ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE (AUTONOMOUS) CUDDALORE-1
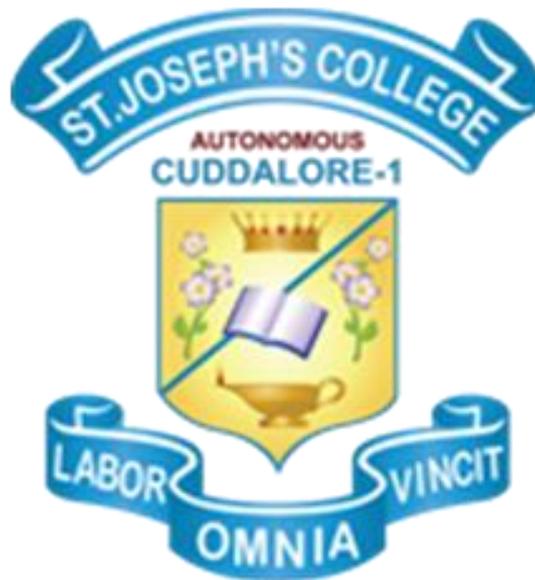
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

MSC.COMPUTER SCIENCE SYLLABUS 2020-2021

M.Sc COMPUTER SCIENCE

CURRICULAM DESIGN TEMPLATE

ADMITTED IN THE YEAR 2020 – 2021

Sem	Subject Code	Subject Title	Hrs/Week	Credit
I	PCS701S	Mathematical Foundation for Computer Science	4	3
	PCS702S	Object Oriented Analysis and Design with UML	4	3
	PCS703S	Advanced Java Programming	4	4
	PCS704S	Unix Network programming	4	4
		Elective – I	4	3
	EPCS705Q	(i)-Computer System Architecture*		
	EPCS705A	(ii)-Artificial Neural Networks		
	EPCS705B	(iii)- Modern Operating system		
	PCSP101T	Practical – 1: Advanced Java Programming	5	3
	PCSP102T	Practical – 2: Advanced Unix programming	5	3
	Total for Semester I		**30**	**23**
II	PCS806S	Software Testing	4	3
	PCS807S	Dot Net Technology	4	4
	19PCS808	Wireless Communication Technologies	4	3
	19PCS809	Web Technology	4	3
		Elective – II	4	3
	EPCS810	(i) - Distributed Computing		
	EPCS810A	(ii) - Fuzzy Logic		
	EPCS810B	(iii)-Grid Computing*		
	20PCSP23	Practical – 3: Dot Net LAB	5	3
	19PCSP24	Practical – 4: Web Technology LAB	5	3
	Total for Semester II		**30**	**22**

M.Sc COMPUTER SCIENCE

CURRICULAM DESIGN TEMPLATE

ADMITTED IN THE YEAR 2020 - 2021

Sem	Subject Code	Subject Title	Hrs/Week	Credit
III	PCS911	Data Mining and Ware Housing	4	3
	PCS912T	Open Source Technology	4	4
	PCS913P	Cloud Computing	4	3
	ECHR901S	Human Rights	2	1
		Elective – III	4	3
	EPCS914T	(i) - Principles of Compiler Design*		
	EPCS914S	(ii)- Mobile Computing		
	EPCS914A	(iii)-Digital Image Processing		
		Elective – IV	4	3
	EPCS915A	(i) – Research Methods*		
	19EPCS35A	(ii) – Cyber Forensics		
	19EPCS35B	(iii)-E-Business		
	PCSP305S	Practical – 5: PHP & MYSQL Lab	5	3
	19JPC306	Practical – 6: Mini Project	3	3
		Total for Semester III	**30**	**23**
IV	20PCS41	Data Science and Big Data Analytics	4	3
	20PCS42	Mobile Application Development	4	4
	20PCSP46	Practical – 7: Android Application	5	3
	JPCS1016	Practical – 8: Main Project	17	12
		Total for Semester IV	**30**	**22**

I M.Sc(CS)	OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML	PCS702S
SEMESTER – I		HRS/WK – 4
CORE – II		CREDIT – 3

Objectives:

- To enable the students to learn the Software development methods and tools related with Object Oriented Technology.

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to analyze and overview of object oriented software development.

CO2: Ability to know the object oriented methodologies and Frameworks.

CO3: Design databases to support the software applications and document them using UML class diagrams

CO4: Develop UML sequence diagrams from robustness diagrams

CO5: Ability to learn software quality Assurance and Debugging principles.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE: PCS702S				TITLE OF THE PAPER: OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)				MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	5	5	4	4	4	4	4	3	4.1
CO2	4	4	3	4	3	4	4	3	3	4	3.6
CO3	4	4	3	3	4	4	4	3	4	4	3.7
CO4	4	4	3	3	3	4	4	3	4	4	3.6
CO5	4	4	3	3	3	4	4	3	4	4	3.6
Mean Overall Score											3.7

Result: The Score of this Course is 3.7(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome.

UNIT – I: **(12**Hrs**)**
OVERVIEW OF OOSD: Introduction – Methodology – OBJECT BASICS: Objects-Attributes- Encapsulation and Information Hiding – Class Hierarchy – Polymorphism-Object Relationships and Associations-OOSDLC – The Software Development Process.

UNIT – II: **(13**Hrs**)**
OBJECT ORIENTED METHODOLOGIES: Introduction – Rumbaugh et al.'s Object Modeling Technique – The Booch Technology – Jacobson et al. Methodologies – Patterns – Frameworks – The Unified Approach.

UNIT – III: **(11**Hrs**)**
UNIFIED MODELING LANGUAGE: Introduction – UML Diagrams – UML Class Diagram – Use Case Diagram – UML Dynamic Modeling – UML Extensibility – UML Meta model.

UNIT – IV: **(12**Hrs**)**
OBJECT ORIENTED ANALYSIS: Introduction – Use Case Model – Developing Effective Documentation
OBJECT ORIENTED DESIGN: Introduction – Axioms – Corollaries – Design Patterns.

UNIT – V: **(12**Hrs**)**
SOFTWARE QUALITY ASSURANCE: Introduction-Quality Assurance tests – Testing Strategies – Impact of Object Orientation on Testing – Test Cases – Test Plan – Continuous Testing – Myer's Debugging Principles

TEXT BOOKS:
   1. "Object Oriented Systems Development", Ali Bahrami - Irwin-McGraw Hill, New Delhi, McGraw Hill Education(1st edition), 2017
REFERENCE BOOKS:
   1. "Object –Oriented analysis and Design with Applications", GradyBooch - Pearson Education– Ninth Indian Reprint 2002, First Impression 2006.

   2." The Unified Modeling Languages User Guide", GradyBooch, James Rumbaugh and Ivar Jacobson - Addison Wesley – Fourth Indian Reprinting 2000, Fifth Impression 2007.

I M.Sc(CS)		PCS703S
SEMESTER – I	**ADVANCED JAVA PROGRAMMING**	HRS/WK – 4
CORE – II		CREDIT – 4

Objectives:

❖ This course provides an in-depth knowledge of Advanced Java language and programming.
❖ Implementing Java components
❖ Practicing RMI, JDBC
❖ Ability to understand Multithreading

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to gain knowledge on fundamentals of java and clear view on Object and Classes.
CO2: Ability to apply knowledge on problems exhibiting packages, Interfaces, Exceptions, Multithreading
CO3: Ability to connect to database and working with AWT
CO4: Ability to access networks and to work with TCP/IP and UDP
CO5: Ability to apply basic Servlets and RMI methods.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE:PCS703S					TITLE OF THE PAPER: ADVANCED JAVA PROGRAMMING					HOURS: 4	CREDITS: 4
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	2	3	3	4	4	4	4	4	3	4	3.5	
CO2	3	4	3	4	3	4	4	3	3	4	3.5	
CO3	4	4	3	3	4	4	4	3	4	4	3.7	
CO4	4	4	3	3	3	5	5	3	4	4	3.8	
CO5	4	4	3	3	3	5	4	3	4	4	3.7	
CO6	4	4	4	3	3	4	4	4	3	4	3.7	
Mean Overall Score											3.7	

Result: The Score of this Course is 3.7(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT_ I INTRODUCTION TO JAVA **(12**Hrs**)**
Introduction to Java – Features of Java - Data types – Variables –Operators - Arrays – Classes – Objects – Constructors - Overloading method - String class – Inheritance - Overriding Method – Using super - Abstract class - Packages – Access protection.

UNIT-II MULTITHREADINGPACKAGES **(13**Hrs**)**

Multithreading: Packages - Access protection- Importing packages – Interfaces – Exception handling –Throw and throws - Thread – Multithreading.

UNIT-III AVA DATABASE **(12** Hrs**)**
Java Database: Working with windows using AWT Classes – AWT Controls – Layout Managers and menus- Swing- Introduction to Swing- Swing Architecture- Examples for Swing-JDBC/ODBC driver-MSACCESS connection-A complete example.

UNIT-IV NETWORKING **(11**Hrs**)**
Networking**:** Sockets - Inet Address - IP Address - Port number - Client/Server computing - TCP/IP - TCP client – server handling multiple clients -UDP-UDP Server-UDP Client-Multithreaded clients.

UNIT VSERVLETS AND RMI **(12**Hrs**)**
Servletsand RMI**:** Servlet architecture-HTML support - Servlet Installation - Servlet API Distributed computing – RMI architecture - parameter in RMI - RMI Client side callbacks - Installing RMI systems - serializing remote objects.

TEXT BOOKS:
1. Advanced Java Programming.Jeffrey C. Rice, Irving Salisbury-McGraw Hill-1997.
2. JAVA: How to program, Paul J. Deitel, Harvey Deitel, Prentice Hall publication, tenth edition ,2014.
3. JAVA: Complete reference,Herbert Schildt,McGraw Hill,Ninth Edition,2017

I M.Sc (CS)		PCS704S
SEMESTER – I	UNIX NETWORK PROGRAMMING	HRS/WK – 4
CORE – IV		CREDIT – 4

Objective:
❖ To make the student aware of all concepts related to Net Working and make them well versed in Unix networking programming.

COURSE OUTCOME:

CO1: Ability to gain knowledge about basics of unix, files and filetypes.
CO2: Ability to understand unix process and process identifiers
CO3: Ability to know about SVR4 and different file locking methods.
CO4: Ability to know about function of TCP and UDP sockets.
CO5: Ability to the uses of TCP and UDP echo client server.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE: PCS704S					TITLE OF THE PAPER: UNIX NETWORK PROGRAMMING					HOURS: 4	CREDITS: 4
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	4	3	4	4	3	4	3	3	3.5	
CO2	4	4	3	3	4	4	3	4	4	4	3.7	
CO3	3	3	3	3	3	3	4	4	3	4	3.3	
CO4	4	3	4	4	3	3	4	4	4	3	3.6	
CO5	3	3	3	3	3	4	3	4	4	4	3.4	
									Mean Overall Score		3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT-I INTRODUCTION & FILE SYSTEM   (12 Hrs)

Overview of UNIX OS - File I/O - File Descriptors - File sharing - Files and directories - Filetypes - File access permissions - File systems - Symbolic links - Standard I/O library - Streams and file objects - Buffering - System data files and information - Password file - Group file - Login accounting - system identification.

UNIT-II PROCESSES   (12 Hrs)

Environment of a UNIX process - Process termination - command line arguments - Process control - Process identifiers - Process relationships terminal logins - Signals -threads.

UNIT-III INTERPROCESS COMMUNICATION   (12 Hrs)

Introduction - Message passing (SVR4)- pipes - FIFO - message queues – Synchronization (SVR4) - Mutexes - condition variables - read - write locks – file locking - record locking -semaphores - Shared memory(SVR4).

UNIT-IV SOCKETS   (10 Hrs)

Introduction - transport layer - socket introduction - TCP sockets - UDP sockets - raw sockets - Socket options - I/O multiplexing - Name and address conversions.

UNIT-V APPLICATIONS   (14 Hrs)

Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat

TEXT BOOKS:

1. "Advanced programming in the UNIX environment", W.Richard Stevens- Addison Wesley, 1999 (Unit 1,2 & 3)
2 ."Unix Network Programming Volume-1: The Sockets Networking API", W. Stevens, Bill Fenner, Andrew Rudoff, 3rd Edition- Pearson education, 2003(unit 4 & 5)

REFERENCE BOOKS:

1. "The 'C' Odyssey Unix The open Boundless C" ,MeetaGandhi,TilakShetty and Rajiv Shah -BPB Publications (1st Edition) 1992.
2. "UNIX network programming: Intercrosses Communications", Stvens, Vo l2, (2nd edition) -PHI.1999.

I M.Sc(CS)	COMPUTER SYSTEM ARCHITECTURE	EPCS705Q
SEMESTER – I	For the students admitted from the year 2014	HRS/WK – 4
Elective – 1A		CREDIT – 3

Objective:

* To learn the advanced concepts of Computer Architecture.

COURSE OUTCOME:

CO1:   Examine the performance of different parallel model.

CO2:   Develop the pipeline concept for a set of instructions.

CO3:   Discriminate the performance of pipeline and non-pipeline.

CO4:   Understand the concept of parallel and scalable architecture.

CO5:   Compare the properties of shared memory and distribute multiprocessor

System and cache coherency.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE: EPCS705Q					TITLE OF THE PAPER: COMPUTER SYSTEM ARCHITECTURE					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	4	3	2	4	4	3	4	4	3.4	
CO2	4	4	4	3	2	4	4	3	4	4	3.7	
CO3	3	3	3	4	2	4	4	3	3	3	3.2	
CO4	3	3	3	3	2	4	4	3	3	3	3.1	
CO5	3	3	3	4	2	4	3	3	3	3	3.1	
									Mean Overall Score		3.2	

Result: The Score of this Course is 3.2(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Poor	Moderate	Good	Very Good	Excellent

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT-I: **(10 Hrs)**
Parallel Models: Multiprocessors and Multicomputers – Multivector and SIMD Computers – PRAM and VLSI Models – Conditions of Parallelism: Data and Resource Dependences.

UNIT-II: **(13 Hrs)**
Processors And Memory Hierarchy: Advanced Processor Technology: Instruction-Set Architecture, CISC, RISC Scalar Processor – Memory Hierarchy Technology: Hierarchical Memory Technology, Inclusion, Coherence and Locality – Virtual Memory Technology – Cache Memory Organization .

UNIT-III: **(13 Hrs)**
Pipelining And Superscalar Techniques: Linear Pipeline Processors – Non Linear Pipeline Processors – Instruction Pipeline Design – Arithmetic Pipeline Design.

UNIT-IV: **(12 Hrs)**
Parallel And Scalable Architecture: Multiprocessor System Interconnects – Vector Processing Principles – SIMD Computer Organizations: Implementation Models.

UNIT-V: **(12 Hrs)**
Scalable, Multithreaded: Latency Hiding Techniques: Shared Virtual Memory, Prefetching Techniques, Distributed Coherent Caches – Principles of Multithreading: Multithreading Issues and solutions, Multiple Context Processors.

Text Books:
1. "Advanced Computer Architecture- Parallelism, Scalability, Programmability" ,Kai Hwang,-McGraw Hill- 1993.
2. "Advanced Computer Architecture- Parallelism, Scalability, Programmability", Kai Hwang, McGraw Hill- Second Edition-2000.

Reference Books:

1. "Computer System Architecture", M.M.Mano-PHI(3rd Edition), 1994.
2. "Computer Architecture and Parallel Processing", Hwang Briggs- McGraw Hill-1985.
3. "Computer Organization and Architecture - Designing for Performance", William Stallings- PHI, 2000.

I M.Sc(CS)		EPCS705A
SEMESTER – I	**ARTIFICIAL NEURAL NETWORKS**	HRS/WK – 4
ELECTIVE – 1B		CREDIT – 3

Objectives:
❖ To enable the student to understand the concepts and principles of fuzzy and Neural Networks.
❖ Investigate some common models and their Applications.

COURSE OUTCOME:

CO1: Understand the basics of Artificial Neural Network

CO2: Able to know about Architecture and Training of ANN

CO3: Understand the concept of Memory and learning process of ANN

CO4: Understand the concept of unsupervised learning

CO5: Learn and improve the skill about Simulation of Neural Network

CO6: Learn about the design and initialization of ANN

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE: EPCS705A					TITLE OF THE PAPER: ARTIFICIAL NEURAL NETWORKS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3.5	4	4	4	5	4.5	4.3	4.2	4.5	4.2	
CO2	4	4	3	3	4	4.3	4.3	4	3	4	3.7	
CO3	4	4	4	4	3	4	4	4	3	4	3.8	
CO4	4	4	3	4	4	4	4	4	3	4	3.8	
CO5	4	4	4	4	4	4	4	4	4	4	4.0	
									Mean Overall Score		3.9	

Result: The Score of this Course is 3.9(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

Unit-1:   **[10 HRS]**
Introduction: Definition – fundamental concepts – applications – advantages and disadvantages – classifications – biological neural network – artificial neural structure – activation functions – adding bias – perception – MLP.

Unit-2:   **[10 HRS]**
Feed forward ANNs: Structure – delta rule – architecture and training – radial basis function – time delay NN.

Unit-3:   **[13 HRS]**
Attractor ANNs: Associative learning – attractor NN – linear associative memory – Hopfield network – content addressable memory – simulated annealing – Boltzmann machine – bidirectional associative memory.

Unit-4:   **[13 HRS]**
Unsupervised ANNs: Clustering procedures – C-Means algorithm – learning vector quantization – MAXNET – self-organizing feature maps – adaptive resonance architectures.

Unit-5:   **[14 HRS]**
ANN Simulation in MATLAB: Creating a custom neural network – initializations – setting weights and bias – using different transfer functions – using training parameters – simulating and plotting network – designing a complete FF neural network (supervised) – designing self organizing maps (unsupervised).

TEXT BOOKS:
1. "Artificial Neural Networks", Robert J. Schalkoff-New Delhi, McGraw Hill, 1997.
2. "Neural Networks: A Classroom Approach", Satish Kumar- McGrawHill,New Delhi , 2004.
3. "Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications", S. Rajasekaran, G. A. VijayalakshmiPai - Prentice Hall , India, 2003.
4. "Fundamentals of Neural Networks" , LaureneFausett - Prentice Hall, 1994.
5. "Neural Network in Computer Intelligence ",Limin Fu- McGraw Hill International, 1994..

REFERENCE BOOKS:
1. "Neural Networks,S.Haykin", A Comprehensive Foundation. Prentice Hall,1999
2. "Neural Networks: Algorithm, Applications and Programming Techniques",Freeman, A. James and Skapura, M. David. California, Addison-Wesley Longman, 2002.
3. "Principles of Neuro Computing for Science of Engineering.Fredric", M. Ham, Ivica Kostunica- Tata McGraw Hill, 2002

I M.Sc (C.S)	MODERN OPERATING SYSTEM	EPCS705B
SEMESTER –I		HRS/WK-4
ELECTIVE-1C		CREDIT-3

Objective:

❖ To provide a clear description of the fundamental concepts in

❖ An operating system and design principles that is applicable to a variety of distributed operating system.

COURSE OUTCOME:

CO1: Ability to gain knowledge about basics of Computer SystemStructures.
CO2: Ability to understand Process Management &CPUScheduling
CO3: Ability to know about Distributed ComputingSystem.
CO4: Ability to know about function of Synchronization
CO5: Ability to learn the uses of security

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE: EPCS705C					TITLE OF THE PAPER: MODERN OPERATING SYSTEM					HOURS: 4	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	3	4	4	3	4	3	3.4	
CO2	4	4	3	4	3	4	3	4	4	3	3.6	
CO3	4	4	3	3	3	3	4	3	4	4	3.5	
CO4	3	4	3	3	3	3	3	4	4	4	3.4	
CO5	4	4	3	3	3	4	4	3	3	4	3.5	
Mean Overall Score											3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT-I   [12Hrs]

INTRODUCTION:COMPUTER SYSTEM STRUCTURES: Computer-System Operation–Storage Hierarchy–General System Architecture–**OPERATING SYSTEM   STRUCTURES**: System Components – System Calls - Virtual Machines–System Generation.

UNIT-II   [12Hrs]

PROCESS MANAGEMENT: Processes–Process Concept – Operation on Processes – Inter-Process Communication.**CPU   SCHEDULING**:   Basic   Concepts–Scheduling   Algorithms–Real   Time Scheduling-Process Synchronization–Background–Critical- Selection Problem–Semaphores -Deadlocks–System Model– Methods for Handling Deadlocks–Deadlock Avoidance–Recovery from Deadlock.

UNIT-III   [12Hrs]

DISRIBUTED COMPUTING SYSTEM: Evolution-Models- Distributed Operating System-Issues in Designing DOS-Distributed Computing Environment. **COMMUNICATION IN DISTRIBUTED SYSTEM**:Protocols-Features of Good Message Passing System- Issues in IPC by Message Passing-Synchronization-Buffering- Process Addressing-Failure Handling-Group Communication.

UNIT-IV   [12Hrs]

SYNCHRONIZATION: Clock Synchronization – Event Ordering - Mutual Exclusion-Deadlock-Election Algorithms. **PROCESS MANAGEMENT**: Process Migration-Threads.

UNIT-V   [12Hrs]

SECURITY: Potential Attacks to Computer Systems – Cryptography–Authentication-Access Control-Digital Signatures-Design Principles.**INTERPROCESS COMMUNICATION:**Process Tracing-System VIPC -Sockets.**MULTI PROCESSOR SYSTEMS**: Problem of Multiprocessor Systems-Solution with Master and Slave Processors-Solution with Semaphores.

TEXT BOOKS:

1.Abraham   Silberschatz   and   Peter   Baer   Galvin,   "Operating   System Concepts",4thEd.,AddisonWesley.,NewYork,1999. Unit I & II

2.Pradeep K.Sinha,"Distributed Operating Systems Concepts   and Design", Prentice Hall, New Delhi,2004.Unit III,IV&V

REFERNECE BOOKS:

1..Andrew S. Tanaenbaum, ,"Modern Operating Systems", PHI ,New Delhi,1997.Delhi, 1997.

I M.Sc(CS)		PCSP101T
SEMESTER – I	**ADVANCED JAVA PROGRAMMING**	HRS/WK – 5
CORE PRACTICAL – I		CREDIT – 3

Objectives:

❖ This provides an in-depth knowledge of Advanced Java language and programming
❖ Gain an in-depth understanding of database programming in Java using JDBC.
❖ Learn how to do distributed programming in Java using RMI and CORBA.

COURSE OUTCOME:

After learning this course, the students should be able to expose

      CO1: Ability to work with different input getting parameters.
      CO2: Ability to handle problems using Thread concepts.
      CO3: Ability to access Network classes and its methods
      CO4: Ability to work with database with different commands
      CO5: Ability to handle AWT methods and event handlings.
      CO6: Ability to work with Graphics and applet interface & implementing RMI
         Concepts

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER I	COURSE CODE:PCSP101T					TITLE OF THE PAPER: Practical- ADVANCED JAVA PROGRAMMING					HOURS: 5	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	2	3	4	4	4	3	3	3	3.3	
CO2	4	4	2	3	4	3	4	5	3	4	3.6	
CO3	4	3	2	4	4	2	4	2	4	4	3.3	
CO4	4	2	2	2	4	4	4	4	4	4	3.6	
CO5	4	4	2	3	4	3	4	3	4	3	3.4	
CO6	4	4	1	3	4	4	4	3	3	4	3.4	
Mean Overall Score											3.4	

Result: The Score of this Course is 3.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

1. Write a java program to find area perimeter using BufferedReader class.

2. Write a java program to implement Multithreading concepts.

3. Write a java program to implement an application for File Stream using Sequential file.

4. Write a program to print the port, protocol, host, and file name from the given URL.

5. Write a program to implement Client and Server application using TCP/IP.

6. Write a program to display the IP Address of a given Host Machine.

7. Write a program for Remote Command Execution using TCP/IP.

8. Write a program for Storing and Retrieving Email Addresses using JDBC.

9. Write a program to print student details using JDBC.

10. Working with Frames and Various Controls.

11. Incorporating Graphics

12. Font animation using Applets Interface.

13. Write a program to implement addition operation using RMI.

I M.Sc(CS)		PCSP102T
SEMESTER – I	**ADVANCED UNIX PROGRAMMING**	HRS/WK – 5
CORE		CREDIT –3
PRACTICAL – 2		

Objectives:

❖ To make the student aware of all concepts related to Unix networking programming.

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to gain knowledge about basics of shell script,.
CO2: Ability to understand unix process and process identifiers
CO3: Ability to know about the grep statements in Shell Scripts.
CO4: Ability to know about functions of shell scripts .
CO5: Ability to write Shell Scripts for search all sub-directories and its current
directory

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE: PCSP102T					TITLE OF THE PAPER: ADVANCED UNIX PROGRAMMING					HOURS: 5	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	4	4	3	3	3.8	
CO2	3	4	3	4	4	4	4	4	3	4	3.7	
CO3	3	4	3	4	3	4	4	4	3	4	3.6	
CO4	4	3	3	4	3	4	4	4	3	4	3.6	
CO5	4	4	4	4	4	4	4	4	4	3	3.7	
									Mean Overall Score		3.6	

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

1. Write a shell script to copy, rename and print multiple files using choice menus.

2. Write a shell script to display logged in users who are using high CPU percentage.

3. Write a shell script to list processes based on CPU percentage and memory un usage.

4. Write a shell script to display total used and free memory space.

5. Write a shell script that takes as command-line input a number n and a word. The program should then print the word n times, one word per line.

6. Write a shell scripts using the following statements.

                    a) While-loop

                    b) For-loop

                    c) If-then-else

                    d) Switch

7. Write a shell script using grep statement.

8. Write a shell script that can search all immediate sub-directories of the current directory for a given file and then quit if it finds one.

I M.Sc(CS)		PCS806S
SEMESTER – II	**SOFTWARE TESTING**	HRS/WK – 4
CORE -5		CREDIT – 3

Objectives:
  ❖ To enable the students to learn the fundamentals of Software Planning and Testing.

COURSE OUTCOME:

  After learning this course, the students should be able to expose

  CO1: Ability to know the Purpose of Software Testing
  CO2: Ability to understand the Principles of Testing
  CO3: Ability to acquire knowledge about the types of testing
  CO4: Ability to apply basic test of object oriented systems
  CO5: Ability to learn the Organizations Structures for Testing Teams

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: PCS806S				TITLE OF THE PAPER:SOFTWARE TESTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**				**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	4	3	3	2	3	4	3.0
CO2	3	4	3	4	4	3	3	2	3	4	3.3
CO3	3	3	4	3	3	3	3	2	4	3	3.1
CO4	4	3	4	3	3	3	3	3	2	3	3.1
CO5	3	3	4	3	3	3	3	3	3	4	3.2
									Mean Overall Score		3.1

Result: The Score of this Course is 3.1(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	**1**	**2**	**3**	**4**	**5**
Interval	**0<=rating<=1**	**1.1<=rating<=2**	**2.1<=rating<=3**	**3.1<=rating<=4**	**4.1<=rating<=5**
Rating	**Very Poor**	**Poor**	**Moderate**	**High**	**Very High**

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT-I: **(12 Hrs)**
INTRODUCTION: Purpose of Software Testing- Is Complete Testing Possible?- The Consequence of Bugs -Taxonomy of Bugs.

UNIT-II :   **(12 Hrs)**
PRINCIPLES OF TESTING: Software Development Life Cycle Models-Phases of Software Project - Quality – Assurance – Control –Testing - Verification- Life Cycle Model - Waterfall Model - Rapid Application Development Models - Spiral Model-V Model.

UNIT- III: **(13 Hrs)**
TYPES OF TESTING: White Box Testing-Static Testing-Structural Testing-Black Box Testing-Integration Testing- Phase of Testing- Scenario Testing-Defect Bash-System and Acceptance Testing –Functional System Testing-Non Functional Testing-Regression Testing-Internalization testing-Ad hoc testing.

UNIT-IV: **(12 Hrs)**
TEST OF OBJECT ORIENTED SYSTEMS: Usability and Accessibility Testing-Approach-Quality Factors-Tools for Usability-Test roles for usability-Common People issues-Comparison between Testing and Development Functions-Role of Echo system.

UNIT-V: **(11 Hrs)**
ORGANIZATIONS STRUCTURES FOR TESTING TEAMS: Dimension-Structure-Single Product Company - Multi product companies - Effects of Globalization - Testing service Organization-Test Management and Automation -Test planning -Test Process-Test Reporting-Best Practices.

TEXT BOOKS:
1. "Software Testing Principles and Practice"s, Srinivasan Desikan ,Gopalswamy Ramesh - Pearson Education Publication, 2006
 2. "The Craft of Software testing including Object Based and Object-Oriented Testing", Brain Marik- Prentice-Hall,1995.

REFERENCE BOOK:

1. "Lessons Learned in software testing", CemKaner, James Bach-Wiley(1st edition) 2008

I M.Sc(CS)		PCS807S
SEMESTER – II	DOT NET TECHNOLOGY	HRS/WK – 4
CORE – 6		CREDIT – 4

Objectives:
❖ To enable the students to learn the fundamentals of .NET, .Net Framework and C#.

COURSE OUTCOMES:

CO1:. To learn the overview of DotNet Framework and gaining knowledge about its Special features.

CO2: Learn basics of C# and creating rich GUI window applications in C# using Visual Studio .NET.

CO3. To gain knowledge about 3-tier architecture of ASP.NET, new features and its rich controls.

CO4: Demonstrate the database connectivity in ASP.NET and working of DataGridControl.

CO5: Creating rich GUI web applications in ASP.NET using Visual Studio.NET.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: PCS807S					TITLE OF THE PAPER:DOTNET TECHNOLOGY					HOURS: 4	CREDITS: 4
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	4	2	2	4	3.6	
CO2	4	4	4	4	4	4	4	2	2	4	3.6	
CO3	4	4	4	3	4	4	4	2	2	3	3.4	
CO4	4	3	4	4	4	3	4	2	2	4	3.4	
CO5	4	4	4	4	3	4	3	2	2	4	3.4	
CO6	4	4	3	4	3	3	4	2	2	4	3.3	
Mean Overall Score											3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Poor	Moderate	Good	Very Good	Excellent

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT - I: **(10**Hrs**)**
INTRODUCTION TO DOTNET TECHNOLOGY– Dot Net Framework Overview –
Activities of CLR – DotNet Applications – Introduction to Visual Studio IDE – Types of
Dotnet Languages.

UNIT - II: **(12**Hrs**)**
INTRODUCTION TO C# : Introduction to C# - data types in C# - conditional statement,
if…else – looping statement, while…/for loop – properties in C# - namespaces in C#.

UNIT - III: **(13**Hrs**)**
INTRODUCTION TO ASP.NET : Introduction to ASP.NET – architecture of ASP.NET –
difference between asp and ASP.NET – page events in ASP.NET – controls in
ASP.NET(server side controls and html controls) – the code behind web forms (separation of
content & business logic) – life cycle of a web forms page – stages in web forms page – web
forms event model.

UNIT - IV: **(12**Hrs**)**
INTRODUCTION TO ADO.NET : Introduction to ADO.net –ADO.net Architecture –
Connection – data reader – command Class.

UNIT - V: **(13**Hrs**)**
DISCONNECTED ARCHITECTURE IN ADO.NET : Key components of ADO.net
disconnected –DataSet class– DataAdapter class – Working with data grids in ASP.NET -
with ADO.net

TEXT BOOKS:
1. Programming with C#, E.Balaguruswamy. - Tata McGraw Hill Publication. 1-
   Edition 5th Reprint, Tata McGraw Hill, 2004.
2. Beginning ASP.NET 1.1 with VB.NET 2003- Chris Ullman, John Kauffman -Wrox
   Publication, 1- Edition ,2004.
3. Professional ASP.NET 1.1– Alex Homer, Dave Sussman – Wrox Publication, 1-
   Edition , 2004.
4. ASP.NET and VB.NET web programming – Crouch – Pearson Education, 1- Edition
   ,2002.
5. ASP.NET Developer's Guide – Greg Buczek-Tata McGraw Hill, 1- Edition ,2002.

REFERENCE BOOKS:
1. Internet & World Wide Web how to program - Deitel and Deitel – PHI, 3ʳᵈ Edition,
   2003.
2. C# and the .NET platform– Andrew Troelsen – A Press, 1ˢᵗ Edition,2001.
3. J2EE Bible – Justin Couch, Daniel H. Steinberg – Wiley India (P) Ltd., 2002.

II-MSC (CS)	WIRELESS COMMUNICATION TECHNOLOGIES	19PCS808
SEMESTER – II		HRS/WK – 4
CORE-VII		CREDIT – 3

Objectives:

1. To know about the various frequency Spectrum and Signals for wireless communication
2. To Know the concept of Infrared, Cordless and WLL
3. To understand the concepts wireless communication technologies such as Wireless LAN, WiMAX, Bluetooth and Wi-Fi

COURSE OUTCOMES:

After learning this course, the students should be able to expose

CO1: Ability to know the Purpose ofProtocols and The TCP/IP Suite
CO2: Ability to understand the Principles of Signal Encoding Techniques
CO3: Ability to acquire knowledge about the wireless networking
CO4: Ability to understand the cordless systems and wireless local loop
CO5: Ability to learn the IEEE 802.11 Wireless LAN Standard

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: 19PCS808					TITLE OF THE PAPER: WIRELESS COMMUNICATION TECHNOLOGIES					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	3	4	4	4	4	3	4	4	3.6	
CO2	3	4	3	4	4	4	4	3	3	4	3.6	
CO3	4	3	4	4	3	3	4	3	3	4	3.5	
CO4	3	4	3	4	3	4	4	3	4	4	3.6	
CO5	3	4	3	4	3	3	3	4	3	4	3.4	
Mean Overall Score											3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having**High** association with Programme Outcome and Programme Specific Outcome

UNIT :I   **(12 Hrs)**

INTRODUCTION TO PROTOCOLS AND THE TCP/IP SUITE- The Need for a Protocol Architecture, The TCP/IP Protocol Architecture, The OSI Model, Inter-networking. Wireless Communication Technology- Antennas and Propagation- Antennas, Propagation Modes, Line-of-Sight Transmission, Fading in the Mobile Environment.

UNIT :II   **(13Hrs)**
JPCS1016 Data- Analog Signals, Analog Data-Analog Signals, Analog Data-Digital Signals, The Concept of Spread Spectrum- Frequency Hopping Spread Spectrum , Direct Sequence Spread Spectrum, Code Division Multiple Access, Generation of Spreading Sequences.

UNIT :III   **(13Hrs)**

WIRELESS NETWORKING- Satellite Communications- Satellite Parameters and Configurations, Capacity Allocation-Frequency Division, Capacity Allocation-Time Division Cellular Wireless Networks- Principles of Cellular Networks, First-Generation Analog, Second-Generation - TDMA, CDMA, Third-Generation Systems

UNIT :IV   **(12 Hrs)**

CORDLESS SYSTEMS AND WIRELESS LOCAL LOOP- Cordless Systems, Wireless Local Loop - Wireless LANs- Wireless LAN Technology – Overview, Infrared LANs, Spread Spectrum LANs, Narrowband Microwave LANs.

UNIT :V   **(10 Hrs)**

IEEE 802.11 WIRELESS LAN STANDARD- IEEE 802 Protocol Architecture, IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control.Introduction to Wi-Fi and Bluetooth Technologies (Only Overview).

TEXT BOOKS
1. "Wireless Communications and Networks,William Stallings", Pearson Prentice Hall (2nd edition), 2005. (Chapters 4, 5, 6, 7, 9, 10,11, 13, 14, 15.1)

REFERENCES
1. :Wireless Communication Technology", Steve Rackley-Elsevier, 2007
2. "AdhocWirelessNetworks-Architechture and Protocols", C. Siva Ram Murthy and B.S.Manoj-Pearson Prentice Hall, 2004

I M.Sc(CS)	WEB TECHNOLOGY	19PCS809
SEMESTER – II		HRS/WK – 4
CORE – VIII		CREDIT – 3

Objectives:
- ❖ To enable the students to learn the principles of Internet programming.
- ❖ To Gain knowledge in Internet basics and XML
- ❖ To Understand Java Script and PHP programming.

COURSE OUTCOMES:
CO1: Understand the basics of internet communications and hardware elements associated with it.
CO2: Learn the fundaments of HTML tags, frames, frameset and tables.
CO3: Acquire knowledge about java script and its controls statements, functions, objects.
CO4: Understand about XML, CSS, XSL, DTD, XSD.
CO5: Create dynamic web applications with PHP scripting.

Relationship Matrix Course Outcome, Programme Outcomes and Programme Specific Outcome

SEMESTER II	COURSE CODE:19PCS809					TITLE OF THE PAPER: WEB TECHNOLOGY					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	3	4	3	4	3	3	4	4	3.4	
CO2	4	4	4	4	4	3	3	3	3	4	3.6	
CO3	4	4	3	3	4	3	4	3	4	4	3.6	
CO4	4	4	3	3	4	4	3	3	4	3	3.5	
CO5	4	3	4	3	3	4	3	3	4	4	3.5	
Mean Overall Score											3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT – I: **(12 Hrs)**
BASICS OF INTERNET COMMUNICATION : Hardware elements associated with internet - Internet Services - Internet Protocols – TCP/IP, UDP, HTTP – Other Protocols – Telnet - Gopher- Mail and its types- FTP - Remote access - Web Indices – Search Engines.

UNIT – II: **(12 Hrs)**
INTRODUCTION TO HTML : Tags and Documents - Link documents using Anchor Tags – Images and Pictures – Tables – HTML Forms - Frames – Framesets.

UNIT – III: **(12 Hrs)**

Introduction to Scripting : Java Script – Data types – Operators – Variables – Conditional Statements – Functions – Objects – Document object– Window Object – Event Handling .

UNIT – IV: **(11 Hrs)**
INTRODUCTION TO XML :Well formed XML – CSS – XSL - Valid XML – DTD – XSD - Introduction to DOM and SAX Parsers.

UNIT – V: **(13 Hrs)**
INTRODUCTION TO DYNAMIC WEB APPLICATIONS: Server Side Scripting basics – Server Side Scripting Languages – PHP Scripting - General Syntactic Characteristics – Primitives, operations and expressions – Control Statement – Arrays – Functions – Pattern Matching – Form Handling – Files – Cookies – Session Tracking – Database access with PHP and MYSQL.

Text Books:
1. "Internet and WWW – How to program?", Deitel&Deitel - Pearson Education, 2005 (Units I, II and III)
2. "Programming the WWW", Robert W Sebesta – Pearson Education.2006 (Unit V)
3. "Beginning XML" , David Hunter Et al – Wrox Publications 2000. (Unit IV)

Reference Books:
1. -"Internet Systems Handbook",Daniel C. Lynch, Marshall T. Rose - Addison Wesley 1993.
2. "10 Minute Guide to the Internet", Peter Kent - - Prentice Hall of India, 1996.
3. "Teach Yourself XML in 21 days", Scott Mitchell and James Atkinson - - Sams Publishing, 1999.
4. Internetworking with TCP/IP", Douglas E.Comer, David L.Stevens(Second Edition)- 2007.

I M.Sc(CS)		EPCS810
SEMESTER – II	**DISTRIBUTED COMPUTING**	HRS/WK – 4
ELECTIVE – 2A		CREDIT – 3

Objectives:
- ❖ To enable the student to be familiar with distributed systems and client server computing.
- ❖ To provide a clear description of the fundamental concepts and design principles that is applicable to a variety of distributed operating systems.

COURSE OUTCOME:
> **CO1:** To understand the basic concepts of distributed systems
> **CO2:** Outline the Client /server communication in distributed systems.
> **CO3:** Demonstrate concurrency control and properties of transaction in Distributed Systems.
> **CO4**: Ability to know about file accessing model and various services in Distributed System.
> **CO5**: Understand the Resource and Process Management in distributed system
> **CO6:** Understand the Concept of Distributed Shared Memory in distributed system.

Relationship Matrix Course Outcomes, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: EPCS810					TITLE OF THE PAPER: DISRIBUTED COMPUTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	2	3	4	3	3	3	2	4	3.0	
CO2	3	3	2	3	4	3	4	3	4	4	3.3	
CO3	3	3	2	4	3	3	3	4	3	3	3.1	
CO4	3	3	3	2	3	4	3	4	3	3	3.1	
CO5	3	3	3	3	4	3	3	4	3	3	3.2	
CO6	3	3	3	3	4	3	2	3	4	3	3.1	
Mean Overall Score											3.1	

Result: The Score of this Course is 3.1(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT - I: **(10 Hrs)**

INTRODUCTION TO DISTRIBUTED SYSTEMS: Introduction – Goals - Hardware concept – Software Concepts – Design Issues: Transparency – Flexibility – Reliability – Performance – Scalability.

UNIT - II: **(12 Hrs)**

COMMUNICATION IN DISTRIBUTED SYSTEMS: The client –server model – Addressing – Types of Primitives – Implementation – Group communication – Introduction – Design Issues – Group communication in ISIS.

UNIT - III: **(14 Hrs)**

SYNCHRONIZATION IN DISTRIBUTED SYSTEMS: Clock Synchronization – Mutual Exclusion -Election Algorithms –Atomic Transactions- Deadlocks.

UNIT - IV: **(12 Hrs)**
PROCESSES AND PROCESSORS : Processes and Processors in Distributed Systems – Threads – Processor Allocation – scheduling – Fault Tolerance. Distributed File system – Design – Implementation – Trends in Distributed File systems.

UNIT - V: **(12 Hrs)**
DISTRIBUTED SHARED MEMORY: Introduction – shared memory – consistency models – page – based distributed shared memory.

Text Book(s):
1. "Modern Operating Systems" Andrew S. Tanenbaum –Prentice Hall of India Pvt. Limited, New Delhi,1997
2. An Introduction to Distributed and Parallel Processing" John A. Sharp - Blackwell Scientific Publications, 1987.

Reference Book(s):
1. "Distributed Databases Principles and systems" StefansCeri, Ginseppe Pelagatti - McGraw Hill Book Co., New York, 1985.
2. "Distributed systems: concepts & Design" George Coulouries- Pearson education Pvt. Ltd (Fourth edition- 2009), (Second Edition 2000).

I M.Sc(CS)		EPCS810A
SEMESTER – II	**FUZZY LOGIC**	HRS/WK – 4
ELECTIVE – 2B		CREDIT – 3

Objective:

This course presents a detailed knowledge of Fuzzy logic principles, sets, relations, systems and its applications.

COURSE OUTCOMES:

After learning this course, the students should be able to expose

CO1: Ability to mathematically quantify knowledge, expertise and intuition, to model complex systems.

CO2: Ability to understand the basic knowledge of fuzzy relation and fuzzy set

CO3: Ability to acquire knowledge about the fuzzy logic and Fuzzy Expert Systems

CO4: Ability to apply basic fuzzy inference and approximate reasoning

CO5: Ability to apply in day to day life.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: EPCS810A					TITLE OF THE PAPER:FUZZY LOGIC					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	5	4	5	4	3	4	5	4.2	
CO2	4	4	4	4	5	4	4	4	3	4	4.0	
CO3	4	4	4	4	4	4	4	4	4	4	4.0	
CO4	4	4	4	4	4	4	4	4	5	4	4.1	
CO5	4	4	5	4	4	4	4	4	4	3	4.0	
									Mean Overall Score		4.0	

Result: The Score of this Course is 4.0(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT - I   **(12 Hrs)**
INTRODUCTION: Crisp sets: an overview - Basic types of fuzzy sets - Basic Concepts of fuzzy sets-Characteristics and Significance - Fuzzy sets Vs Crisp sets - Additional properties of Alpha Cuts - Representation of Fuzzy sets - Extension principle for Fuzzy sets - Operations on Fuzzy Sets - types of operations- Fuzzy compliments, Union, Intersection - Combination of Operations - Aggregation Operations- Fuzzy Arithmetic - Fuzzy numbers - Linguistic variables - Arithmetic Operation on Intervals And Fuzzy numbers - Lattice of Fuzzy numbers - Fuzzy Equation.

UNIT – II   **(12 Hrs)**
FUZZY RELATION: Fuzzy Relation - Crisp & Fuzzy Relations - Projections &Cylindric Extensions - Binary Fuzzy Relations - Binary Relations on a Single Set - Fuzzy Equivalence Relations - Fuzzy Compatibility Relations - Fuzzy Ordering Relations - Fuzzy Morphisms - Compositions of Fuzzy Relation - Fuzzy Relation Equations - General Discussion - Problem Partitioning - Solution Method - Fuzzy Relation Equation Based on Sup_i&Inf_i Completions - Approximate Solutions - The use of Neural Networks - Possibility Theory - Fuzzy Measures - Evidence Theory - Possibility Theory - Fuzzy Sets & Possibility Theory - Possibility Theory Vs Probability Theory.

UNIT – III   **(13 Hrs)**
FUZZY LOGIC: Fuzzy Logic - Classical logic - Multi valued Logic - Fuzzy Propositions & Quantifiers - Linguistic Hedges - Inference from Conditional Fuzzy Propositions - Inference from Conditional & Qualified Propositions - Inference from Quantified Propositions - Uncertainty Based Information - Information & Uncertainty - Non specificity of Crisp Sets & Fuzzy sets- Fuzziness of Fuzzy sets - Uncertainty in Evidence Theory - Uncertainty Measures - Principles of Uncertainty - Approximate Reasoning - Fuzzy Expert Systems - Fuzzy Implication & Its selections - Multi conditional Approximate Reasoning - The Role of Fuzzy Relation Equations - Interval Valued Approximate Reasoning.

UNIT – IV   **(12 Hrs)**
FUZZY SYSTEMS: Fuzzy Systems - General Discussion - Overview of Fuzzy Controllers and Example - Fuzzy systems & Neural Networks - Fuzzy Neural Networks - Fuzzy Automata - Fuzzy Dynamic Systems - Pattern Recognition - Introduction - Fuzzy clustering - Fuzzy Pattern Recognition - fuzzy Image Processing-Fuzzy Databases & Information Retrieval Systems - General Discussion - Fuzzy Databases -Fuzzy Information Retrieval.

UNIT – V   **(11 Hrs)**
APPLICATIONS: Engineering & Other applications - Introduction - Civil Engineering - Mechanical Engineering - Industrial Engineering - Computer Science Engineering - Reliability Theory - Robotics - Medicine - Economics - Decision Making - Fuzzy Systems & Genetic Algorithms - Fuzzy Regression - Interpersonal Communication.

TEXT BOOKS:

1**.** "Fuzzy Sets and Fuzzy Logic Theory and Applications",George J. Klir& Bo Yuan-Prentice Hall, India.1995

REFERENCE BOOKS:
1. "Fuzzy Sets Uncertainty & Information", George J. Klir& Tina A. Folger-PHI, 2001.
2. "Neuro - Fuzzy and Soft Computing ",J.S.R.Jang, C.T.Sun, E.Mizutani- PHI, 2003.

I M.Sc(CS) SEMESTER – II ELECTIVE – II C	**GRID COMPUTING**	**EPCS810B**
		HRS/WK – 4 **CREDIT – 3**

Objective:

* To impart knowledge related to the various concepts, methods of Grid computing with grid benefits, components, and standards support grid computing techniques.

COURSE OUTCOME:

CO1: Understand the basic concept of Grid Computing.
CO2: Gain knowledge on the concepts of Grid Benefits & Status of Technology.
CO3: Understand the concept of Compents of Grid Computing Systems
CO4: Ability to know Grid computing Architecture & its Drawbacks.
CO5: Understand the Concept of Grid Computing Standards and Service
        Elements.
CO6: Gain knowledge on the Components of OGSA Services

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE: EPCS810B					TITLE OF THE PAPER: GRID COMPUTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	4	2	4	3	4	3	3	4	3.1	
CO2	3	4	4	3	4	3	3	3	3	4	3.4	
CO3	3	3	4	3	4	3	3	3	2	4	3.2	
CO4	3	2	3	3	3	3	3	2	4	4	3.0	
CO5	3	3	3	4	3	3	3	2	3	3	3.0	
CO6	4	3	3	4	3	3	3	2	3	3	3.1	
Mean Overall Score											3.1	

Result: The Score of this Course is 3.1(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	**1**	**2**	**3**	**4**	**5**
Interval	**0<=rating<=1**	**1.1<=rating<=2**	**2.1<=rating<=3**	**3.1<=rating<=4**	**4.1<=rating<=5**
Rating	**Very Poor**	**Poor**	**Moderate**	**High**	**Very High**

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT: I   **[12 Hrs]**
INTRODUCTION: Grid Computing & Key Issues-Applications-Other Approaches-Grid Computing Standards-Grid Topology-Component s& Layers-Pragmatic Course of Investigation.

UNIT: II   **[12 Hrs]**
GOAL BENEFITS & STATUS OF TECHNOLOGY: Motivations-History of Computing, Communications and Grid Computing –Grid Computing Prime Time-Suppliers and Vendors-Economic Value-Challenges

UNIT: III   **[12 Hrs]**
COMPONENTS OF GRID COMPUTING SYSTEMS & ARCHITECTURE: Basic Constituent Elements-A Functional view-A Physical View-Service View.

UNIT: IV   **[12 Hrs]**
GRID COMPUTING STANDARDS-OGSI: Standardization-Architectural Constructs-Practical view-OGSA/OGSI Service Elements and Layered Model-More Detailed View.

UNIT: V   **[12 Hrs]**
STANDARDS SUPPORTING GRID COMPUTING-OGSA: Functionality Requirements-OGSA Service Taxonomy-Service Relationships-OGSA Services-Security Considerations.

TEXT BOOKS:
  1. "**A Networking Approach to Grid Computing**" ,Daniel Minoli-Wiley publications-2004

REFERENCE BOOKS:
  1. "**Grid Computing-A practical Guide to Technology & Applications**" Ahmar Abbas-Charles River Media Publications-2004

IM.Sc (CS) SEMESTER – II CORE PRACTICAL – 3	DOT NET LAB	20PCSP23 HRS/WK – 5 CREDIT – 3

Objective:
❖ To enable the student to build applications in DOT NET Language

COURSE OUTCOME:
CO1: Creating rich GUI window applications for Splash Screen using C# in Visual Studio.NET

CO2: Creating rich GUI window applications for Notepad & Login form using C# in Visual Studio.NET.

CO3: Creating rich GUI window applications for Student Mark sheet using C# in Visual Studio.NET.

CO4: Creating rich GUI web applications in Request and Response Application using C# and Ms-Access with ASP.NET using Visual Studio.NET.

CO5: Creating rich GUI web applications in using AdRotator Control

CO6: Creating rich GUI web applications in File uploading and downloading using Server object

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE:20PCSP23					TITLE OF THE PAPER:DOTNET LAB					HOURS: 5	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	4	2	3	4	3.7	
CO2	4	4	4	4	4	4	4	3	2	4	3.7	
CO3	4	4	4	3	4	4	4	2	3	3	3.5	
CO4	4	3	4	4	4	3	4	3	2	4	3.5	
CO5	4	4	4	4	4	4	3	2	3	4	3.6	
CO6	4	4	3	4	4	3	4	2	2	4	3.4	
Mean Overall Score											3.6	

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

C#.NET

1.   Splash Screen
2.   Notepad Application
3.   Student Marksheet program and Ms-Access.
4.   Login Form Creation program and Ms-Access.

ASP.NET

1.   Creating Student Bio-Data.
2.   Request and Response Application using C# and Ms-Access..
3.   Chatting using application and session object.
4.   Application using AdRotator Control.
5.   File uploading and downloading using server object.
6.   Telephone Record maintenance and Ms-Access.

Reference:

https://www.codewithc.com/asp-net-projects-with-source-code/

I M.Sc(CS)		19PCSP24
SEMESTER – II	**WEB TECHNOLOGY LAB**	HRS/WK – 5
CORE PRACTICAL – 4		CREDIT –3

Objective:

❖ To develop applications using HTML, XML and PHP.

COURSE OUTCOME:

CO1: Create a HTML table with rows and columns and split them using Rowspan and Colspan.

CO2: Understand and create web pages using text links and align them.

CO3: Acquire knowledge to create XML documents, write a XSL style sheet and validate them using DTD or XSD.

CO4: Understand and write PHP programs for storage and retrieval of data from mysql.

CO5: Create java script programs and illustrate its various concepts.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER II	COURSE CODE:19PCSP24					TITLE OF THE PAPER: WEB TECHNOLOGY LAB					HOURS: 5	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	4	3	4	4	4	4	3	3.6	
CO2	4	4	3	4	3	4	3	4	3	3	3.5	
CO3	4	3	3	4	4	4	4	3	3	4	3.6	
CO4	4	3	4	3	3	3	4	3	4	4	3.5	
CO5	3	4	4	3	4	4	3	3	4	4	3.6	
Mean Overall Score											3.6	

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

1. Create a HTML table with rows and columns and split them using Rowspan and Colspan.

2. Create a web page in the format of front page of a news paper using Text links. Align the text with colors.

3. Write a HTML program for new email account registration. Validate the input using Java Script.

4. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.

5. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

6. Write a PHP program to access the data stored in a mysql table.

7. Develop a simple Web page using Html and JavaScript about your college.

8. Write a JavaScript Program to prepare a salary slip for an Employee

9. Write a JavaScript Program to illustrate the use of String Functions

10. Write a JavaScript Program to illustrate the use of Mathematical Functions and Date Functions.

II M.Sc (CS)	DATA MINING AND WAREHOUSING	PCS911
SEMESTER – III	For the students admitted from the year 2008	HRS/WK – 4
CORE – 9		CREDIT – 3

Objective:
❖ This course enable us to understand the concepts of Data Warehousing and Data Mining and its applications.

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to know the data mining introduction and classification of data mining system
CO2: Ability to understand the Principles of knowledge discovery process
CO3: Ability to acquire knowledge about Data Warehouse Architecture
CO4: Ability to apply classification and prediction
CO5: Ability to learn the Data warehouse scoping and planning

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE: PCS911					TITLE OF THE PAPER:DATAMINING AND WAREHOUSING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	2	4	3	4	4	3	2	4	3.4	
CO2	4	4	2	4	4	5	4	3	2	4	3.6	
CO3	4	3	3	4	3	4	4	3	3	4	3.4	
CO4	4	4	2	4	4	3	4	3	3	4	3.5	
CO5	4	4	2	4	4	4	4	3	2	4	3.5	
									Mean Overall Score		3.6	

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT I: **(10 Hrs)**
DATA MINING INTRODUCTION:
Data mining –Introduction-classification of data mining system-Data mining Vs Data base-Application of data mining-Data mining functionalities-Integration of data mining system with the data warehouse system.

UNIT II: **(12 Hrs)**
KNOWLEDGE DISCOVERY PROCESS: Knowledge Discovery process-Data cleaning: missing values-noisy data-data cleaning as a process-Data Integration and Transformation-Data Reduction-Types of OLAP servers: ROLAP Vs MOLAP Vs
HOLAP- Decision trees- Neural network- Genetics algorithms.

UNIT III: **(13 Hrs)**
DATA WAREHOUSE ARCHITECTURE: Steps for the design and construction of data warehouses-A three tier data warehouse architecture –data warehouse back-End Tools and utilities-metadata repository-From data warehousing to data mining-From online analytical processing to online analytical mining-Data warehouse implementation-Efficient computation of data cubes.

UNIT IV: **(13 Hrs)**
CLASSIFICATION AND PREDICTION: Bayesian classification- Baye's theorem-

Rule based classification: Using IF-THEN rules for classification-Rule Extraction

from a decision tree-Prediction-Cluster Analysis-Types of data in cluster analysis.

Unit V: **(12 Hrs)**
PLANNING : Data warehouse scoping and planning –Testing and implementation of data warehouse – Advantages of Data warehousing –Disadvantages of data warehousing.

TEXT BOOKS:

1."Data Mining Concepts And Techniques", Jiawei Han and MichelineKamber -Morgan Publishers (second edition),2006

REFERENCE BOOKS :

1. "Data Mining ",Pieter Adrians ,DolfZantiage - Addison Wesley,1996
2."Data Warehousing in the real world",Sam Anahory,DennisMurrey-AddisonWesley, 1996.
3. "Data Warehousing-Concepts, Techniques, Products & Applications"-C.S.R Prabhu,PHI Second Edition, 2002.

II M.Sc (CS)	OPEN SOURCE TECHNOLOGY	PCS912T
SEMESTER – III	For the students admitted from the year 2014	HRS/WK – 4
CORE – 10		CREDIT – 4

Objective:
❖ This course provides an in-depth knowledge in PHP and MYSQL.

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: To understand the basics of PHP.
CO2: To understand the PHP functions and Arrays.
CO3: To learn about the PHP Pre defined functions.
CO4: To understand the basis of MYSQL..
CO5: To know how to connect the PHP with MYSQL

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE:PCS912T					TITLE OF THE PAPER: OPEN SOURCE TECHNOLOGY					HOURS: 4	CREDITS: 4
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	2	3	4	4	4	3	3	3	3.3	
CO2	4	4	2	3	4	3	4	5	3	4	3.6	
CO3	4	3	2	4	4	2	4	2	4	4	3.3	
CO4	4	2	2	2	4	4	4	4	4	4	3.6	
CO5	4	4	2	3	4	3	4	3	4	3	3.4	
Mean Overall Score											3.4	

Result: The Score of this Course is 3.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT I   **(12 Hrs)**
INTRODUCTION: PHP as Open Source – First Script – Beginning and Ending a block –comments in PHP – variables – Data types – Operators and Expressions – Constants- Using PHP Script with HTML.

UNIT II   **(12 Hrs)**
CONTROL STATEMENTS: Branching and Looping Statements – Break and Continue statements – Nested Loops.
FUNCTIONS: Defining functions – calling functions – user defined functions – variable scope.
ARRAYS: Creating Arrays – Associative arrays – Multidimensional arrays – accessing arrays – manipulating arrays – sorting arrays.

UNIT III   **(13 Hrs)**
PHP FUNCTIONS: I/O Functions – Data Functions – Time, Date and Mathematical Functions – Database functions.

UNIT IV: **(12 Hrs)**
MySQL: Understanding RDBMS – Working with Databases and Tables – Editing Records and Performing Queries – MySQL Access Controls.

UNIT V: **(11 Hrs)**
USING PHP WITH MySQL: Querying a MySQL Database with PHP – Validating User Input – Formatting Query Output.

TEXT BOOKS:
1. "Core PHP Programming" ,Leo Atkinson,–Pearson Publishers – Third Edition – PHI ,2004
2. "PHP and MySQL" , VikramVaswami – McGraw Hill,2005

REFERENCE BOOKS:
1. "MySQL/PHP Database Applications "Brad Bulger, Jay Greenspan, David Wall (Second Edition) – Wiley Publication,2003.
2. "Teach yourself PHP within 24 Hours "Mati Zandstra- SAMS Publication,2004.

II M.SC (CS)	CLOUD COMPUTING	PCS913P
SEMESTER – III		HRS/WK – 4
CORE – II		CREDIT – 3

Objective:

* To impart the basic concepts of Cloud Computing and its applications.

COURSE OUTCOME:

CO1: To understand the basic concepts of Cloud Computing

CO2: Understand the concept of Infrastructure as a service in cloud

CO3: Ability to Design & develop backup strategies for cloud data based on features.

CO4: Gain idea about the Cloud with Map Reducing concept.

CO5: Abllity to understand the concept of security

CO6: To understand the Cloud Applications and key components of AWS.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE:PCS913P					TITLE OF THE PAPER: CLOUD COMPUTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	3	2	4	3	3	2	3	4	3.0	
CO2	3	4	3	4	4	3	3	2	3	4	3.3	
CO3	3	3	4	3	3	3	3	2	4	3	3.1	
CO4	4	3	4	3	3	3	3	3	2	3	3.1	
CO5	3	3	4	3	4	3	4	3	3	4	3.4	
CO6	3	2	3	4	3	3	3	3	3	4	3.1	
Mean Overall Score											3.2	

Result: The Score of this Course is 3.2(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT :I   **(12Hrs)**
INTRODUCTION TO CLOUD COMPUTING: Roots of Cloud Computing -Layers and Types of Cloud - Features of a Cloud - Infrastructure Management- Cloud Services - Challenges and Risks - Migrating into a Cloud: Introduction - Broad Approaches - Seven Step Model - Integration as a\Service - Integration Methodologies - SaaS.

UNIT: II   **(12Hrs)**
INFRASTRUCTURE AS A SERVICE: Virtual Machines - Layered Architecture - Life Cycle - VM Provisioning Process - Provisioning and Migration Services - Management of Virtual Machines Infrastructure - Scheduling Techniques - Cluster as a Service - RVWS Design - Logical Design - Cloud Storage – Data Security in Cloud Storage - Technologies.

UNIT: III   **(12Hrs)**
PLATFORM AND SOFTWARE AS A SERVICE: Integration of Public and Private Cloud - Techniques and Tools - Framework Architecture –Resource Provisioning Services - Hybrid Cloud - Cloud Based Solutions for Business Applications - Dynamic ICT Services - Importance of Quality and Security in Clouds - Dynamic Data Center - Case Studies - Workflow Engine in the Cloud - Architecture - Utilization - Scientific Applications for Cloud – Issues - Classification - SAGA - Map Reduce Implementation.

UNIT IV   **(12Hrs)**
MONITORING AND MANAGEMENT: An Architecture for Federated Cloud Computing - Use Case - Principles - Model - Security Considerations – SLA Management - Traditional Approaches to SLO - Types of SLA - Life Cycle of SLA - Automated Policy - Performance Prediction of HPC - Grid and Cloud - HPC Performance Related Issues.

UNIT V   **(12Hrs)**
APPLICATIONS: Best Practices in Architecting Cloud Applications in the AWS Cloud - Massively Multilayer Online Game Hosting on Cloud Resources - Building Content Delivery Networks using Clouds – Resource cloud Mashups

TEXTBOOKS
1. "CloudComputing Principles and Paradigms", RajkumarBuyya, James Broberg and AndrzejGoscinski, Wiley Publications, 2011

REFERENCE BOOKS
1. "Cloud Application Architectures"George Reese, ShroffO'reilly, ISBN: 8184047142, 2009.
2. "Cloud Computing Web Based Applications that change the way you work and collaborate online", Michael Miller - Pearson Education, 2009.

II M.SC (CS)	**PRINCIPLES OF COMPILER DESIGN**	EPCS914T
SEMESTER – III	**For the students admitted in the year 2015**	**HRS/WK – 4**
ELECTIVE – 3A		**CREDIT – 3**

Objectives:

❖ . To understand the various phases of a compiler and to develop skills in designing a compiler

COURSE OUTCOMES:

CO1: Apply skills and familiarity which are applicable to a broad range of computer applications.

CO2: Design and develop a comprehensive Compiler for a given language

CO3: Implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler.

CO4: Understand the concept parsing techniques

CO5: Able to understand the memory allocation

CO6: Understand the Loop Optimization and DAG

Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER III	COURSE CODE: EPCS914T					TITLE OF THE PAPER:PRINCIPLES OF COMPILER DESIGN					HOURS: 4	CREDITS: 3
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)					MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	4	4	3	3	3.8	
CO2	3	4	3	4	4	4	4	4	3	4	3.7	
CO3	3	4	3	4	3	4	4	4	3	4	3.6	
CO4	4	3	3	4	3	4	4	4	3	4	3.6	
CO5	4	4	4	4	4	4	4	4	4	3	3.7	
									Mean Overall Score		3.6	

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT I: (12 Hrs)
Compiler - Phases of Compiler – Lexical Analysis – Role of Lexical analyzer – Finite Automata – Regular Expression – From a Regular expression to an NFA , NFA to DFA – Design of Lexical Analyzer.

UNIT II :   (12 Hrs)
Syntax Analyzer – CFG – Role of the Parser – CFG – Top Down Parsing – Recursive descent parsing, predictive Parsers – Bottom up Parsing – Shift reduce, operator precedence parsers.

UNIT III: (12 Hrs)
Syntax directed definition :- Construction of Syntax trees – Intermediate code generation – Intermediate Languages – Syntax trees, post fix form, Three address code – Boolean expressions.

UNIT IV: (12 Hrs)
Symbol table – contents of Symbol table – Implementation of Stack allocation scheme – Storage allocation.

UNIT V: (12 Hrs)
Code Optimization and code generation – principles sources of optimization – loop optimization – Dag Representation of Basic blocks.Code generation – simple code generator

Text Books:

1. Compilers Principles ,Techniques and Tools Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman.
Chapter 1 : (1.1,1.3), Chapter 3: (3.1,3.6,3.7,3.9), Chapter 4: (4.1,4.2,4.4 – 4.6),
Chapter 5: (5.1,5.2), Chapter 7: (7.5), Chapter 8: (8.1,8.4)

2. Principles of Compiler Design Alfred V.Aho and Jeffrey D.Ullman.
Chapter 9: (9.1,9.2), Chapter 10: (10.1,10.2,10.3),
Chapter 12: (12.1,12.2,12.3), Chapter 15: (15.2,15.4,15.5,15.7)

II M.SC (CS)		EPCS914S
SEMESTER – III	**MOBILE COMPUTING**	HRS/WK – 4
ELECTIVE – 3B		CREDIT – 3

Objectives:

❖ To provide basics for various techniques in Mobile Communications.
❖ To build working knowledge on various telephone and satellite networks.
❖ To study the working principles of wireless LAN and its standards.
❖ To build skills in working with Wireless application Protocols to develop mobile content applications.

COURSE OUTCOME:

After learning this course, the students should be able to expose

   CO1: Ability to gain knowledge on basis of mobile computing and MAC
   CO2: Ability to acquire knowledge on multiple Telecommunication systems
   CO3: Ability to access wireless LAN, bluetooth
   CO4: Ability to gain idea on IP, Tunneling and reverse tunneling
   CO5: Ability to understand WAP, itsArchiteture,WML.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE:EPCS914S					TITLE OF THE PAPER: MOBILE COMPUTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	4	3	3	3	4	4	3	4	3	3.4	
CO2	4	4	3	4	3	4	3	4	4	3	3.6	
CO3	4	4	3	3	3	3	4	3	4	4	3.5	
CO4	3	4	3	3	3	3	3	4	4	4	3.4	
CO5	4	4	3	3	3	4	4	3	3	4	3.5	
Mean Overall Score											3.5	

Result: The Score of this Course is 3.5(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT I   **(12 Hrs)**
INTRODUCTION: Mobile and Wireless Devices-Simplified Reference Model-Need For Computing- Multiplexing-Spread Spectrum and Cellular Systems-Medium Access Control-Comparisons.

UNIT II   **(12 Hrs)**
TELECOMMUNICATION SYSTEMS: Telecommunication systems – GSM – Architecture-Protocols- Hand Over and Security – Satellite Networks **-** Satellite Systems.

UNIT III   **(13 Hrs)**
WIRLESS LAN: IEEE 802.11– System Architecture – Protocol Architecture – Blue Tooth – MAC layer –Security and Link Management.

UNIT IV   **(12 Hrs)**
MOBILE IP: Goals– Packet Delivery– Agent Advertisement and Solicitation - Registration-Tunneling and Reverse Tunneling.

UNIT V   **(11 Hrs)**
WIRELESS APPLICATION PROTOCOL: Objectives of WAP– Architecture of WAP– WML Features-WML Script.

Text Book:
1. "Mobile Communications", Jochen Schiller- PHI/Pearson Education(2nd Edition).Delhi,2000.

Reference Books:
1. "The Wireless Application Protocol: Writing Applications for the Mobile internet",SandeepSinghal,ThomasBridgman,LalithaSuryanarayana,DanilMouney, JariAlvinen, David Bevis, Jim Chan and StetanHild-Pearson Education Delhi,2001.
2. "Mobile Computing", Asoke K Talukder, Roopa R Yavagal- TMG,2006.

II M.Sc (C.S)		EPCS914A
SEMESTER –III	**DIGITAL IMAGE PROCESSING**	HRS/WK-4
Elective – 3C		CREDIT-3

Objectives:
*Digital image Processing is an area which is ever growing in the research side.
*This paper intends to improve the student's perspective on research side with an eye opener
  On Digital image processing.

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to gain knowledge on basic fundamentals of Digital Image Processing
CO2: Ability to acquire knowledge about Image Enhancement
CO3: Ability to know about Image Restoration
CO4: Ability to gain idea on Geometric Transforms
CO5: Ability to understand Image Compression.

Relationship Matrix Course Outcome, Programme Outcomes and Programme Specific Outcome

SEMESTER III	COURSE CODE: EPCS914A					TITLE OF THE PAPER: **Digital Image processing**					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	2	3	4	4	4	3	3	3	3.3	
CO2	4	4	2	3	4	3	4	5	3	4	3.6	
CO3	4	3	2	4	4	2	4	2	4	4	3.3	
CO4	4	2	2	2	4	4	4	4	4	4	3.6	
CO5	4	4	2	3	4	3	4	3	4	3	3.4	
Mean Overall Score											3.4	

Result: The Score of this Course is 3.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT – I   **[10 HRS]**

INTRODUCTION : Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels .(p.nos. 15-17, 21- 44, 50-69).

UNIT-II   **[14 HRS]**

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening. (p.nos.76-141).

UNIT-III   **[12 HRS]**

IMAGE RESTORATION: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering.

UNIT-IV   **[12 HRS]**

GEOMETRIC TRANSFORMS:Introduction to the Fourier transform and the frequency domain, estimating the degradation function (p.nos147-167,220-243,256-276).

UNIT-V   **[12 HRS]**

IMAGE COMPRESSION: Fundamentals, image compression models, error-free compression. (p.nos: 409-467,492-510).

TEXT BOOKS:

RafealC.Gonzalez, Richard E.Woods, Digital Image Processing, , Second Edition, Pearson Education/PHI.

REFERENCE BOOKS:

1. "Image Processing, Analysis, and Machine Vision", Milan Sonka, Vaclav Hlavac and Roger Boyle- Thomson Learning (Second Edition),2007
2. "Compute Vision and Image Processing ",Adrian Low-B.S.Publications(Second Edition),2014
3. "Digital Image Processing", William K. Prat , - Wily Third Edition,2010
4. "Digital Image Processing and Analysis", Chanda, D. DattaMajumder - Prentice Hall of India, 2003.

II M.SC (CS)	**RESEARCH METHODS**	EPCS915A
SEMESTER – III		HRS/WK – 4
ELECTIVE – 4A		CREDIT – 3

Objective:

* To enable student to understand and work with methods and concepts related to Research and also to develop broad comprehension of research area

COURSE OUTCOME:

CO1: Understand and acquire the basics knowledge about research methodology and the research design concepts.
CO2: Understand the various data collection methods for doing research.
CO3: Knowledge about data analysis methods and its usage.
CO4: Understand the usage and significance of report writing and its techniques.
CO5: Understand about the importance of writing and presentation of research report.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE: EPCS915A				TITLE OF THE PAPER: RESEARCH METHODS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)				PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	4	4	4	3	4	4	3	3	3.5
CO2	4	4	3	3	3	4	4	4	3	4	3.6
CO3	3	4	4	3	3	4	4	4	3	4	3.6
CO4	4	4	3	3	3	3	4	4	3	4	3.5
CO5	3	4	3	4	4	4	3	3	4	4	3.6
Mean Overall Score											3.6

Result: The Score of this Course is 3.6(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT I :Basics of Research Methodology   **[12hrs]**
Research Methodology: An introduction – Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research Approaches – Significance of Research – Research methods versus methodology.

Unit II:Research Design   **[12hrs]**
Research Design – Meaning –needs – features – Important topics related to Research Design-Types-Principles-Sample Design: Steps – Criteria for selecting a sample design – criteria for good sample design.

Unit III:Data Collection   **[12hrs]**

Methods of Data Collection – Collection of primary data – Collection of data through questionnaires – Schedules – Differentiation between questionnaires and schedules – Other methods of data collection – Collection of secondary data – Selection of appropriate method for data collection– Data Collection using Journals.

Unit IV:Analyzing of Data   **[12hrs]**

Processing Operations   - Some Problems in Processing - Elements/Types of Analysis - Statistics in Research - Measures of Central Tendency -Measures of Dispersion -Measures of Relationship -Simple Regression Analysis -Multiple Correlation and Regression - Partial Correlation .

Unit V: Significance of Report Writing   **[12hrs]**

significance of report writing– Different steps in writing Report – Layout of the Research Report – Types of Reports – Oral presentation – Mechanics of writing a Research Report – Precautions for writing a Research Reports – Conclusions.

REFERENCES BOOKS
1. "Research Methodology – Methods and Techniques", C.R. Kothari.(2nd Edition)-New Delhi: New Age International (P) Limited, 2003.
2. "Qualitative Research in IS: Issues & Trends", Eileen M. Trauth-USA/London: IDEA Group Publishing, 2001. (ISBN: 1-930708-06-08)

II M.Sc (C.S)		19EPCS35A
SEMESTER –III	**CYBER FORENSICS**	HRS/WK-4
Elective – 4B		CREDIT-3

Objectives:

*To Explain the responsibilities and liabilities of a computer forensic investigator
*To collect digital evidences from a crime scene without damaging it or risking it becoming inadmissible in a court of law

COURSE OUTCOME:

After learning this course, the students should be able to expose

CO1: Ability to gain knowledge on basic Forensics, itstasks, cybercrime laws
CO2: Ability to restrict fromcrimes, threat and fraud by learning social ethics
CO3: Ability to learn about cyber criminals, crime fighters and understanding investigators
CO4: Ability to understand local, state, national, international laws and their procedures
CO5: Ability to understand how to preserve and recover digital evidence.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE: 19EPCS35A					TITLE OF THE PAPER:CYBER FORENSICS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	**PROGRAMME OUTCOME(PO)**					**PROGRAMME SPECIFIC OUTCOME(PSO)**					**MEAN SCORE OF CO**	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	5	3	2	5	3.9	
CO2	4	4	4	4	4	4	5	4	3	5	4.1	
CO3	4	4	4	4	4	4	5	4	3	5	4.1	
CO4	4	4	4	4	4	4	5	3	3	5	4.0	
CO5	4	4	4	4	4	4	5	3	2	5	3.9	
									Mean Overall Score		4.0	

Result: The Score of this Course is 4.0(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT:1   **(Hrs 11)**
INTRODUCTION TO COMPUTER FORENSICS : Computer forensics definitions - Computers' roles in crimes- Computer forensics tasks-Prepare for an investigation- Collect evidence -Preserve evidence -Recover evidence- Document evidence Challenges associated with making "cybercrime" laws-Jurisdictional issues.

UNIT:1I   **(Hrs 12)**
COMPUTER CRIMES :Crimes -Violent crimes where computers are used include terrorism- assault threat- stalking- child pornography -Nonviolent crimes where computers are used include trespass- theft- fraud- vandalism -Where evidence often resides for different types of crimes -Address books- chat logs- e-mail- images- movies- Internet browser history-etc.

UNIT:1II   **(Hrs 12)**
COMPUTER CRIMINALS: Using evidence to create a crime timeline - Modify Access Create (MAC) dates associated with files- Problems with using these (they don't change in a logical fashion in some cases)-Criminals and crime fighters- Understanding "cyber criminals" and their victims -Understanding "cyber investigators.

UNIT:1V   **(Hrs 13)**
BUILDING A CYBERCRIME CASE: Bodies of law- Constitutional law- Criminal law-Civil law- Administrative regulations- Levels of law- Local laws- State laws- Federal laws-International laws- Levels of culpability- Intent –Knowledge- Recklessness- Negligence-Level and burden of proof- Criminal versus civil cases- Vicarious liability- Laws related to computers –CFAA- DMCA- CAN Spam- etc.

UNIT:V   **(Hrs 12)**
PRESERVING AND RECOVERING DIGITAL EVIDENCE: Disk imaging -Creating a message digest or hash code for a disk -Where data hides; deleted and erased data -File systems –Files-Modify Access Create (MAC) dates to establish time line -File headers - info about file type.

TEXT BOOK
1. "Guide to Computer Forensics and Investigations", Bill Nelson, Amelia Phillips, Christopher Steuart, - 4th edition, Course Technology- Cengage Learning, 2010

REFERENCES BOOK
1. "Computer Crime Scene Investigation", John R. Vacca, Computer Forensics-2nd Edition, Charles River Media, 2005

I M.Sc (C.S)	E –BUSINESS	19EPCS35B
SEMESTER –III		HRS/WK-4
ELECTIVE – 4C		CREDIT-3

Objectives:
*This course introduces students to various aspects and models for E-Business.
*At the end of the course, students should have an understanding of the impacts which E-Business is having on society, markets and commerce.
*Students should also become aware of the global nature of E-commerce and how traditional means of doing business will need to change in the electronic age.

COURSE OUTCOME:
CO1: Essential knowledge on Business Process Model
CO2. Learn the working environment functions for E Market places
CO3. Learn about the E Business Applications of Outsourcing Industry
CO4. Acquired an idea about employment and job Market online different field and Industries
CO5. Understood the challenges and dynamics of each E-Learning process Education and Industries to help better manage operations

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE:19EPCS35B					TITLE OF THE PAPER: E-BUSINESS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	5	5	4	4	4	4	3	3	4.0	
CO2	4	4	3	4	4	4	4	3	3	4	3.7	
CO3	4	4	3	3	4	4	4	3	4	4	3.9	
CO4	4	4	3	3	4	4	4	3	4	4	3.7	
CO5	4	3	4	4	3	4	4	3	4	4	3.7	
Mean Overall Score											3.8	

Result: The Score of this Course is 3.8(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT: I   **(Hrs 12)**
INTRODUCTION TO E-BUSINESS AND E-COMMERCE- Define the E-Commerce and E-Business - Define E-Commerce Types of EC transactions - Define E-Business Models - Internet Marketing and E-Tailing - Elements of E-Business Models- Explain the benefits and limitations of E-Commerce.

UNIT: II   **(Hrs 12)**
E-MARKETPLACES: Structures, Mechanisms, Economics, and Impacts- Define E-Marketplace and Describe their Functions- Explain E-Marketplace types and their features - Describe the various types of auctions and list their characteristics - Discuss the benefits, limitations and impacts of auctions - E-Commerce in the wireless environment - Competition in the DE and impact on industry

UNIT: III   **(Hrs 12)**
E-BUSINESS APPLICATIONS: E-Procurement and E-Payment Systems - Integration and E-Business suits - ERP, E-SCM, CRM - E-Procurement definition, processes, methods and benefits - E-Payment - Discuss the categories and users of smart cards - Describe payment methods in B2B EC.

UNIT: IV   **(Hrs 12)**
THE IMPACT OF E-BUSINESS ON DIFFERENT FIELDS AND INDUSTRIES: - E-Tourism - Employment and Job Market Online - Online Real Estate - Online Publishing and E-Books - Banking and Personal Finance Online - On-Demand Delivery Systems and E-Grocers - Online Delivery of Digital Products, Entertainment, and Media

UNIT:V   **(Hrs 12)**
E-LEARNING AND ONLINE EDUCATION:- Define electronic learning-Discuss the benefits and drawbacks of E-Learning.
 THE E-LEARNING INDUSTRY- Discuss E-Content development and tools-Describe the major technologies used in E-Learning- Discuss the different approaches for E-Learning delivery-How E-Learning can be evaluated. Future Trends-e-Government- Definition of E-Governments-Implementation-E-Government Services- Challenges and Opportunities- E-Government Benefit.

TEXT BOOK
1. "Electronic Commerce: A Managerial Perspective", Turban, E. et al.,-Prentice Hall 2008.

REFERENCE BOOKS
1. "Electronic Business and Electronic Commerce Management", Dave Chaffey, 2nd edition, Prentice Hall, 2006
2. "E-Learning Tools and Technologies", Horton and Horton-Wiley Publishing, 2003

II M.SC (CS) SEMESTER – III CORE PRACTICAL – 5	PHP &MYSQL For the students admitted from the year 2020	PCSP305S HRS/WK – 5 CREDIT – 3

Objective:

❖ Gain an in-depth understanding of database programming in PHP using MySQL.

COURSE OUTCOME:

CO1: To create a simple PHP program.

CO2: Ability to create a simple webpage Bio-Data and Marksheet

CO3: Construct the webpage using classes and objects

CO4: To create web pages with MYSQL Database.

CO5: Ability to create webpage using PHP functions

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome

SEMESTER III	COURSE CODE:PCSP305S					TITLE OF THE PAPER: PRACTICAL: PHP AND MYSQL					HOURS: 5	CREDITS: 3
COURSE OUTCOMS	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	3	2	3	4	4	4	3	3	3	3.3	
CO2	4	4	2	3	4	3	4	5	3	4	3.6	
CO3	4	3	2	4	4	2	4	2	4	4	3.3	
CO4	4	2	2	2	4	4	4	4	4	4	3.6	
CO5	4	4	2	3	4	3	4	3	4	3	3.4	
Mean Overall Score											3.4	

Result:The Score of this Course is 3.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

PHP &MYSQL LAB

1. Multiplication Table.

2. Creating Bio-Data Using PHP and HTML.

3. Marksheet Preparation.

4. Shopping Cart.

5. Using Class and Objects.

6. Creating Feedback Form Using PHP Functions.

7. Shell Program in PHP to find User Session.

8. Cookie to Find the Visit of user in a Web page.

9. Connecting the MySQL Database with PHP.

10. Accessing Operations in MySQL DB using PHP.

II M.Sc (CS)	**MINI PROJECT**	**19JPC306**
SEMESTER – III		**HRS/WK-3**
CORE PRACTICAL-6		**CREDIT – 3**

Objective:
❖ The main objective of this Mini project is to expose the students to get a broad idea to develop project.

COURSE OUTCOMES (CO):

CO1: Ability to perform Critical Thinking, Reasoning, and Creative Thinking.
C02: Ability to use the technology
C03: Ability to visualize the problems and Provide Solution
C04: Ability to test technical skills.
C05: Ability to work both independently and in groups on presentations and/or development of Projects.

SEMESTER	COURSE CODE:	TITLE OF THE PAPER: MINI PROJECT											HOURS:	CREDITS:
III	**19JPC306**												**3**	**3**
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)								MEAN SCORE OF CO'S	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	
CO1	5	4	5	5	4	4	4	4	4	3	4	4	4	**4.10**
CO2	5	4	5	5	4	4	4	4	5	3	4	4	4	**4.20**
CO3	5	5	5	5	5	5	5	4	5	3	4	4	4	**4.50**
CO4	5	5	5	5	5	5	5	4	5	3	4	4	4	**4.50**
CO5	5	5	5	5	5	5	5	4	5	3	4	4	4	**4.50**
Mean Overall Score														**4.4**

Result: The Score of this Course is 4.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	**Very Poor**	**Poor**	**Moderate**	**High**	**Very High**

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

FORMAT FOR PREPARING MINI PROJECT REPORT

Arrangement of contents

1. Title Page
2. Bonafide Certificate
3. Acknowledgement
4. Table of contents
5. Abstract
6. Chapters of the Report
7. References
8. Appendices, if any

Appendices should be named as
          APPENDIX- A
          APPENDIX- B

BINDING SPECIFICATION

❖ Report should be found using flexible cover of thick white Art Paper.
❖ The Spine for the Bound volume should be of black calico of 2cms width.
❖ The Cover should be printed in Block letters.

MARGIN SPECIFICATION

          Top   : 4   cms
          Bottom   : 3   cms
          Left   : 4.5 cms
          Top   : 2.5 cms

PAGE NUMBERING

All Page numbers should be typed without punctuation on the Bottom-Center Portion of the Page. The Preliminary pages (table of contents and abstract) should be numbered in Lowercase Roman Literals. Papers of main Text, starting with Chapter-1, Should be consecutively numbered using Arabic Numerals.

TITLE PAGE:

<div align="center">

TITLE OF THE PROJECT

A project report

Submitted for the partial fulfillment for

the award of degree of

MASTER OF COMPUTER SCIENCE

By

STUDENT'S NAME

(Register Number)

Under the Guidance of

GUIDE'S NAME

COLLEGE ADDRESS

Month and year

</div>

CERTIFICATE PAGE:

CERTIFICATE

This is to certify that the mini project report entitled

TITLE OF THE PROJECT

being submitted to the St.Joseph's College of Arts and Science (Autonomous),

Affiliated to Thiruvalluvar University-Vellore.

By

Mr. / Ms. STUDENT'S NAME

For the partial Fulfillment for the award of degree of

MASTER OF COMPUTER SCIENCE

Is a Bonafide record of work carried out by him/her, under

my guidance and supervision.

Head of the Department   Internal Guide

Submitted for the viva-voce examination on--

Examiners:

1.

2.

II-MSC (CS)	DATA SCIENCE AND BIG DATA	20PCS41
SEMESTER - IV	ANALYTICS	HRS/WK –4
CORE – 12	For the students admitted from the year 2020	CREDIT – 3

Objectives:
- ❖ To provide basics for Data Science.
- ❖ To build working knowledge on R Program.
- ❖ To build working knowledge R Object.
- ❖ To build skills in working with Big Data, Hadoop and Spark

COURSE OUTCOMES (CO):

After learning this course, the students should be able to expose

CO1: Ability to gain knowledge on Data science process
CO2: Ability to Learn about Running the R Program
CO3: Ability to learn about Working with R Objects
CO4: Ability to understand big data analytic processes
CO5: Ability to understand Hadoop Distributed File System.

Relationship Matrix Course Outcome, Programme Outcomes and Programme Specific Outcome

SEMESTER IV	COURSE CODE:20PCS41					TITLE OF THE PAPER: Data Science and Big Data Analytics					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	5	3	2	5	3.9	
CO2	4	4	4	4	4	4	5	4	3	5	4.1	
CO3	4	4	4	4	4	4	5	4	3	5	4.1	
CO4	4	4	4	4	4	4	5	3	3	5	4.0	
CO5	4	4	4	4	4	4	5	3	2	5	3.9	
									Mean Overall Score		4.0	

Result: The Score of this Course is 4.0(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT –I   **(12 Hrs)**

INTRODUCTION TO DATA SCIENCE: Data science process – data science project roles - stages in data science project – exploring data - build a model - using summary statistics to spot problems - invalid information - the summary command - typical problems revealed by data summaries - missing values - missing a few values - invalid values and outliers - examples of invalid values - examples of outliers - outliers - decision on missing values and outliers - data range

UNIT- II   **(11 Hrs)**

INTRODUCTION TO R : Getting the Hang of R - Running the R Program - Finding Your Way with R - Command Packages - Some Simple Math - Reading and Getting Data into R - Viewing Named Objects - Types of Data Items - The Structure of Data Items - Working with History Commands - Saving Your Work in R - reading data from files

UNIT- III   **(12 Hrs)**

WORKING WITH R OBJECTS: Manipulating Objects - Manipulating Vectors - Manipulating Matrix and Data Frames - Manipulating Lists - Viewing Objects within Objects - Constructing Data Objects - Forms of Data Objects: Testing and Converting - Convert a Matrix to a Data Frame - Convert a Data Frame into a Matrix - Convert a Data Frame into a List - Convert a Matrix into a List

UNIT -IV   **(13 Hrs)**

INTRODUCTION TO BIG DATA – Challenges of Conventional Systems – Structured vs Unstructured Data - Five Vs of Big Data - Big data analytic processes - Ingesting data into the system - Persisting the data in storage - Computing and Analyzing data – batch processing and stream processing - Visualizing the results – Big data tools – APACHE FLUME – APACHE SQOOP- Introduction to NOSQL and its types

UNIT- V   **(12 Hrs)**

INTRODUCTION TO HADOOP AND SPARK: Hadoop – Components of Hadoop – Hadoop Distributed File System (HDFS) – HDFS architecture – Read and Write operations in HDFS - MAP Reduce - Understanding the Map Reduce architecture - Executing the Map phase - Shuffling and sorting - Reducing phase execution - Introduction to data analysis with spark.

TEXT BOOKS:

1. "Practical Data Science with R",Nina Zumel, John Mount- Manning Publications, 2014.

2. "Mining of Massive Datasets",Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman-

3. Cambridge University Press, 2014.

4. "Beginning R - The Statistical Pr ogramming Language", Mark Gardener, John Wiley & Sons- Inc., 2012

5. "Understanding Big data", Chris Eaton, Dirk deroos et al. -McGraw Hill, 2012.

6. "HADOOP: The definitive Guide" , Tom White, O Reilly 2012.

REFERENCE BOOKS:

1. "Spark - The Definitive Guide", Bill Chambers and Matei Zaharia, 2018, O'Reilly Media, Inc, USA, ISBN10 1491912219, ISBN13 9781491912218

2. "Learning Spark Lightning-Fast Data Analysis",Holden Karau, Andy Konwinski, Patrick Wendell & Matei Zaharia, ISBN-13: 978-1449358624, ISBN-10: 1449358624, O'Reilly, 2015

3. " Advanced Analytics with Spark: Patterns for Learning from Data at Scale ", Josh Wills, Sandy Ryza, Sean Owen, and Uri Laserson 2nd Edition, O'Reilly, 2016

II-MSC (CS)	MOBILE APPLICATION DEVELOPMENT	20PCS42
SEMESTER – IV	For the students admitted from the year 2020	HRS/WK – 4
CORE –13		CREDIT – 4

Objectives:
❖ This course introduces students to understand various aspects of Mobile Network Architecture.
❖ At the end of the course, students should have an understanding of the Android for mobile apps development
❖ Students should also become aware of the Hardware Design Consideration, Design Demands for Android application.

COURSE OUTCOMES (CO):
CO1: Essential knowledge on Mobile Network Architecture
CO2. Learn the working environment functions for hardware and software related
CO3. Learn about the Design patterns for mobile applications
CO4. Acquired an idea about Environment setup for Android apps Development
CO5. Understood the Basic operation of SQLite Database.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific outcome

SEMESTER IV	COURSE CODE:20PCS42					TITLE OF THE PAPER: MOBILE APPLICATION DEVELOPMENT					HOURS: 4	CRE4ITS: 4
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	5	5	4	4	4	4	3	3	4.0	
CO2	4	4	3	4	4	4	4	3	3	4	3.7	
CO3	4	4	3	3	4	4	4	3	4	4	3.9	
CO4	4	4	3	3	4	4	4	3	4	4	3.7	
CO5	4	3	4	4	3	4	4	3	4	4	3.7	
Mean Overall Score											3.8	

Result: The Score of this Course is 3.8(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

UNIT- I   **(12 Hrs)**
MOBILE NETWORK ARCHITECTURE: Mobile Device Architecture - Mobile Application Development - Mobile Web Applications - Business Communication

UNIT- II   **(12 Hrs)**
DESIGN CONSTRAINTS FOR MOBILE APPLICATIONS: Both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures.

UNIT- III   **(12 Hrs)**
DESIGNING APPLICATIONS: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT- IV   **(12Hrs)**
OVERVIEW OF ANDROID: What does Android run On – Android Internals-Android for mobile apps development - Environment setup for Android apps Development - Framework - Android- SDK, Eclipse - Emulators – What is an Emulator / Android AVD? - Android Emulation – Creation and set up - First Android Application

UNIT- V   **(12 Hrs)**
SIMPLE UI -LAYOUTS AND LAYOUT PROPERTIES: Introduction to Android UI Design, Introducing Layouts - Event driven Programming in Android (Text Edit, Button clicked) - Activity Lifecycle of Android - Menu: Basics, Custom versus System Menu - Basic operation of SQLite Database

TEXT BOOKS:

1. "Architecting Mobile Solutions for the Enterprise", Dino Esposito-Microsoft press, 2015
2. "Professional Mobile Application Development", Jeff Mcwherter, Scott Gowell, - Wiley India Pvt Lt, 2014

REFERENCE BOOK:

1. "Mobile Application Penetration Testing Paperback" Vijay Kumar Velu – Import, 11 Mar 2016,

II-MSC (CS)	ANDROID APPLICATION	20PCSP46
SEMESTER – IV	For the students admitted from the year 2020	HRS/WK – 5
PRACTICAL-VI		CREDIT – 3

Objectives:
- ❖ This course introduces students to Learn basics of Android Application.
- ❖ At the end of the course, students should have an understanding of Android Application and its various importance of Research Application.
- ❖ Students will also be aware of the utilization of Android Application in building dynamics of Knowledge.

COURSE OUTCOMES (CO):
CO1: Essential knowledge on Alert Dialogue in Android.
CO2. Learn the Basics of Face book Integration concepts.
CO3. Acquire the fundamental knowledge on building Image Effects in Android.
CO4. Develop an idea about Navigation in Android.
CO5. Understand and develop Research Application using Android.

Relationship Matrix Course Outcome, Programme Outcome and Programme Specific outcome

SEMESTER IV	COURSE CODE: 20PCSP46				TITLE OF THE PAPER: ANDROID APPLICATION					HOURS: 5	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)				MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	5	5	4	4	4	4	3	3	4.0
CO2	4	4	3	4	4	4	4	3	3	4	3.7
CO3	4	4	3	3	4	4	4	3	4	4	3.9
CO4	4	4	3	3	4	4	4	3	4	4	3.7
CO5	4	3	4	4	3	4	4	3	4	4	3.7
Mean Overall Score											3.8

Result: The Score of this Course is 3.8(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

ANDROID APPLICATION

1. Develop an Application for an Alert box in Android
2. Design an Application for Representing a Simple Calculator
3. Develop an Application for working with Menus and Screen Navigation.
4. Write Android code for Time Picker Control.
5. Write Android code for Creating an Image Slider.
6. Write Android code for Login control in web pages.
7. Develop an application for working with Google Map.
8. Design a simple Application using SQLite.

WEB R**EFERENCES**:

1. https://zetcode.com/mob/android

2. https://developer.android.com/studio/write/sample-code

3. https://www.javatpoint.com/android-tutorial

II-MSC (CS) SEMESTER – IV PROJECT	**PROJECT** For the students admitted from the year 2020	JPCS1016 HRS/WK–17 CREDIT– 12

Objective:

❖ The main objective of this Main project is to expose the student to gain knowledge on software development.

COURSE OUTCOMES (CO):

CO1: Ability to perform Critical Thinking, Reasoning, and Creative Thinking.
C02: Ability to use the technology
C03: Ability to visualize the problems and Provide Solution
C04: Ability to test technical skills.
C04: Ability to work both independently and in groups on presentations and/or development of Projects.

SEMESTER IV	COURSE CODE: JPCS1016	TITLE OF THE PAPER: PROJECT											HOURS: 17	CREDITS: 12
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)								MEAN SCORE OF CO'S
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	5	4	5	5	4	4	4	4	4	3	4	4	4	4.10
CO2	5	4	5	5	4	4	4	4	5	3	4	4	4	4.20
CO3	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50
CO4	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50
CO5	5	5	5	5	5	5	5	4	5	3	4	4	4	4.50
Mean Overall Score														4.4

Result: The Score of this Course is 4.4(High)

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

FORMAT FOR PREPARING MAIN PROJECT REPORT

 Arrangement of contents

   1. Title Page
   2. Bonafide Certificate
   3. Acknowledgement
   4. Table of contents
   5. Abstract
   6. Chapters of the Report
   7. References
   8. Appendices, if any

Appendices should be named as
            APPENDIX – A
            APPENDIX - B

BINDING SPECIFICATION

   ❖ Report should be found using flexible cover of thick white Art Paper.
   ❖ The Spine for the Bound volume should be of black calico of 2cms width.
   ❖ The Cover should be printed in Block letters.

MARGIN SPECIFICATION

         Top   : 4   cms
         Bottom   : 3   cms
         Left   : 4.5   cms
         Top   : 2.5   cms

PAGE NUMBERING

All Page numbers should be typed without punctuation on the Bottom-Center Portion of the Page. The Preliminary pages (table of contents and abstract) should be numbered in Lowercase Roman Literals. Papers of main Text, starting with Chapter-1, Should be consecutively numbered using Arabic Numerals.

TITLE PAGE:

TITLE OF THE PROJECT

A project report

Submitted for the partial fulfillment for

the award of degree of

MASTER OF COMPUTER SCIENCE

By

STUDENT'S NAME

(Register Number)

Under the Guidance of

GUIDE'S NAME

COLLEGE ADDRESS

Month and year

CERTIFICATE PAGE:

CERTIFICATE

This is to certify that the mini project report entitled

TITLE OF THE PROJECT

being submitted to the St. Joseph's College of Arts and Science (Autonomous),

Affiliated to Thiruvalluvar University-Vellore.

By

Mr. / Ms. STUDENT'S NAME

For the partial Fulfillment for the award of degree of

MASTER OF COMPUTER SCIENCE

Is a Bonafide record of work carried out by him/her, under

my guidance and supervision.

Head of the Department   Internal Guide

Submitted for the viva-voce examination on--

Examiners:

1.

2.