSE55	Artificial Intelligence	1	5	4	25	75	100
18UCSE56	Internet of Things	1	5	4	25	75	100
18UCSSP5	**Part IV : Skill Subject** Linux Lab	1	2	2	40	60	100
	Total	**6**	**30**	**24**	**180**	**420**	**600**

SEMESTER – VI

Subject Code	Title of the Paper	No. Of Courses	Hrs / Week	Credits	Maximum Marks		
					INT.	EXT.	TOT
18UCSC61	**Part-III Core Subject** C# and.Net Programming	1	6	5	25	75	100
18UCSCP6	C# and .Net Programming – Lab	1	6	4	40	60	100
18UCSPR1	Project and Viva-Voce	1	6	4	40	60	100
	Core Elective-III						
18UCSE61	Software Engineering	1	5	4	25	75	100
18UCSE62	Software Project Management	1	5	4	25	75	100
18UCSE63	Mobile Computing	1	5	4	25	75	100
	Core Elective-IV						
18UCSE64	Cloud Computing	1	5	4	25	75	100
18UCSE65	Biometrics	1	5	4	25	75	100
18UCSE66	Neural Networks	1	5	4	25	75	100
18UCSSP6	**Part IV : Skill Subject** Python Programming - Lab	1	2	2	40	60	100
	Total	**6**	**30**	**23**	**195**	**405**	**600**

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)	**Part III : Core**
Semester : V	**Hours : 06**
Subject Code: 18UCSC51	**Credits : 05**

COMPUTER NETWORKS

COURSE OUTCOMES:
On the successful completion of the course, learners should be able to
CO1: Explain about building blocks of Computer Networks, components and transmission
media.
CO2: Demonstrate the functionalities and protocols in the layers of ISO/OSI network model.
CO3: Make use of data link layer protocols in Error detection and correction
CO4: Classify the routing protocols and analyze how to assign the IP addresses for the given
network
CO5: Justify how digital signatures are used to provide authentication

UNIT I
Introduction: Data communications– Networks –Network Types– Standards and Administration -**Network Models:** Protocol Layering–TCP/IP Protocol Suite– The OSI Model.
UNIT II
Transmission Media: Introduction-Guided media – Unguided media (Wireless)–**Other Wireless Networks:** Cellular Telephony – Satellite Networks.
UNIT III
Error Detection and Correction: Introduction – Block Coding – Linear Block Codes – Cyclic Codes – Checksum –**Data Link Control:** DLC services– Data-Link Layer Protocols– HDLC– Point –To-Point Protocol
UNIT IV
Network Layer: Network Layer Services-Packet Switching-IPV4 Addresses-Forwarding of IP packets-**Unicast Routing:** Introduction-Routing Algorithms-Unicast Routing Protocols-**Multicast Routing:** Introduction-Multicasting Basics-Intradomain Multicast Protocols-Interdomain Multicast Protocols-IGMP
UNIT V
        Cryptography and Network Security: Introduction– Confidentiality – Other Aspects of Security

Text B**ook:**

1. Behrouz A.Forouzan**, Data Communications and Networking,** Tata McGraw Hill Education Private Limited, New Delhi, Fifth Edition, 2013.

Unit I	:	Chapter 1 – Section: 1.1, 1.2, 1.3, 1.5
		Chapter 2 – Section: 2.1- 2.3
Unit II	:	Chapter 7 – Section : 7.1,7.2,7.3
		Chapter 16 – Section: 16.2,16.3
Unit III	:	Chapter 10 – Section :10.1-10.5
		Chapter 11 – Section :11.1-11.4
Unit IV	:	Chapter 19- Section: 18.1,18.2,18.4,18.5
		Chapter 20- Section: 20.1-20.3
		Chapter 21-Section: 21.1-21.5
Unit V	:	Chapter 31- Section: 31.1-31.3

Reference Books:

1. Andrew S.Tanenbaum, **Computer Network**, Prentice Hall of India, New Delhi, Fifth Edition, 2014.
2. Prakesh C.Gupta, **Data Communications & Computer Networks,** Prentice Hall of India, New Delhi, Third Edition, 2006.
3. William Stallings, **Data and Computer Communications**, Prentice Hall of India, New Delhi, Seventh Edition, 2004.

Web Resources:
1. https://beginnersbook.com/2019/03/introduction-to-computer-network/
2. https://www.computernetworkingnotes.com/networking-tutorials/
3. https://www.tutorialride.com/computer-network/computer-network-tutorial.htm

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DEPARTMENT OF COMPUTER SCIENCE
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Programme	: B.Sc (CS)	**Part III**	: Core
Semester	: V	**Hours**	: 06
Subject Code	: 18UCSC52	**Credits**	: 05

RELATIONAL DATABASE MANAGEMENT SYSTEM

COURSE OUTCOMES
On successful completion of the course, the learners should be able to
CO1: Explain the structure and model of the relational database system.

CO2: Make a study of SQL and Relational database design.

CO3: Analyze different information about the organization requiring an electronic database and translate them to user requirements.

CO4: Interpret knowledge in transaction processing with relational database design.

CO5: Create and populate a RDBMS for a real life application, with constraints, keys using SQL.

UNIT I

Introduction: View of Data - Database languages- Relational databases – Database design – Transaction Management – Database Architecture-Introduction to the Relational Model: Structure of Relational Databases – Databases Schema – Keys – Schema Diagrams - Relational Query Languages – Relational Operations.

UNIT II

Introduction to SQL: Overview of the SQL Query Language – SQL Data Definition - Basic Structure of SQL Queries – Additional Basic Operations - Set Operations – NULL Values - Aggregate Functions – Nested Sub Queries – Modification of the Databases. Intermediate SQL: Join expressions – Views – Transactions - Integrity Constraints – SQL Datatypes and Schemas.

UNIT III

Advanced SQL: Functions and Procedures – Triggers-Formal Relational Query Languages: The Relational Algebra – The Tuple Relational Calculus – The Domain Relational calculus. Database Design and the ER Model: The Entity Relationship Model – Constraints - Entity Relationship Diagrams.

UNIT IV

Relational Database Design: Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory – Decomposition using Multivalued Dependencies – More Normal Forms. Transaction Management: Transactions- Transaction Concept – Serializability.

UNIT V

Error Handling: Exceptions-Built – in Exceptions-User Defined Exceptions-Subprograms in PL/SQL: Describing a Subprogram-Procedure-Functions-Trigger: Sample Trigger-Trigger Concept

Text books:

1. **Abraham Silberschatz, Henry F. Korth, S.Sudarshan, Data Base System Concepts (Sixth Edition) McG.Hill International Edition, 2011.**

UNIT I	**Chapter 1 –1.3-1.6,1.8,1.9**
	Chapter 2– 2.1-2.6
UNIT II	**Chapter 3– 3.1-3.9**
	Chapter 4 – 4.1-4.5
UNIT III	**Chapter 5 – 5.2,5.3**
	Chapter 6 – 6.1-6.3
	Chapter 7 – 7.2,7.3,7.5
UNIT IV	**Chapter 8– 8.2-8.4,8.6,8.7**
	Chapter 14– 14.1,14.6

1. Dr.P.S.Deshpande , **SQL & PL/SQL for Oracle 11g Black Book** [TM]**,** Dreamtech Press, New Delhi, Reprint 2007.

UNIT V	**Chapter 30 Page No : 542-546**
	Chapter 31 Page No : 560-563
	Chapter 33 Page No : 609-625

Reference Books:

1. C.J.Date, **An Introduction to Database Systems Vol.1,** Narosha Publishing House, New Delhi,1995.
2. Raghu Ramakrishnan, Johannes Gehrke, **Database Management Systems** (Third Edition), McGraw-Hill Education, New Delhi,2003.
3. Bulusu Lakshman Oracle9i PL/SQL: Adeveloper's Guide, Apress

Web Resources:

1. https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. https://www.webopedia.com/TERM/R/RDBMS.html
3. https://www.webucator.com/tutorial/learn-sql/relational-database-basics.cfm

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)	**Part III : Core**
Semester : V	**Hours : 06**
Sub code : 18UCSCP5	**Credits : 04**

RELATIONAL DATABASE MANAGEMENT LAB

Course Outcomes:
On successful completion of the course, the learners should be able to:

CO1: Write the basic database language commands to create simple database.

CO2: Apply PL/SQL for processing database.

CO3: Analyze the database using queries to retrieve records.

CO4: Evaluate the importance of queries and procedures to create real world applications.

CO5: Develop solutions using database concepts for real time requirements.

TABLE MANIPULATION

1. Table Creation, Renaming a Table, Copying another Table, Dropping a Table

2. Table Description: Describing Table Definitions, Modifying Tables, Joining Tables, Number and Date Functions.

SQL QUERIES AND SUB QUERIES

3. SQL Queries: Queries, Sub Queries, and aggregate functions

4. DDL: Experiments using database DDL SQL statements

5. DML: Experiment using database DML SQL statements

6. DCL: Experiment using database DCL SQL statements

EXCEPTION HANDLING AND PL/SQL

7. Exception Handling: PL/SQL Procedure for application using exception handling

8. Functions: PL/SQL Procedure for application using functions

9. Cursor: PL/SQL Procedure for application using cursors

10. Trigger: PL/SQL Procedure for application using triggers

11. Package: PL/SQL Procedure for application using package

MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
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Programme : B.Sc (CS)	**Part III : Core Elective -I**
Semester : V	**Hours : 05**
Subject Code : 18UCSE51	**Credits : 04**

OPERATING SYSTEM

Course Outcomes

On successful completion of the course, the learners will be able to

CO1: Define Operating System, its components and Goals, basic concepts, structure and functions of operating systems

CO2: Explain the mutual exclusion primitives, semaphores and concurrent programming.

CO3: Implement processor scheduling, deadlock prevention and avoidance for a given scenario.

CO4: Compare contiguous vs noncontiguous memory allocation and fixed and variable partition multiprogramming

CO5: Analyze the necessity of Disk Scheduling and various file systems.

UNIT I

　　　　Introduction To Operating System: Introduction, Operating System Components And Goals, Operating System Architecture. Process Concepts: Introduction, Process States, PROCESS MANAGEMENT, INTERRUPTS, INTERPROCESS COMMUNICATION

UNIT II

　　　　Asynchronous Concurrent Execution: Introduction, Mutual Exclusion, Implementing Mutual Exclusion Primitives, Software Solutions To The Mutual Exclusion Problem, Hardware Solution To The Mutual Exclusion Problem, Semaphores. Concurrent Programming: Introduction, Monitors.

UNIT III

　　　　Deadlock And Indefinite Postponement: Introduction, Examples of Deadlock, Related Problem Indefinite Postponement, Resource Concepts, Four Necessary Conditions For Deadlock, Deadlock Solution, Deadlock Prevention, Deadlock Avoidance With Dijkstra's Banker's Algorithm, Deadlock Detection, Deadlock Recovery. Processor Scheduling: Introduction, Scheduling Levels, Preemptive Vs Non-Preemptive Scheduling Priorities, Scheduling Objective, Scheduling Criteria, Scheduling Algorithm

UNIT IV

　　　　Real Memory Organization And Management: Introduction, Memory Organization, Memory Management, Memory Hierarchy, Memory Management Strategies, Contiguous vs Non Contiguous Memory Allocation, Fixed Partition Multiprogramming, Variable Partition Multiprogramming Virtual Memory Management : Introduction, Page Replacement, Page Replacement Strategies , Page Font Frequency, Page Size

UNIT V

Disk Performance Optimization: Introduction, Why Disk Scheduling Necessary, Disk Scheduling Strategies, Rotational Optimization File and Database System: Introduction, Data Hierarchy, File System, File Organization, File Allocation, Free Space Management, File Access Control

Text book:
1. Operating Systems by H.M.Deitel, P.J.Deitel, D.R.Choffnes- Pearson education Third Edition-2008

UNIT I	Chapter 1: 1.1, 1.2, 1.12, 1.13,
	Chapter-3: 3.1, 3.2, 3.3, 3.4, 3.5
UNIT II	Chapter 5: 5.1, 5.2, 5.3, 5.4(up to 5.42), 5.5, 5.6
	Chapter -6: 6.1, 6.2
Unit-III	Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10
	Chapter 8: 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7
Unit-IV	Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8, 9.9
	Chapter 11: 11.1, 11.5, 11.6, 11.8, 11.9, 11.10
Unit-V	Chapter 12: 12.1, 12.4, 12.5, 12.6
	Chapter 13: 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8,

Reference Books
1. A. Tanenbaum, 'Modern Operating Systems', Prentice Hall India, 2003.
2. An Introduction to Operating Systems Concepts and Practice by Pramod Chandra P.Bhatt, PHI 2nd Edition, 2008.
3. Silberschatz A, Galvin P.B., Gange G, Operating System Concepts, John Wiley& Sons, INC, New Delhi, Sixth Edition, 2002.
4. Milan Milenkovic, Operating System Concepts and Design, Tata McGraw Hill, New Delhi, Third Edition, 1997.
5. M.J. Bach, 'Design of Unix Operating system', PrenticeHall, 1986.Computer EngineeringIITRoorkeeA joint venture by IISc and IITs, funded by MHR

Web Resources:
1. https://codescracker.com/operating-system/
2. http://yumpu-download.tiny-tools.com/pages.php?id=27375301
3. https://www.cl.cam.ac.uk/teaching/1011/OpSystems/os1a-slides.pdf

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
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Class　　　: B.Sc (CS)	**Part III　: Elective**
Semester　: V	**Hours　　: 05**
Subject Code : 18UCSE52	**Credits　: 04**

DATA MINING

Course Outcomes:
On successful completion of the course, the learners should be able to,
CO1: Know the data mining principles, techniques and discover the knowledge imbibed in the high dimensional system.
CO2: Study algorithms for finding the hidden interesting patterns in data in real life.
CO3: Expose the students to the concepts of Data warehousing Architecture, implementation and analyze the various models.
CO4: Prepare evaluation criteria for classification methods and clustering
CO5: Study the overview of Web mining, Text mining and Big DataMining Tools and develop application tools

UNIT I
　　　　Data Mining – why Data Mining Now – The data Mining Process – Data Mining Applications – Data Mining Techniques – Some Data Mining Case Studies – The Future of Data Mining – Guidelines for Successful Data Mining – Data Mining Software.

UNIT II
　　　　Introduction – Basics –　　　The Task and Naïve Algorithm – The Apriori Algorithm – Improving the efficiency of the Apriori Algorithm – Direct Hashing and Pruning DHP-Mining Frequent Patterns without Candidate Generation – Performance Evaluation of Algorithms – Software for Association Rule Mining.

UNIT III
　　　　Introduction – Decision Tree – Building a decision Tree- The Tree Induction Algorithm – Decision Tree Rules – Decision tree summary –Other Evaluation Criteria for classification methods – Classification Software- Cluster Analysis – Desires Features of cluster analysis – Types of data- computing distance- Types of Cluster analysis methods – Partitional Methods – Hierarchical Methods –cluster Analysis Software.

UNIT IV
　　　　Introduction – Web Mining- Web Technology and characteristics – Locality and Hierarchy in the web – Web content Mining – Web Usage Mining – Web Structure Mining – Web Mining Software.

UNIT V
　　　　Dataware houses-Dataware house design-data warehouse metadata-OLAP-Characteristics of OLAP systems-Multidimensional view and Datacube - Datacube implementations-Datacube operations

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Text book:

1. Introduction to Data Mining with Case studies, G.K. Gupta, PHI Third Edition, 2006

UNIT I	:	Chapters - 1.1 to 1.9.
UNIT II	:	Chapters - 2.1 to 2.11
UNIT III	:	Chapters -3.1 to 3.3, 3.7, 3.8, 3.12, 3.13, 4.1 to 4.7, 4.11
UNIT IV	:	Chapters –5.1 to 5.7
UNIT V	:	Chapters -7.4, 7.5, 7.7, 8.2, 8.3, 8.5, 8.6, 8.7

Reference Books

1. Data Mining Concepts & Technologies, Jiawei Han, Michelinekamber, Morgan Kaufmann, Second Edition, 2005.

2. Data Mining, Vikram Pudi,P.Radha Krishna, Oxford University Press, First Edition, 2009.

3. Data Warehousing – Reema Thareja Oxford University Press – 2009.

4. Insight into Data Mining Theory and Practice – K.p. Soman, Shyam Diwakar, V.Ajay, Prentice Hall of India – 2008

Web Resources:

1. https://www.exinfm.com/pdffiles/intro_dm.pdf

2. https://maths-people.anu.edu.au/~steve/pdcn.pdf

3. https://www.guru99.com/data-mining-tutorial.html

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)	**Part III : Elective**
Semester : V	**Hours : 05**
Sub Code : 18UCSE53	**Credits : 04**

SYSTEM SOFTWARE

Course Outcomes:

On successful completion of the course, the learners should be able to:

CO1: Describe the various machine architectures and explain the function of assemblers, loader and linkers, Macroprocessors, Compilers and DBMS

CO2: Make use of the features of dependent and independent software

CO3: Focus the algorithm and data structures of assemblers, loader, compilers

CO4: Interpret the code using analysis and optimization techniques

CO5: Imagine an editor that use high level source code and parse the data

UNIT I

Background: System software and machine architecture – The simplified Instructional Computer (SIC) – SIC Machine architecture – SIC/XE Architecture - Traditional (CISC) Machines – VAX Architecture – Pentium Pro Architecture - RISC Machines – UltraSPARC Architecture – PowerPC Architecture – Cray T3E Architecture.

UNIT II

Assemblers: Basic Assembler Functions- A Simple SIC Assembler – Assembler Algorithm and Data Structures – Machine – Independent Assembler Features – Literals – Symbol- Defining Statements – Expressions – Program Blocks – Control Sections and Program Linking – Assembler Design Options – One – Pass Assemblers – Multi-Pass Assemblers.

UNIT III

Loaders and Linkers: Basic Loader Functions – Design of an Absolute Loader – A simple Bootstrap Loader – Machine – Dependent Loader Features – Relocation- Program Linking- Algorithm and Data Structures for a Linking Loader. **Macro Processors:** Basic Macro Processors Functions – Macro Definition and Expansion – Macro Processor Algorithm and Data Structures.

UNIT IV

Compilers: Basic Compiler Functions – Grammars – Lexical Analysis – Syntactic Analysis – Code Generation – Machine – Independent Compiler Features – Structured Variables- Machine – Independent Code Optimization – Storage Allocation - Block Structured Languages – Compiler Design Options – Division into Passes – Interpreters – P –Code Compilers – Compiler – Compliers.

UNIT V

Other System Software: Database Management Systems – Basic Concepts of a DBMS – Levels of Data Description – Use of a DBMS – Text Editors – Overview of the Editing Process – User Interface – Editor Structure.

Text book:

1. Leland L.Beck, D.Manjula, **SYSTEM SOFTWARE**, Pearson Education, India, Third Edition, 2007.

UNIT I	:	Chapter 1: 1.2 - 1.5
UNIT II	:	Chapter 2: 2.1, 2.3, 2.4
UNIT III	:	Chapter 3: 3.1, 3.2
		Chapter 4: 4.1
UNIT IV	:	Chapter 5: 5.1, 5.3, 5.4
UNIT V	:	Chapter 7: 7.1, 7.2

Reference Books:

1. D.M.Dhamdhere**, Introduction to System Software**, Silicon Press, USA, reprint, 1997.

2. John J Donovan, **Systems Programming**, Tata McGraw Hill, New Delhi, Forty Sixth reprint, 2009.

3. I.A.Dhotre, A.A.Puntambekar, **System Software**, Technical Publications, First Edition, 2007.

Web Resources:

1. http://www.darshan.ac.in/Upload/DIET/Documents/CE/Darshan%20-%20Sem5%20-%202150708%20-%20SP_25112015_054658AM.pdf

2. http://ecomputernotes.com/fundamental/disk-operating-system/system-software

3. https://www.technicalsymposium.com/SYSTEM_SOFTWARE_FULL_NOTES.html

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme	:B.Sc(CS)	**Part III**	: Elective
Semester	: V	**Hours**	: 05
Subject code	: 18UCSE54	**Credits**	: 04

CRYPTOGRAPHY AND NETWORK SECURITY

Course Outcomes:
On successful completion of the course, the learners should be able to:
CO1: Understand the concept of Symmetric key and Asymmetric key cryptography
CO2: Apply the symmetric-key ciphers and asymmetric key ciphers to encrypt data
CO3: Analyze the different crypto systems in asymmetric key cryptography for data authentications
CO4: Evaluate the various digital signature schemes to check the user authentication
CO5: Compose secure data exchange between sender and receiver by using message integrity and message authentication

UNIT I
Introduction: Security Goals – Cryptographic Attacks – Services and Mechanism – Techniques
Traditional symmetric-key ciphers: Introduction – Substitution Ciphers – Transposition Ciphers – Stream and Block Ciphers
UNIT II
Introduction to Modern Symmetric-key Ciphers: Modern Block Ciphers – Modern Stream Ciphers. **Data Encryption Standard (DES):** Introduction – DES Structure – DES Analysis – Security of DES – Multiple DES-Conventional Encryption Algorithms – Examples of Block Ciphers Influenced by DES
UNIT III
Advanced Encryption Standard (AES): Introduction – Transformations – Key Expansion – The AES Ciphers – Examples – Analysis of AES.**Asymmetric-key Cryptography:** Introduction – RSA Cryptosystem – Rabin cryptosystem – Elgamal Cryptosystem – Elliptic Curve Cryptosystems
UNIT IV
Message Integrity and Message Authentication: Message Integrity – Random Oracle Model – Message Authentication**. Digital Signature:** Comparison – Process – Services – Attacks and Digital Signature – Digital Signature Schemes – Variations and Applications.
UNIT V
Key Management: Symmetric-key Distribution – Kerberos – Symmetric-key Agreement – Public-key Distribution –Hijacking. **System Security:** Description of the System- Users, Trust and Trusted Systems – Buffer overflow and Malicious Software – Malicious Programs – Worms – Viruses – Intrusion Detection Systems(IDS) – Firewalls: Definitions, Construction and Working Principles.

Text book:

1. Behrouz A.Forouzan, Debdeep Mukhopadhyay, **"Cryptography and Network Security",** 2ndEdition,TataMcgraw Hill Education Pvt Ltd, New Delhi, 2013.

Unit – I	:	Chapter 1, 3
Unit – II	:	Chapter 5, 6
Unit – III	:	Chapter 7, 10
Unit – IV	:	Chapter 11, 13
Unit – V	:	Chapter 15, 19

Reference Books:

1. Atul Kahate, **"Cryptography and Network Security"** Third Edition, Mcgraw Hill Education (India) Pvt.Ltd, NewDelhi,2011.

2. S.Bose, P.Vijayakumar "**Cryptography and Network Security"**, Pearson Edition, Chennai,2017

Web Resources:

1. https://nptel.ac.in/courses/106105031/

2. http://www.cse.iitm.ac.in/~chester/courses/16e_cns/slides/01_Introduction.pdf

3. http://www.cse.iitm.ac.in/~chester/courses/16e_cns/slides/01_Introduction.pdf

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)	**Part III** :Elective
Semester : V	**Hours** : 05
Subject Code : 18UCSE55	**Credits** : 04

ARTIFICIAL INTELLIGENCE

COURSE OUTCOMES
On Successful Completion of this Course, the learners are able to
CO1 Describe the concept of Artificial Intelligence.
CO2 Analyze the search techniques and knowledge representation.
CO3 Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO4 Acquire knowledge to solve problems in areas ranging from optimization problems to text analytics.
CO5 Learn the purpose of heuristic search techniques and design AI machine and enveloping applications for real world problems.

UNIT I
AI: The Problem- Assumptions- AI technique- Level of the model- Criteria for success- **Problems:** Problem Spaces and Search- Production Systems- Problem Characteristics-Reduction System Characteristics- Issue in the design of search programs.
UNIT II
Heuristic search techniques: Generate and test- Hill climbing- best first search- Problem Reduction- Constraint Satisfaction- Means – Ends analysis.
UNIT III
Knowledge Representation Issue: Representation and Mappings – Approaches, issue in Knowledge representation- Frame problem. **Using Predicate Logic :**Representation of simple facts in logic-Instance and ISA relationships- Computable function and predicates-Resolution-Natural deduction.
UNIT IV
Representing knowledge using rules: Procedural versus declarative knowledge- logic Programming-Forward versus Backward reasoning-Matching Control Knowledge.
UNIT V
Symbolic Reasoning Under Uncertainty: Introduction to Non Monotonic Reasoning – Logic for Non Monotonic Reasoning- Implementation issues – Augmenting Problem Solver Implementation of DFS- Breadth–First search.

Text book:

1. Elaine Rich, Kevin Knight, **Shivashankar B Nair,Artificial Intelligence,** Tata McGraw Hill Ltd, New Delhi, Third edition, 2009.

Unit	I	:	Chapters 1 – Section 1.1 – 1.5.
			Chapter 2– Section 2.1, 2.5
Unit	II	:	Chapter 3 – Section 3.1 –3.6
Unit	III	:	Chapter 4 – Section 4.1 – 4.4.
			Chapter 5 – Section 5.1–5.5
Unit	IV	:	Chapter 6 – Section 6.1 – 6.5
Unit	V	:	Chapter 7 – Section 7.1 – 7.6

Reference Books:

1. Stuart J.Russell and Peter Norvig, **Artificial Intelligence: A Modern Approach**, Pearson Education, New Delhi, Second Edition, 2009.
2. Simon Haykin, **Neural Networks and learning Machines**, Prentice Hall, New Delhi, Third Edition, 2008.

Web Resources:

1. www.techopedia.com/definition/190/artificial-intelligence-ai.

2. https://hackr.io/tutorials/learn-artificial-intelligence-ai

3. www.edx.org/learn/artificial-intelligence

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)   Part III : Elective
Semester : V   Hours : 05
Subject Code: 18UCSE56   Credits : 04
INTERNET OF THINGS

Course Outcomes:
On Successful Completion of this Course, the learners should be able to
CO1: Describe and explain about IoT, Physical and Logical design of IoT, IoT levels, domain
        specific IoTs
CO2: Determine physical and logical design of IoT
CO3: Compare Physical and Logical IoT, different levels and domain specific IoTs
CO4: Conclude the importance of IoT, Physical and Logical IoT, IoT levels, domain specific
        IoTs
CO5: Design and develop Physical and Logical IoT, IoT deployment templates

UNIT I
Introduction to Internet of things: Introduction to Internet of things– Definition &
Characteristics of IoT - **Physical Design of IoT** – Things in IoT - IoT protocols. **Logical Design of
IoT :**IoT Functional blocks- IoT communication Models- IoT communication APIs. **IoT Enabling
Technologies** – Wireless Sensor Networks- Cloud Computing- Big data Analysis –
Communication Protocols – Embedded systems.

UNIT II
IoT Levels & Deployment Templates: IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT
Level-5 IoT Level -6. IoT physical devices and endpoints- IoT device – Basic building blocks of
an IoT Device.

UNIT III
Domain Specific IoTs: Introduction – Home Automation- Smart Lighting- Smart Appliances-
Intrusion Detection-Smoke/ Gas Detectors. **Cities**– Smart Parking- SmartLighting- Smart roads–
Structural Health Monitoring – Surveillance – Emergency Response. **Environment –** Weather
Monitoring- Air Pollution Monitoring - Noise Pollution Monitoring - Forest Fire Detection – River
Floods Detection Energy- Re Logistics-Agriculture.

UNIT IV
IoT and M2M : Introduction – M2M – Difference between IoT and M2M – SDN and NFV for
IoT – Software Defined Networking – Network Function Virtualization – **IoT System
Management with NETCONF – YANG** – Need for IoT Systems Management – Simple Network
Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements –
NETCONF – YANG – IoT Systems Management with NETCONF – YANG.

UNIT V

IoT Platforms Design Methodology : Introduction - IoT Design Methodology **–** Introduction – IoT Design Methodology **–** Purpose &Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development

Text book:

1. ArshdeepBahga , Vijay Madisetti, **Internet of Things -** A Hands on Approach University Press (India)Private Limited,New Delhi,2014

UNIT I: Chapter 1: 1.1-1.2, 1.3-1.4.
UNIT II: Chapter 1 & 7: 1.5, 7.1
UNIT III: Chapter 2: 2.1 – 2.10
UNIT IV: Chapter 3 & 4 : 3.1-3.4, 4.1-4.6.
UNIT V: Chapter 5: 5.1 – 5.3

References:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, A Press Publications, 2013.

Web Resources:

1. https://www.edureka.co/blog/iot-tutorial/
2. https://www.gangboard.com/blog/iot-tutorial/
3. https://www.cs.ucy.ac.cy/courses/EPL422/slides19/Topic10b-IoT_intro.pdf

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)   Part IV: Skill
Semester   : V   Hours : 02
Subject Code: 18UCSSP5   Credits : 02

LINUX LAB

Course Outcomes:

On successful completion of this Lab the student will be able to

CO1: Know the student setup users and groups, Configure user defaults, logins and user profiles.

CO2: Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.

CO3: Identify and use UNIX/Linux utilities to create and manage simple file processing operations,   organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

1. Basic Commands in Linux.

2. Number Checking in Linux

3. Multiplication Table in Linux.

4. Roman Letter Conversion in Linux.

5. Checking File or Directory in Linux.

6. File Operations in Linux.

   Create, Copy, Delete, Rename

7. Directory Operations in Linux

   Create, Remove, Toggle

8. Directory Operations in Linux

   Copy, Move

9. Listing the files regarding their names in Linux.

10. Changing the access rights in Linux.

11. Counting number of users currently logged in Linux.

12. List of files having full access rights in Linux.

13. Counting number of lines, words and characters in a file in Linux

14. Fibonacci series in shell scripting.

15. Odd or even in shell scripting

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Class	: B.Sc (CS)	**Paper III**	: Core
Semester	: VI	**Hours**	: 06
Sub Code	: 18UCSC61	**Credits**	: 05

C# AND.NET PROGRAMMING

COURSE OUTCOMES

On successful completion of this course, the learners should be able to

CO1 Represent the insights of the Internet programming

CO2 Demonstrate design and implement complete application over the web

CO3 ConnectMS.NET framework developed by Microsoft.

CO4 Evaluate the usage of recent platforms like C#, XML, and ASP.Net which is used in the
         development of web applications

CO5 Defend the deployment and the security in the .NET framework.

Unit-I:
         Introducing C#-Understanding .NET: The C# Environment-Overview of C#-
Literals,Variables and Data Types-Operators and Expressions-Decision Making and Branching-
Decision Making and Looping.

Unit –II:
         Methods in C#- Handling Arrays –Manipulating Strings- Structures and Enumerations.

Unit-III:
         Classes and Objects - Inheritances and Polymorphism - Interface: Multiple Inheritance

Unit-IV:
         Operator Overloading-Delegates and Events.

Unit-V:
         Managing Console I/O Operations-Managing Errors and Exceptions.

Text book:

1. Balagurusamy .E ,Programming in C # , Tata McGraw Hill, New Delhi, Fourth Edition,
   2004.

2.

Units Chapters

UNIT I   : Chapters - 1 To 7
UNIT II   : Chapters - 8 To 11
UNIT III   : Chapters - 12 To 14
UNIT IV   : Chapters - 15, 16
UNIT V   : Chapters - 17, 18

Reference Books:

1. Rober Powell, Richard Weeks, C# and .NET Framework, Tech Media Publication,NewDelhi,2008.

2. E.Balagurusamy, Programming in C# and .NET, Tata McGraw Hill, New Delhi,2010.

Web Resources:

https://www.guru99.com › net-framework
https://docs.microsoft.com › en-us › dotnet
https://www.c-sharpcorner.com

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Class	: BSc (CS)	**Paper III**	: Core
Semester	: VI	**Hours**	: 06
Subject Cod	: 18UCSCP6	**Credits**	: 04

C# AND.NET PROGRAMMING LAB

Course Outcomes:

On successful completion of the course, the learners should be able to:

CO1: How to use C# and Visual Studio 2010 to build .NET Framework applications

CO2: Explain the purpose of the .NET Framework.

CO3: Apply the syntax of basic C# programming constructs.

CO4: Modify the given type of value to another type using boxing and unboxing techniques.

CO5: Conclude andcall methods in a C# application using catch, handle and throw exceptions.

1. C# program for print number pattern

2. C# program for pascal triangle

3. C# program for boxing and unboxing.

4. C# program for Structures and Enumerations

5. C# program for properties.

6. C# program for classes and objects.

7. C# program for inheritance.

8. C# program for the different parameter passing methods.

9. C# program for delegate.

10. C# program for the preparation of menu card.

11. C# program to implement the various user interface.

12. C# program for base class constructor.

13. C# program for operator overloading.

14. C# program for window application.

15. C# program for method overloading and overriding.

16. C# program for user and pre-defined exception.

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Class	: B.Sc. CS	**Part III**	: Core
Semester	: VI	**Hours**	: 06
Subject Code	: 18UCSPR1	**Credits**	: 04

PROJECT AND VIVA – VOCE

Course Outcomes

CO1 The Project Lab is one that involves practical work for understanding and solving problems in the field of computing.

CO2 Students will select individually Commercial or Technical Project based on Application Development Technologies.

CO3 With the known technologies they can develop the software

Course Description

The Project is conducted by the following Course Pattern.

Internal

    Presentation
    Submission   **40**

External

    Project Report
    Viva Voce   **60**

_____

    Total   **- 100**

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc (CS)	Part III : Elective
Semester : VI	Hours : 05
Subject Code : 18UCSE61	Credits : 04

SOFTWARE ENGINEERING

Course Outcomes:

On successful completion of the course, the learners should be able to:

CO1: Explain about software engineering life cycle and process model in software development.

CO2: Prepare the SRS, Design document, Project plan of a given software system.

CO3: Apply Project Management and Requirement analysis, Principles to S/W project development.

CO4: Analyze the cost estimate and problem complexity using various estimation techniques

CO5: Assess SQA in software project through various testing strategies with quality management.

UNIT I

Introduction to Software Engineering: The Evolving role of Software – Software – The changing Nature of Software – Legacy software –**A Generic View of Process**: Software Engineering-A Process framework-The Capability Maturity Model Integration(CMMI)-**Process Models:** Prescriptive Models -The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model.

UNIT II

Requirements Engineering: Requirements engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements - Negotiating Requirements – Validating Requirements **Building the Analysis Models** –Requirement analysis-Scenario-Based Modeling-Flow-Oriented Modeling-Creating a Behavioral Model.

UNIT III

Design Engineering: Design Process and Design Quality-Design Concepts-The Design Model-**Modeling Component-Level Design**: Component Designing Class-Based Components-Designing Conventional Components. **Performing User Interface Design**: The Golden Rules-User Interface Analysis and Design-Design Evaluation.

UNIT IV

Testing Strategies: A strategic approach to Software Testing-Test strategies for Conventional Software- Validation testing –System testing –**Testing Tactics:** Software Testing fundamentals-Black-box and White Box Texting-,White Box Testing, Basic Path testing-Control Structure Testing-Black Box Testing.

UNIT V

Estimation: Observations on Estimation-Resource-Software Project Estimation-Decomposition Techniques-Empirical Estimation Models-**Quality Management:** Quality Concepts-Software Quality Assurance – Software Reviews-Formal Technical Reviews.

Text book:

1. R.S. Pressman, **Software Engineering: A Practitioner's Approach**, McGraw Hill Education (India) Private Limited, Sixth Edition, New Delhi, 2010.

UNIT I:	Chapter 1-Section 1.1-1.5,
	Chapter 2 - Section 2.1-2.3,
	Chapter 3- Section 3.1-3.4
UNIT II:	Chapter 7- Section 7.1-7.5,
	Chapter 8- Section 8.1, 8.2, 8.5, 8.6, 8.8
UNIT III:	Chapter 9- Section 9.1-9.4,
	Chapter 11- Section 11.1, 11.2, 11.5
	Chapter 12- Section 12.1-12.2, 12.5
UNIT IV:	Chapter 13- Section 13.1, 13.3, 13.5, 13.6,
	Chapter 14- Section 14.1-14.6
UNIT V:	Chapter 15- Section 15.1, 15.5-15.7
	Chapter 23- Section 23.1, 23.4-23.7

References:

1. Richard Fairley, Software Engineering, Tata McGraw Hill,2016
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.

Websites:

1. https://www.geeksforgeeks.org/software-engineering/
2.https://www.guru99.com/software-engineering-tutorial.html
3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc(CS)	**Part III**	**: Elective**
Semester : VI	**Hours**	**: 05**
Subject code: 18UCSE62	**Credits**	**: 04**

SOFTWARE PROJECT MANAGEMENT

COURSE OUTCOMES:

On successful completion of this course, the learners should be able to:

CO1: Define the methods used to evaluate and select projects for investment of funds.

CO2: Elaborate knowledge on the principles and techniques of software project management.

CO3: Prepare organization behavior and general management techniques used for project.

CO4: Organize test case design and types of testing.

CO5: Evaluate the levels of testing.

UNIT I

Software Projects And Project Models: Introduction: Software projects Vs Other types of projects – SPM Activities – Plans, methods, Methodologies – Categorizing software projects - Stepwise project planning - Project evaluation: Technical assessment – Cost-benefit analysis – Cost-benefit evaluation techniques – Risk evaluation – Selection of an appropriate project approach: Choice of process models .

UNIT II

Software Project Handling : Software Effort Estimation: The basis for software estimating - Effort estimation techniques Activity planning: Sequencing and Scheduling activities – Network planning models –Precedence networks – Activity on arrow networks - Critical path - Resource Allocation: Resource requirements – Scheduling - Cost schedules - Monitoring and Control: Visualizing progress - Cost monitoring – Earned value analysis - Prioritizing monitoring – change control. Software Quality - SQA plan, Techniques, Conventions and Metrics.

UNIT III

Testing Fundamentals : Introduction to Testing as an Engineering activity: Testing as a Process- TMM – Testing fundamentals: Basic Definitions, Software Testing Principles, The Tester's Role – Defects, Hypotheses and Tests: Origins of Defects, Defect Classes, The Defect Repository and Test Design, Defect Examples.

UNIT IV

Testing Approaches : Test case design (Black box): Test Case Design Strategies, Random Testing, Equivalence Class Partitioning, Boundary Value Analysis - Test case design (White box): Test Adequacy Criteria, Coverage and Control Flow Graphs, Covering Code Logic, Paths: Evaluating Test Adequacy Criteria.

UNIT V

Testing Methods : Levels of Testing: Unit, Integration Test, System Test, Regression, Alpha, Beta and Acceptance test - Test goals, policies, plans and documentation - Test Planning – Testing Tools: Overview of Software testing tools – Case study using an Open source Testing tool .

Text book:

1. Bob Hughes and Mike Cotterell, Software Project Management, 5th edition, McGraw-Hill Higher Education, 2009.

UNIT I	CHAPTER 1, 2	1.1-1.24,2.1-2.40
UNIT II	CHAPTER 3, 4	3.1-3.13, 4.1-4.2
UNIT III	CHAPTER 5	5.1-5.33
UNIT IV	CHAPTER 9	9.1-9.49
UNIT V	CHAPTER 11 11.1-11.81	

References

1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, Seventh Indian, Reprint 2010.

2. RenuRajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, New Delhi, 2005.

3. Paul C. Jorgensen "Software Testing, A Craftsman's Approach", 2nd Edition, 2007, CRC Press.

Web Resources:

1. https://www.wrike.com › project-management-guide
2. https://www.mavenlink.com › resources › what-is-project-management-sof...

3. https://www.javatpoint.com › software-project-management

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Programme : B.Sc(CS)   Part III: Elective
Semester   : VI   Hours   :05
SubjectCode :18UCSE63   Credits :04

MOBILE COMPUTING

Course Outcomes:

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

CO1: Describe the Architecture, Application and Services of Mobile Computing.

CO2: Build an Application Based on the User Requirements.

CO3: Select Appropriate Framework for Developing Applications based on the Problem Requirements.

CO4: Explains the importance of Emerging Technologies, GPRS, CDMA and 3G, Security Issues.

CO5: Design and Develop Mobile Applications for Societal and Environmental IT Problems.

UNIT I

Introduction: Mobility of Bits & Bytes– Wireless – The Beginning–Mobile Computing–DialogueControl–Networks–MiddlewareandGateways–ApplicationandServices–Developing mobile computing applications–Security in mobile computing.Mobile computing architecture: Internet–The ubiquitous network–Architecture for mobile computing–Three-tier architecture–Design considerations for mobile computing–Mobile computing through internet.

UNIT II

Mobilecomputingthroughtelephony: Evolution of Telephony–Multipleaccessprocedures–Satellitecommunicationsystems–Mobile computing through telephone–developing an IVR application–Voice XML–TAPI– Computer supported telecommunication Applications,**EmergingTechnologies:**Introduction–Bluetooth–RFID–Wireless broadband-MobileIP–IPV6–Javacard.

UnitIII

Global System for mobile communications(GSM):GSM Communications–GSM Architecture–GSM Entities–Call routing in GSM–PLMN interfaces–GSM addresses &identifiers–Network Aspectsin GSM–MobilityManagement–GSMfrequency allocation–Personalcommunication sservice–Authentication &security.

General Packet Radio Service(GPRS): Introduction–GPRS & Packet data network–Network architecture–Network operations–DataServices in GPRS –Applications for GPRS –Limitations of GPRS–Billing & Charging in GPRS–EDGE.

UNIT IV

Wireless Application Protocol(WAP): Introduction –WAP–MMS–GPRS–Applications.**CDMAand3G:**Spread SpectrumTechnology–IS-95–CDMA versus GSM–WirelessData–Third generation networks-Applications on 3G.

UNIT V

Wireless LAN: Advantages–IEEE 802.11standards–Wireless LAN Architecture– Mobility in wireless LAN–Deploying WLAN–Mobile Adhoc networks and Sensor networks–Wireless LAN.Security–Wireless access in Vehicular environment-Wireless local loop–Hiper LAN–WIFI versus 3G.**Security Issues in mobile computing:**Information Security–Security techniques and algorithms–Security Protocols–Public key infrastructure–Trust–Security models–Security Frameworks fo rmobile environment.

Text book:

1. Asokek Talukder, HasanAhmed, RoopaRYavagal, **Mobile Computing Technology, Applications and Service Creation**, Second Edition, Tata Mc Graw Hill, New Delhi, 2012.

UNIT I	– Chapters1.1to1.9,2.3,2.4,2.5,2.6,2.7UNIT II–Chapters3,4
UNIT III	– Chapters5,7
UNIT IV	– Chapters8,9
UNIT V	– Chapters10,20

ReferenceBooks:
1. Jochen Schiller, **Mobile Communications**, 2nd Edition, Pearson Education, Delhi, 2003.
2. William Stallings,**Wireless Communications and Networks**, 2nd Edition, Pearson Education, Delhi, 2004.

Web Resources:

1. https://www.minigranth.com › mobile-computing

2. https://www.simplilearn.com › mobile-technology-platforms-applications-t...

3. kosmi.snubi.org › APAMI › resource › Tutorials › T2-Leong

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
(For those who joined in 2018-2019 and after)

Class	:B.Sc(CS)	**Part III**	: Elective
Semester	: VI	**Hours**	: 05
Sub code	: 18UCSE64	**Credits**	: 04

CLOUD COMPUTING

Course Outcomes

On successful completion of this course, the learners should be able to

CO1: Define Cloud Computing and its types

CO2: Explain the architecture of cloud computing

CO3: Make use of Virtualization Techniques

CO4: Analyze the different Google applications

CO5: Propose the various applications in the Cloud

UNIT I:

Define cloud Computing: Defining Cloud Computing – Cloud types –The NIST model, the cloud cube model, Deployment models, Service models, Characteristics of cloud computing- merits and demerits of cloud computing.

UNIT II:

Understanding Cloud Architecture: Cloud computing stack: compos ability – Infrastructure – platforms - Virtual appliances - Communication protocols – Applications. **Understanding Services and Applications by Type:** Defining IaaS(Infrastructure as a Service) – Defining Platform as a Service(PaaS) – Defining Software as a Service(SaaS) – Defining Identity as a Service(IDaas) – Defining Compliance as a Service(CaaS)

UNIT III:

Understanding Abstraction and Virtualization: Using Virtualization Techniques – Load balancing and Virtualization – Understanding Hypervisors – Porting Applications

UNIT IV:

Exploring Platform as a Service: Defining services - Using PAAS application frameworks-
Using Google Web services: Exploring Google Applications – Surveying the Google Application Portfolio – Exploring the Google Toolkit – Working with the Google App Engine.

UNIT -V:

Understanding Cloud Security: Securing the Cloud- Securing Data – Establishing Identity and Presence – **Moving Applications to the Cloud**: Applications in the Clouds – Applications and cloud APIs.

Text book:

1. Barrie Sosinsky, "**Cloud Computing Bible"**,Wiley, India 2014.

   Unit 1: Chapter 1
   Unit 2: Chapter 3, 4
   Unit 3: Chapter 5
   Unit 4: Chapter 7, 8
   Unit 5: Chapter 12, 14

Reference Books:

1. Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, "**Cloud Computing: Principles and Paradigms**", Wile, 2011.

2. Antony T Velte, "**Cloud Computing: A Practical Approach**", McGraw Hill, 2009.

Web Resources:

1. https://www.citrix.com › en-in › glossary › what-is-cloud-computing

2. https://data-flair.training › Blog Home › Cloud Computing Tutorials

3. https://www.tutorialspoint.com › cloud_computing

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Semester	**: VI**	**Hours**	**: 05**
Subject Code	**: 18UCSE65**	**Credits**	**: 04**

BIOMETRICS

Course Objective:
On successful completion of this course, the learners should be able to,
CO1: Relate the security infrastructure in the industry and generally in information sensitive environments.
CO2: Show the brief functioning of biometric system.
CO3: Describe the different types of biometric and their accuracy.
CO4: Analyze the awareness of privacy issues for end users and for students.
CO5: Develop the likelihood that biometric technologies, when deployed, will be as protective of personal and informational privacy as possible.

UNIT I:
Working of Authentication Technologies – working principles of Biometrics .

UNIT II:
Fingerprint and Hand Geometry – Facial and Voice Recognition

UNIT III:
Eye Biometrics: Iris and Retina Scanning – Signature Recognition and Keystroke Dynamics.

UNIT IV:
Esoteric Biometrics-Biometric liveness Testing.

UNIT V:
Biometrics in Large Scale Systems – Biometric Testing and Evaluation.

Text book:

1. John D.Woodward, Jr, Nicholas M.Orlans, Peter T. Higgins, **Biometrics – The Ultimate Reference**, Dream Tech Publishers, New Delhi, 2003.

UNIT I	Chapters - 1, 2
UNIT II	Chapters - 3, 4
UNIT III	Chapters - 5, 6
UNIT IV	Chapters - 7, 8
UNIT V	Chapters - 9, 11

Reference Books:

1. Paul Reid, **Biometrics for Network Security**, Prentice Hall Series in Computer Networking and Distributed, New Delhi, 2004.
2. James L. Wayman (Editor), Anil Jain (Editor), DavideMaltoni , Dario Maio, **Biometric Systems: Technology, Design and Performance Evaluation**, Springer Publications, London, 2005.

Websites:
1. https://www.techopedia.com/definition/26991/biometric-data
2. www.biometric-security-devices.com/types-of-biometric-devices.html
3. www.idiap.ch/en/scientific-research/biometrics-security-and-privacy

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Programme	: B.Sc (CS)	Part III	: Elective
Semester	: VI	Hours	: 05
Subject Code	: 18UCSE66	Credits	: 04

NEURAL NETWORKS

Course Outcomes:

On successful completion of the course, the learners should be able to:

CO1: Know the basics of biological Neural Network and its types.

CO2: Attain the capability to apply the algorithms and techniques of neural network in real life problem domains

CO3: Categorize the different types of neural networks and its architecture.

CO4: Predict human behavior in social web and related communities.

CO5: Construct solution for fuzzy network and Patterns Recognition Applications

UNIT I

Introduction: Brain as a Neural Network – Basic Properties of Neurons- Artificial Neural networks- **Learning:** Learning and Training-Learning Rules-Stability and Plasticity.

UNIT II

Hopfield, Perceptron and related models: Hopfield Model-Basic Models of Hopfield Network-Cellular Neural Networks- Perceptron -Other Associative Models. **Adaptive Resonance Theory:** Network for ART-1-ART-2 Network.

UNIT III

Self-Organization Maps: Kohonen Map-Adaptive of Learning Vector Quantization-Multilayer self – organizing feature map. **Feed-Forward Back Propagation networks-**Training of Multilayer Feed-Forward Networks by back propagation-Training Aspects and Variations of Back propagation Method- Back propagation as stochastic approximation.

UNIT IV

Hybrid Learning Neural Networks-Counter Propagation Network-Radial Basis Function Networks-**Probabilistic Models, Fuzzy ARTMAP and Recurrent Networks:** Probabilistic Neural Networks-General Regression Neural Networks –Fuzzy ARTMAP-Recurrent back propagation neural networks.

UNIT V

Application of Neural Networks: Design and Optimization of Systems-System Identification and Monitoring- Patterns Recognition Applications-Motion and Vibration Control Applications.

Text book:

1. M.Ananda Rao, J.Srinivas **"Neural Networks Algorithms and Applications",** Narosa

   Publishing House, Fifth Reprint 2010.

UNIT I	: Chapters: 1, 2
UNIT II	: Chapters: 3, 4
UNIT III	: Chapters: 5, 6
UNIT IV	: Chapters: 7, 8
UNIT V	: Chapters: 9

Reference Book:

1. Laurene Fausett, "Fundamentals of Neural Networks" , Pearson Education,2004..

2. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.

3. S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TATA Mc Graw Hill, 2006.

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Programme : B.Sc (CS)	**Part IV**	: Skill
Semester : VI	**Hours**	: 02
Sub Code : 18UCSSP6	**Credits**	: 02

PYTHON PROGRAMMING LAB

COURSE OUTCOMES:

On successful completion of the course, the learners should be able to

CO1   Recall the basics of declaration of variables, statements and expressions

CO2   Develop the program using branching and looping statements

CO3   Interpret the logic into code using Recursion, Function and Module

CO4   Examine the logical skill of python program using exception

CO5   Create a new modules and interfaces implementing the concept

LIST OF EXPERIMENTS

1. Find the Square root
2. Calculate the Area of a triangle
3. Quadratic Equation
4. Swap two variables
5. Generate a Random number
6. Convert Kilometers to Miles
7. Convert Celsius to Fahrenheit
8. Largest among three numbers
9. Prime numbers in interval
10. Factorial of a number
11. Fibonacci sequence
12. Armstrong number in an interval
13. Find factors of number
14. Make a simple calculator
15. Fibonacci sequence using recursion
16. Sum of Natural numbers using recursion
17. Add two matrices
18. Multiply two matrices
19. Check whether a string is Palindrome or Not
20. Count the number of each vowel