ANNEXURE 18D04

V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A' Grade (3rd Cycle) by NAAC
VIRUDHUNAGAR - 626 001

CHOICE BASED CREDIT SYSTEM
REGULATIONS AND SYLLABUS
(with effect from Academic Year 2018 - 2019)

V.V. Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 19 UG Programmes, 14 PG Programmes, 6 M.Phil. Programmes and 3 Ph.D. Programmes. All these programmes, except Ph.D. Programmes, have been framed as per the guidelines given by UGC under Choice Based Credit System (CBCS).

The Departments of Commerce, English and History upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The students' performance will be evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

Arts & Humanities	:	History (E.M. & T.M.), English and Tamil
Physical & Life Sciences	:	Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology and Computer Applications.
Commerce & Management	:	Commerce, Commerce with Computer Applications, Commerce with Professional Accounting Business Administration.

PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Biochemistry, Food Processing & Quality Control, Chemistry, Zoology, Computer Science, Information Technology, Computer Applications (MCA*)
Commerce & Management	:	Commerce, Business Administration (MBA*)
		* AICTE approved Programmes

PRE-DOCTORAL PROGRAMMES (M.Phil.)

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Biochemistry
Commerce & Management	:	Commerce

OUTLINE OF CHOICE BASED CREDIT SYSTEM (PG)

1. Core Courses
2. Discipline Specific Elective Courses (DSEC)
3. Non Major Elective Course (NMEC)

List of Non Major Elective Courses (NMEC) Offered

PG PROGRAMMES

Name of the Course	Semester	Department
History of Freedom Movement in India (A.D. 1885 – 1947)	III	History
Functional and Communicative English	III	English
jkpOk; gpwJiwfSk;	III	Tamil
Taxation Concepts and Assessment	III	Commerce
Entrepreneurship	III	Business Administration
Mathematics For Competitive Examinations	III	Mathematics
Digital Electronics /Microprocessors & Microcontrollers	III	Physics
Industrial Chemistry	III	Chemistry
Apiculture	III	Zoology
Nutrition and Health	III	Home Science – Nutrition and Dietetics
Clinical biochemistry (Basics)	III	Biochemistry
Introduction to Internet and HTML	III	Computer Science
Fundamentals of Information Technology	III	Information Technology
Principles of Information Technology	III	Computer Applications

ELIGIBILITY FOR ADMISSION

The Candidate should have studied B.Sc. (Information Technology), B.Sc. (Computer Science) and BCA courses of Madurai Kamaraj University or any other University recognized by the syndicate of Madurai Kamaraj University as equivalent thereto.

Candidate should have passed the Degree with a minimum of 55% marks in Part III subjects. In case of SC/ST candidates, they should have passed the degree with a minimum of 50% marks in Part-III subjects.

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed course of study for a period of two academic years (Four semesters)

MEDIUM OF INSTRUCTION

English

EVALUATION SCHEME

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	40	60	100
Practical / Project	40	60	100

Core Courses, Discipline Specific Elective Courses and Non Major Elective Course

INTERNAL ASSESSMENT
Distribution of Marks
Theory

Mode of Evaluation		Marks
Periodic Test	:	25
Seminar	:	10
Assignment	:	5
Total	**:**	**40**

Three Periodic Tests - Average of the best two will be considered
Two Assignments - Better of the two will be considered

Practical

Mode of Evaluation		Marks
Periodic Test	:	30
Record	:	5
Performance	:	5
Total	**:**	**40**

Three Periodic Tests - Average of the best two will be considered

Question Pattern for Periodic Tests **Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Max. Marks
A Q.No.(1 - 5)	Multiple Choice	5	5	1	5
B Q.No.(6 - 10)	Internal Choice Either or Type	5	5	5	25
C Q.No.(11 - 13)	Open Choice	3	2	10	20
				Total	**50**

EXTERNAL EXAMINATION
Question Pattern **Duration: 3 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each question	Total Marks
A Q.No.(1 - 5)	Multiple Choice (Atleast one question from each unit)	5	5	1	5
B Q.No.(6 - 10)	Internal Choice Either Or Type	5	5	5	25
C Q.No.(11-15)	Open Choice (one from each unit)	5	3	10	30
Total					**60**

ON LINE ASSESSMENT (SET/NET Preparation – General Paper)

Online Test with Multiple Choice Question Pattern for 100 marks will be conducted in III Semester.

ELIGIBILITY FOR THE DEGREE

1. The candidate will not be eligible for degree without completing the prescribed Courses of study, lab work etc., and a minimum of 50% Pass marks in all the Courses.
2. Attendance, progress and conduct certification from the Head of the Institution will be required for the students to write the examination.
   - No Pass minimum for Internal Assessment.
   - Pass minimum for External Examination is 27 marks out of 60 for Core Courses, Discipline Specific Elective Courses and Non Major Elective Courses.

ATTENDANCE

The following rules are applicable to the students of all UG, PG and M.Phil. Programmes with effect from 2018-2019.

a) The students with an attendance of 85% and above are permitted to appear for the Summative Examinations without any condition.

b) The students with 78% - 84 % of attendance are permitted to appear for the Summative Examinations by paying a fine of ₹500/-

c) The students with 66% - 77% of attendance can appear for the Summative Examinations only after getting special permission from the Principal. Special permission shall be granted by the Principal only on medical grounds and those students should also pay a fine of ₹1000/- along with the application form for exemption. If permission is not granted, they have to appear for the Summative Examinations in the next Semester by paying a fine of ₹1000/-

d) The students who have less than 65% of attendance cannot appear for the Summative Examinations and have to repeat the whole semester.

e) For Part V Courses, the students require 75% of attendance to get the required credit.

f) For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

M.SC. INFORMATION TECHNOLOGY

Program Code - 7021

PROGRAMME OUTCOMES

- Empower self-disciplined, self-monitored and self-esteemed thinking.
- Practice intellectual conception of information, analytical observation, intelligent perception, systematic evaluation and active execution.
- Enhance virtual and non-virtual communication, technical and technological bondage with the society.
- Spread scientific temperament to the Nation, while dealing with the various issues of the society.
- Volunteer in the civic life with values, morality, responsibility and justice.
- Preserve nature in its original form amidst all the natural and artificial calamities.
- Develop the self-sustained and infinite learning to meet the challenges of the contemporary socio-technological scenario.

PROGRAMME SPECIFIC OUTCOMES

- Analyze and recommend the appropriate IT infrastructure required for the implementation of a project
- Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
- Design and develop software projects given their specifications and within performance and cost constraints.
- Extend the state of art in some of the areas of interest and create new knowledge.

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MASTER OF INFORMATION TECHNOLOGY

Programme Structure - Allotment of Hours and Credits
For those who join in the Academic Year 2018-2019

Components	Semester				Total Number of Hours/ (Credits)
	I	II	III	IV	
Core Course	5(5)	5(5)	6(5)	-	16(15)
Core Course	5(5)	5(5)	6(5)	-	16(15)
Core Course	5(5)	5(5)	-	-	10(10)
Core Practical	5(3)	5(3)	6(3)	6(3)	22(12)
Core Practical	5(3)	5(3)	6(3)	-	16(9)
Discipline Specific Elective Course	5(5)	5(5)	-	6(5)	16(15)
Non Major Elective Course	-	-	5(4)	-	5(4)
Online Assessment (SET/NET Preparation – General Paper)	-	-	1(1)	-	1(1)
Project	-	-	-	18(9)	18(9)
Total	**30(26)**	**30(26)**	**30(21)**	**30(17)**	**120 (90)**

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M.Sc. INFORMATION TECHNOLOGY (SEMESTER)
Programme Code - 7021
PROGRAMME CONTENT
SEMESTER I

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course-1	Data Structures and Algorithms	18PITC11	5	5	3	40	60	100
2	Core Course-2	Advanced Java Programming	18PITC12	5	5	3	40	60	100
3	Core Course-3	Cryptography and Network Security	18PITC13	5	5	3	40	60	100
4	Core Practical-1	Data Structures using C Pointers Lab	18PITC11P	5	3	3	40	60	100
5	Core Practical-2	Advanced Java Programming Lab	18PITC12P	5	3	3	40	60	100
6	DSEC-1	Distributed Operating Systems/ Cloud Computing/ TCP/IP Protocols	18PITE11/ 18PITE12/ 18PITE13	5	5	3	40	60	100
Total				**30**	**26**				**600**

DSEC - Discipline Specific Elective Course

M.Sc. INFORMATION TECHNOLOGY - SEMESTER II

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course-4	Distributed Database Systems	18PITC21	5	5	3	40	60	100
2	Core Course-5	Artificial Intelligence	18PITC22	5	5	3	40	60	100
3	Core Course-6	Mobile Applications Development	18PITC23	5	5	3	40	60	100
4	Core Practical-3	Mobile Applications Lab	18PITC21P	5	3	3	40	60	100
5	Core Practical-4	.Net Lab	18PITC22P	5	3	3	40	60	100
6	DSEC-2	Internet Of Things/ Data Mining/ Advanced Software Engineering	18PITE21/ 18PITE22/ 18PITE23	5	5	3	40	60	100
			Total	**30**	**26**				**600**

DSEC- Discipline Specific Elective Course

M.Sc. INFORMATION TECHNOLOGY - SEMESTER III

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Course-7	Open Source Technology	18PITC31	6	5	3	40	60	100
2	Core Course-8	Digital Image Processing	18PITC32	6	5	3	40	60	100
3	Core Practical-5	PHP and MYSQL Lab	18PITC31P	6	3	3	40	60	100
4	Core Practical-6	Image Processing Lab	18PITC32P	6	3	3	40	60	100
5	NMEC	Fundamentals of Information Technology	18PITN31	5	4	3	40	60	100
6	Online Course	SET/NET Preparation- General	18POLS31	1	1	-	100	-	100
Total				**30**	**21**				**600**

DSEC: Discipline Specific Elective Course NMEC : Non Major Elective Course

M.Sc. INFORMATION TECHNOLOGY - SEMESTER IV

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1	Core Practical-7	R Programming Lab	18PITE41	6	3	3	40	60	100
2	Project-1	Project Work and Viva Voce	18PITC41PR	18	9	3	40	60	100
3	DSEC-4	Big Data Analytics/ Text Mining/ Wireless Communication and Networks	18PITE41/ 18PITE42/ 18PITE43	6	5	3	40	60	100
Total				**30**	**17**				**300**

DSEC: Discipline Specific Elective Course

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester I	**DATA STRUCTURES AND ALGORITHMS**	Hours/Week: 5	
Core Course-1		Credits: 5	
Course Code **18PITC11**		Internal 40	External 60

COURSE OUTCOMES

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

- access the choice of data structures and algorithm design methods that impacts the performance of programs.
- solve problems using data structures such as binary trees, heaps, binary search trees, and graphs.
- understand the performance of the implementations of basic linear data structures.
- understand prefix, infix, and postfix expression formats.
- use stacks to evaluate postfix expressions.
- analyze the asymptotic performance of algorithms.

UNIT I

Introduction and Overview: Definition - Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures.

Trees: Basic Terminology - Definition and Concepts – Binary Trees – Properties of Binary Tree - Representation of Binary Tree – Linear Representation of a Binary Tree- Linked Representation of Binary Tree - Physical Implementation of Binary Tree in Memory – Operations on Binary Tree – Insertion – Deletion – Traversal – Merging of Two Binary Trees

(15 Hours)

UNIT II

Trees: Types of Binary Trees – Expression Tree – Binary Search Tree – Heap Trees – Threaded Binary Trees – Height Balanced Binary Tree, Red-Black tree, Splay tree- B-tree, B+ tree indexing. (20 Hours)

UNIT III

Graph: Introduction – Graph Terminologies – Representation of Graphs – Set Representation – Linked Representation – Matrix Representation – Operations on Graphs – Operations on Linked List Representation of Graphs – Operations on Matrix Representation of Graphs – Applications of Graph Structures – Shortest Path Problem – Topological Sorting– Minimum Spanning Trees – Connectivity in a Graph – Euler's and Hamiltonian Circuits.

(15 Hours)

UNIT IV

Dynamic Programming General Method: All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack Problem, Reliability Design, Traveling Sales Persons Problem.

(15 Hours)

UNIT V

Back Tracking and Branch – and – Bound General Method: 8 – Queens Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0 / 1 Knapsack Problem. (10 Hours)

TEXT BOOKS

1. Samantha.D (2009). *Classic Data Structures*, PHI.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, 2nd edition, University Press.

REFERENCE BOOKS

1. Chitra.A, Rajan.D.T. (2007), *Data Structures*, VNI Publication.
2. Seymour Lipschutz (2006), *Data Structures*, Mc-Graw Hill Companies.
3. Robert Lafore, *Data Structures and Algorithms in JAVA*, Second Edition, SAMS Publications

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester I	**ADVANCED JAVA PROGRAMMING**	Hours/Week: 5	
Core Course-2		Credits: 5	
Course Code **18PITC12**		Internal 40	External 60

COURSE OUTCOMES

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

- have an overview of uses of class and inheritance in Java.
- have a thorough knowledge of networking and Applet class.
- have a thorough knowledge of Event Handling and AWT.
- develop Swing-based GUI
- develop client/server applications and TCP/IP socket programming
- update and retrieve the data from the databases using SQL.
- develop distributed applications using RMI.
- develop component-based Java software using JavaBeans.

UNIT I

Classes, Objects and Methods – Interfaces: Multiple Inheritance – Packages: Putting Classes Together – Multithreaded Programming – Managing Errors and Exception.

(15 Hours)

UNIT II

Event Handling: Two Event Handling Mechanisms-The Delegation Event Model-Event Classes-Sources of Events-Event Listener Interfaces.

Introducing the AWT: Working with windows, Graphics: AWT Classes-Window Fundamentals-Working with Frame Windows.

The Applet Class: Applet Basics-Applet Architecture-An Applet Skeleton-Simple Applet Display Methods-Requesting Repainting-Using the Status window-The HTML APPLET Tag-Passing parameters to Applets-getDocumentbase() and getCodeBase()-AppletContext and showDocument(). (20 Hours)

UNIT III

A Tour of Swing: JApplet-Icons and Labels-Text Fields-Buttons-Combo Boxes-Tabbed Panes-Scroll Panes-Trees-Tables-Exploring Swing`.

JDBC Objects: The concept of JDBC – JDBC Driver types – JDBC Packages – A Brief overview of the JDBC process – Database Connection – associating the JDBC/ODBC bridge with Database – Statement objects – Result sets. (15 Hours)

UNIT IV

Java Remote Method Invocation: Remote Method Invocation Concept – Server side – Client side.

Networking: Networking Basics – Java and the Net-Inetaddress-TCP/IP Client Sockets-URL- URL Connection - Datagrams. (15 Hours)

UNIT V

Java Beans: What is a Java Bean? – Advantages of Java Beans – Application Builder Tools – Using the Bean Developer Kit (BDK) – JAR Files – Introspection – Developing a Simple Bean Using the BDK – Using Bound Properties – Using the Bean Info Interface – Constrained Properties – Persistence – Customizers – The Java Beans API – Using Bean Builder. (10 Hours)

TEXT BOOKS

1. Balagurusamy.E (2012), *Programming with Java A Primer*, Fourth Edition, Tata Mc Graw Hill Education Private Limited.
2. Herbert Schildt (2002), *The Complete Reference Java 2*, Fifth edition, PEARSON Education, Tata McGraw-Hill Publication.
3. Jim Keogh (2002), *The Complete Reference J2EE*, Tata Mc Graw Hill Education Private Limited.

REFERENCE BOOKS

1. Paul J.Deitel, Harvey M.Deitel (2009), *Internet & World Wide Web: How to Program*, Pearson Education International.
2. Herbert Schildt (2007), *Swing: A Beginner's Guide*, Tata Mc Graw Hill Publishing Company Limited.
3. Steven Holzner et al (2002), *Java 2 Programming Black Book*, Dreamtech Press.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester I	**CRYPTOGRAPHY AND NETWORK SECURITY**	Hours/Week: 5	
Core Course-3		Credits: 5	
Course Code **18PITC13**		Internal 40	External 60

COURSE OUTCOMES

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

- know the methods of conventional encryption.
- understand the concepts of public key encryption and number theory.
- understand authentication and Hash functions.
- understand the system level security usage.
- comprehend the concept of digital signature for security.
- know the authentication mechanism for system security.

UNIT I

Introduction: Security Goals – Attacks – Services and Mechanism – Techniques. **Traditional Symmetric – Key Ciphers:** Introduction –Substitution Ciphers – Transposition Ciphers – Stream and Block Ciphers.

Introduction to Modern Symmetric Key Ciphers: Modern Block Ciphers. **Data Encryption Standard (DES):** Introduction – DES Structure – DES Analysis. (14 Hours)

UNIT II

Advanced Encryption Standards (AES): Introduction – Transformations – Key Expansion – Ciphers. **Asymmetric Key Cryptography:** Introduction – RSA Cryptosystem.

(18 Hours)

UNIT III

Message Integrity and Message Authentication: Message Integrity – Random Oracle Model – Message Authentication. **Cryptographic Hash Functions:** Introduction – SHA-512 - WHIRLPOOL. (12 Hours)

UNIT IV

Digital Signature: Process – Attacks on Digital Signature – Digital Signature Schemes – RSA Digital Signature Scheme – ElGamal Digital Signature Scheme – Digital Signature Standard. **Entity Authentication:** Introduction – Passwords – Challenge – Response – Zero-Knowledge. **Key Management:** Symmetric- Key Distribution – Symmetric-Key Agreement – Public Key Distribution. (15 Hours)

UNIT V

Security at the Application Layer: PGP and S/MIME: E-Mail – PGP - S/MIME.

Security at the Transport layer: SSL AND TLS : SSL Architecture – Four Protocols – SSL Message Formats – Transport Layer Security. (10 Hours)

TEXT BOOK

Behrouz A. Forouzan (2015), *Cryptography and Network Security*, Special Indian Edition, Third Edition, TATA McGraw Hill Publishing Company Limited.

REFERENCE BOOKS

1. Bruce Schneier (2002), *Applied Cryptography*, Second Edition, John Willey and Sons Publications.
2. Wenbo Mao (2004), *Modern Cryptography*, First Edition, Pearson Education.
3. Roberta Bragg, Mark Rhodes, Keith Strassberg (2004), *Network Security*, Tata McGraw Hill Edition.

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(2018 -19 onwards)

Semester I	**DATA STRUCTURES USING C POINTERS LAB**	Hours/Week: 5	
Core Practical-1		Credits: 3	
Course Code		Internal	External
18PITC11P		40	60

1. Implementing Data Structures Programs with Pointers concept.
2. Implementation of Heap Tree
3. Implementation of Tree Traversal
4. Implementation of BFS
5. Implementation of DFS
6. Implementation of Arithmetic Evaluation using Pointers
7. Implementation of Sparse Matrix.
8. Implementation of Shortest Path.
9. Implementation of Spanning Tree
10. Implementation of 8-Queens Problem.
11. Implementation of Travelling Salesman Problem
12. Implementation of Tower of Hanoi

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester I	**ADVANCED JAVA PROGRAMMING LAB**	Hours/Week: 5	
Core Practical-2		Credits: 3	
Course Code		Internal	External
18PITC12P		40	60

1. Write a Java program to Prepare Hotel Bill Management using Interface
2. Write a Java program to Perform EB-Bill calculation using Package
3. Write a Java program to Prepare Student mark sheet preparation using database connectivity of ODBC
4. Write a Java program to Prepare Library book details using database connectivity of ODBC
5. Write a Java program to Prepare Employee pay bill details using database connectivity of Oracle
6. Write a Java program to Prepare Banking operations using database connectivity of Oracle
7. Write a Java program for sending messages from server to client using TCP/IP
8. Write a Java program for Sending messages from client to server using TCP/IP
9. Write a Java program for Chatting with same host using TCP/IP
10. Write a Java program for Chatting with different host using TCP/IP
11. Write a Java program for Sending messages from server to client using UDP
12. Write a Java program for Sending messages from client to server UDP
13. Write a Java program for Chatting with same host UDP
14. Write a Java program for Chatting with different host UDP
15. Write a Java program to perform String operations using Applet.
16. Write a Java program to perform Text formatting using Net Beans
17. Write a Java program to perform Image slide show using Image Slider

18. Write a Java program to perform Color Pallets using Swing.
19. Write a Java program to perform Arithmetic operations using RMI.
20. Write a Java program to perform Restart your own system using RMI.
21. Write a Java program to perform Shutdown a system in a Network using RMI.

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(2018 -19 onwards)

Semester I	**DISTRIBUTED OPERATING SYSTEMS**	Hours/Week: 5	
DSEC-1		Credits: 5	
Course Code **18PITE11**		Internal 40	External 60

COURSE OUTCOMES

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

- understand the concepts of Distributed Operating System
- know about various communication techniques.
- apprehend the management of resources in Distributed Systems.
- comprehend the shared memory concepts.
- deal with the process management issues.
- know the File system in Distributed Systems.

UNIT I

Fundamentals: Distributed Computer System – Evolution of Distributed Computing Systems – Distributed Computing Systems Models –Distributed Computing Systems Gaining Popularity –Distributed Operating System – Issues in Designing a Distributed Operating System – Introduction to Distributed Computing Environment (DCE). (12 Hours)

UNIT II

Message Passing: Introduction – Desirable Features of a Good Message – Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Multi datagram Messages – Encoding and Decoding of Message Data – Process Addressing – Failure handling – Group Communication. (15 Hours)

UNIT III

Distributed Shared Memory: Introduction – General Architecture of DSM Systems – Design and implementation issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Other Approaches to DSM Heterogeneous DSM – Advantages DSM. (18 Hours)

UNIT IV

Resource Management: Introduction – Desirable Features of a Good Global Scheduling Algorithm – Task Assignment Approach – Load-Balancing Approach – Load Sharing Approach.

Process Management: Introduction – Process Migration – Threads. (16 Hours)

UNIT V

Distributed File System: Introduction – Desirable Features of a Good Distributed File System – File Models – File-Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles.

Naming: Introduction – Desirable Features of a Good Naming System – Fundamental Terminologies and Concepts – Systems-Oriented Names. (14 Hours)

TEXT BOOK

Pradeep.K.Sinha (2008), *Distributed Operating Systems Concepts and Design*, Prentice Hall of India Publications.

REFERENCE BOOKS

1. Andrews S.Tanenbaum, *Distributed Operating Systems*, First edition PHI.
2. Randy Chow, Theodore (2009), *Distributed Operating System and Algorithms and Analysis*, Pearson Education India.
3. Doreen L. Galli (2000), *Distributed Operating Systems Concepts and Design*, Prentice Hall.

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(2018 -19 onwards)

Semester I	**CLOUD COMPUTING**	Hours/Week: 5	
DSEC-1		Credits: 5	
Course Code **18PITE12**		Internal 40	External 60

COURSE OUTCOMES

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

- which may led to the design and development of simple cloud service.
- focused on some key challenges and issues around cloud computing.
- Automatic security.
- Collaborating using Cloud Services.
- Security, Standards and Applications

UNIT I

Introduction : Cloud-definition, benefits, usage scenarios, History of Cloud Computing - Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing - issues in Clouds - Eucalyptus - Nimbus - Open Nebula, Cloud Sim. (14 Hours)

UNIT II

Cloud Services : Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force. (18 Hours)

UNIT III

Collaborating using Cloud Services: Email Communication over the Cloud - CRM Management - Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware. (16 Hours)

UNIT IV

Virtualization for Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V. (12 Hours)

UNIT V

Security, Standards and Applications: Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud. (15 Hours)

TEXT BOOKS

1. John Rittinghouse & James Ransome (2010), *Cloud Computing, Implementation, Management and Strategy*, CRC Press.
2. Michael Miller (August 2008), *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate*, Que Publishing.
3. James E Smith, Ravi Nair (2006), *Virtual Machines*, Morgan Kaufmann Publishers.

REFERENCE BOOKS

1. David E.Y. Sarna (2011), *Implementing and Developing Cloud Application*, CRC press.
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas (May 2011), *Draft cloud computing synopsis and recommendation*, NIST.
3. Anthony T Velte, Toby J Velte, Robert Elsenpeter (2010), *Cloud Computing : A Practical Approach*, Tata McGraw-Hill.
4. Haley Beard (July 2008), *Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, Emereo Pty Limited.

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VIRUDHUNAGAR - 626 001

M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester I	**TCP/IP PROTOCOLS**	Hours/Week: 5	
DSEC-1		Credits: 5	
Course Code		Internal	External
18PITE13		40	60

COURSE OUTCOMES

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

- understand the concepts of TCP/IP Protocols.
- gain the knowledge of IP routing.
- get deep into the networking protocols such as ARP, ICMP, TFTP, BOOTP.
- know the structure and features of TCP.
- study the message format of DNS.
- know the applications of the Protocols.

UNIT I

IP: Internet Protocol: Introduction – IP Header – IP Routing – Subnet Addressing – Subnet Mask – Special case IP addresses – Subnet Example – ifconfig command – net stat command.

ARP: Resolution Protocol: Introduction – An Example – ARP cache – ARP packet format – ARP examples – Proxy ARP.

ICMP: Internet Control Message Protocol: Introduction – ICMP Message types- ICMP Address Mask Request and Reply – ICMP Timestamp Request and Reply – ICMP Port Unreachable Error. (15 Hours)

UNIT II

IP Routing: Introduction – Routing Principles – ICMP Host and Network Unreachable Error – ICMP Redirect Errors – ICMP Router Discovery Messages.

TFTP: Trivial File Transfer Protocol and BOOTP: Introduction – Protocol – An Example – Security – BOOTP Packet Format – An Example – BOOTP Server Design – BOOTP Through a Router. (10 Hours)

UNIT III

TCP: Transmission Control Protocol: Introduction – TCP Services – TCP Header – TCP Connection Establishment and Termination – Time out of Connection Establishment – Maximum Segment Size – TCP Half-Close – TCP State Transition Diagram – Reset Segments – Simultaneous Open – Simultaneous Close – TCP Options.

TCP Interactive Data Flow and Bulk Data Flow : Introduction – Interactive input – Delayed acknowledgement – Nagle Algorithm – Window size Advertisement – Normal Data Flow – Sliding Windows – Window Size – PUSH Flag – Slow start – Bulk Data Throughput – Urgent Mode. (15 Hours)

UNIT IV

TCP Timeout and Retransmission: Introduction – Simple Timeout and Retransmission Example – Round-Trip Time Management – An RTT Example – Congestion Example – Congestion Avoidance Algorithm – Fast Retransmit and Fast Recovery algorithm – Congestion Example – Per-Route Metrics – ICMP Errors – Repacketization.

DNS: Domain Name System: Introduction – DNS Basics – DNS Message Format – A Simple Example – Pointer Queries – Resource Records – Caching – UDP or TCP – Another Example. (20 Hours)

UNIT V

FTP: File Transfer Protocol: Introduction – FTP Protocol – FTP Examples.

SMTP: Simple Mail Transfer Protocol: Introduction – SMTP Protocol – SMTP Examples – SMTP Futures.

SNMP: Simple Network Management Protocol: Introduction – Protocol – Structure of Management Information – Object Identifiers – Introduction to the Management Information Base – Instance Identification – Simple Examples – Management Information Base – Additional Examples – Traps.

Other TCP/IP Applications: Introduction – Finger Protocol – Who is Protocol – Archie, WAIS, Gopher, Veronica and WWW – X-Window System. (15 Hours)

TEXT BOOK

W.Richard Stevens & G.Gabrani (2006), *TCP/IP Illustrated Volume 1 – The Protocols*, Pearson Education.

REFERENCE BOOKS

1. Parker , *Guide yourself TCP/IP*, Second Edition Pearson Education.
2. Karanjit S.Siyan (1997), *Inside TCP/IP*, Third Edition, Techmedia.
3. Douglas E.Comer (2003), *Networking With TCP/IP Principles, Protocols, and Architectures*, Sixth Edition, Prentice Hall India.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**DISTRIBUTED DATABASE SYSTEMS**	Hours/Week: 5	
Core Course-4		Credits: 5	
Course Code **18PITC21**		Internal 40	External 60

COURSE OUTCOMES

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

- introduce principles and foundations of distributed databases
- develop skills on Concurrency and Transaction Management
- prepare Flow Charts for Manufacturing and Service sector
- design and implement distributed database for enterprise application.
- provide solutions for heterogeneous database.
- know Distributed Recovery Protocol

UNIT I

Distributed Database Concepts: Fundamentals of Distributed Database – Features of a Distributed DBMS – Advantages and Disadvantages Distributed DBMS – An example of Distributed DBMS - Homogeneous and Heterogeneous Distributed DBMS - Functions of Distributed DBMS - Components of a Distributed DBMS -Date's 12 Objectives S for Distributed Database Systems - Distributed Database Design.

Distributed Database Design Concepts: Alternative Approaches for Distributed Database Design.

Objectives of Data Distribution: Alternative Strategies for Data Allocation.

Data Fragmentation - Benefits of Data Fragmentation - Correctness Rules for Data Fragmentation – Different types of Fragmentation - The Allocation of Fragments – Measure of Costs and benefits for Fragment Allocation – Horizontal Fragments –Vertical Fragments.

(10 Hours)

UNIT II

Transparencies in Disturbed Database Design: Data Distribution Transparency – Transaction Transparency – Performance Transparency – DBMS Transparency.

Distributed DBMS Architecture – Introduction – Client Server System - Advantages and Disadvantages of Client/Server System - Architecture of Client/Server Distributed Systems - Architectural Alternatives for Client/Server Systems - Peer-to-Peer Distributed System - Reference Architecture of Distributed DBMSs - Component Architecture of Distributed DBMSs - Distributed Data Independence - Multi-Database System (MDBS) – Five-Level Schema Architecture of federated MDBS - Reference Architecture of Tightly Coupled Federated MDBS - Reference Architecture of loosely Coupled Federated MDBS. (15 Hours)

UNIT III

Distributed Transaction Management - Basic Concepts of Transaction Management - ACID Properties of Transactions - Objectives of Distributed Transaction Management - A Model for Transaction Management in a Distributed System - Classification of Transactions.

Distributed Concurrency Control: Objectives of Distributed Concurrency Control - Concurrency Control Anomalies - Distributed Serializability - Classification of Concurrency Control Techniques - Locking-based Concurrency Control Protocols - Centralized 2PL- Primary Copy 2PL - Distributed 2PL - Majority Locking Protocol - Biased Protocol - Quorum Consensus Protocol.

Timestamp – Based Concurrency Control Protocols - Basic Timestamp Ordering (TO) Algorithm - Conservative TO Algorithm - Multi-version TO Algorithm - Optimistic Concurrency Control Technique. (15 Hours)

UNIT IV

Distributed Recovery Management: Introduction to Recovery Management - Failures in a Distributed Database System - Steps Followed after a Failure - Local Recovery Protocols -

Immediate Modification Technique - Shadow Paging – Check pointing and Cold Restart - Distributed Recovery Protocols - Two-Phase Commit Protocol (2PC) - Termination protocols for 2PC - Coordinator - Participant - Recovery Protocols for R2PC - Coordinator failure - Participant failure - Communication schemes for 2PC - Three-Phase Commit Protocol - Termination Protocols for 3PC - Coordinator - Participant - Recovery Protocols for 3PC - Election Protocol.

Distributed Query Processing -Concepts of Query Processing - Objectives of Distributed Query Processing - Phases in Distributed Query Processing - Query Decomposition - Normalization - Analysis - Simplification - Query Restructuring -Query Fragmentation - Reduction for Horizontal Fragmentation - Reduction for Vertical Fragmentation - Reduction for Derived Fragmentation - Reduction for Mixed Fragmentation - Global Query Optimization - Search space - Optimization Strategy - Distributed Cost Model - Cost Functions - Database Statistics - Cardinalities of intermediate results - Local Query Optimization - Global Query Optimization Algorithm - INGRES Algorithm-Distributed INGRES Algorithm – Distributed R* Algorithm – SDD -1 Algorithm. (20 Hours)

UNIT V

Distributed Database Security and Catalog Management: Distributed Database Security -View Management - View Updatability - Views in Distributed DBMS - Authorization and Protection - Centralized Authorization Control -Distributed Authorization Control - Semantic Integrity Constraints - Global System Catalog - Contents of Global System Catalog - Catalog Management in Distributed Systems.

Distributed Database Systems - SDD-1 Distributed Database System - General Architecture of SDD-1 Database System - Distributed Concurrency Control in SDD-1 - Conflict graph analysis - Timestamp-based protocols - Distributed Query Processing in SDD-1 - Access planning - Distributed execution - Distributed Reliability and Transaction Commitment in SDD-1 - Guaranteed delivery - Transaction control - The Write Rule - Catalog Management in SDD-1 -R* Distributed Database System - Architecture of R* - Query Processing in R* - Transaction Management in R* - The Presumed Abort Protocol - The Presumed Commit Protocol. (15 Hours)

TEXT BOOK

Chanda Ray (2009), *Distributed Database System*, Pearson Education India.

REFERENCE BOOK

1. Tamer Ozsu.M, Patrick Valduriez, *Principles of Distributed Database*, Second Edition, Pearson Education, India.
2. Elmasri and Navathe, *Fundamentals of Database Systems*, Sixth Edition, Pearson Education India.
3. Seed K. Rahimi and Frank S. Haug (Aug 2010), *Distributed Database Management System*, Wiley, India.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester: II	**ARTIFICIAL INTELLIGENCE**	Hours/Week: 5	
Core Course-5		Credits: 5	
Course Code **18PITC22**		Internal 40	External 60

COURSE OUTCOMES

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

- search and create an animation
- showing different search strategies for a problem, program a new game/ problem in Prolog.
- evaluate different Knowledge Representation schemes for typical AI problems.
- design and implement a typical AI problem to be solved Using Machine Learning Techniques.
- design and implement a futuristic AI application

UNIT I

Introduction: Introduction – Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI problems. (10 Hours)

UNIT II

Problem Solving Methods: Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations - Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search - Game Playing -Optimal Decisions in Games -Alpha--Beta Pruning -Stochastic Games.

(15 Hours)

UNIT III

Knowledge Representation: First Order Predicate Logic – Prolog Programming - Unification -Forward Chaining -Backward Chaining - Resolution –Knowledge Representation - Ontological Engineering - Categories and Objects –Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information. (15 Hours)

UNIT IV

Machine Learning: Probability basics - Bayes Rule and its Applications - Bayesian Networks – Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees - Regression and Classification with Linear Models - Artificial Neural Networks - Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning. (18 Hours)

UNIT V

Applications: AI applications – Language Models - Information Retrieval - Information Extraction – Natural Language Processing - Machine Translation – Speech recognition – Robot – Hardware – Perception – Planning – Moving. (17 Hours)

TEXT BOOKS

1. S. Russell and P. Norvig (2009), *Artificial Intelligence: A Modern Approach*, Third Edition, Prentice Hall.
2. Ivan Bratko (2011), *Prolog Programming for Artificial Intelligence (International Computer Science Series)*, Fourth edition, Addison-Wesley Educational Publishers.
3. David L. Poole, Alan K. Mackworth (2010), *Artificial Intelligence: Foundations of Computational Agents*, Cambridge University Press.

REFERENCE BOOKS

1. M. Tim Jones (2008), *Artificial Intelligence: A Systems Approach (Computer Science)*, First Edition, Jones and Bartlett Publishers.
2. Ethem Alpaydin (2009), *Introduction to Machine Learning (Adaptive Computation and Machine Learning series)*, Second Edition, The MIT Press.
3. Nils J. Nilsson (2009), *The Quest for Artificial Intelligence*, Cambridge University Press.
4. William F. Clocksin, and Christopher S. Mellish (2003), *Programming in Prolog: Using the ISO Standard*, Fifth Edition, Springer.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**MOBILE APPLICATIONS DEVELOPMENT**	Hours/Week: 5	
Core Course-6		Credits: 5	
Course Code **18PITC23**		Internal 40	External 60

COURSE OUTCOMES

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

- understand the limitations and challenges of working in a mobile and wireless environment.
- describe and apply the different types of application models/architectures used to develop mobile software applications.
- describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT))
- apply the different components to develop a working system.
- design, implement and deploy mobile applications using an appropriate software development environment.
- know the android application life cycle.

UNIT I

History of mobile: The Evolution of Devices - the Mobile ecosystem – Operators – Networks Devices – Platforms -Operating-Systems - Application Frameworks – Applications – Services - Size and Scope of the Mobile-Market -The Addressable Mobile Market-Mobile As a Medium. (12 Hours)

UNIT II

Mobile design: Thinking in Context-Taking the Next Steps- Developing a Mobile Strategy -New Rules- Types of Mobile Applications-Mobile Application Medium Types- Mobile Information Architecture – Mobile Information Architecture-The Design Myth-Interpreting Design-the Mobile Design Tent-Pole-Designing for the best possible experience-the elements of Mobile Design-Mobile Design Tools-Designing for the right Device-Designing for different Screen Sizes. (15 Hours)

UNIT III

Mobile Application Development: Mobile Web Apps Versus Native Applications-the Ubiquity Principle-When to Make a Native Application When to Make a Mobile Web Application- Mobile 2.0 - Mobile Web Development –Web Standards-Designing for Multiple Mobile Browsers-Device Plans-Markup – CSS: Cascading Style Sheets Java Script.

(18 Hours)

UNIT IV

Introduction to Android: Background - An Open Platform for Mobile Development.-Native Android Applications - Android SDKFeatures.-Introducing the Open Handset Alliance.-Android Run - Develop for Android-Introducing the Development Framework. (16 Hours)

UNIT V

Application Development: Developing for Android- Developing for Mobile Devices-To-Do List Example -Android Development Tools.-An Android Application -Introducing the Application Manifest.-Using the Manifest Editor - The Android Application Life Cycle-Understanding Application Priority and Process State - A Closer Look at Android Activities.

(14 Hours)

TEXT BOOKS

1. Brian Fling (2009), *Mobile Design and Development Practical concepts and techniques for creating mobile sites and web apps*, O'Reilly Media Publisher.
2. Reto Meier (2012), *Professional Android Application Development*, John Wiley & Sons Publications.

REFERENCE BOOKS

1. Jeff McWherter, Scott Gowell (2012), *Professional Mobile Application Development*, John Wiley & Sons Publications.
2. Dan Hermes (2015), *Xamarin Mobile Application Development: Cross-Platform C# and Xamarin. Forms fundamentals*, Taylor & Francies Publications.
3. Anwar Ludin (2014), *Learn BlackBerry 10 App Development*, Apress.

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(2018 -19 onwards)

Semester II	**MOBILE APPLICATIONS LAB**	Hours/Week: 5	
Core Practical-3		Credits: 3	
Course Code **18PITC21P**		Internal 40	External 60

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Applications using controls
4. Develop a Native Calculator Application.
5. Write an application that draws basic graphical primitives on the screen.
6. Develop an application that makes use of database.
7. Applications involving Data Retrieval
8. Develop an application that makes use of RSS Feed.
9. Implement an application that implements Multi Threading
10. Develop a native application that uses GPS location information.
11. Implement an application that writes data to the SD card.
12. Implement an application that creates an alert upon receiving a message.
13. Write a mobile application that creates alarm clock
14. Mobile networking applications (SMS/Email)

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**.NET LAB**	Hours/Week: 5	
Core Practical-4		Credits: 3	
Course Code **18PITC22P**		Internal 40	External 60

Write programs for the following in

VB.Net

1.To prepare employee pay bill

2.Prepare book details using structure

3.To calculate area for different shapes using function overloading

4.To prepare student mark list using constructor overloading

5.To authenticate Login form.

6.To prepare student details using database connectivity.

7.To prepare EB-bill using database.

C#.Net

8. To generate prime numbers and perfect numbers.
9. To prepare employee details using array of objects.
10. To calculate the time.
11. To subtract two complex numbers using constructor.
12. To prepare student mark list using multilevel inheritance.
13. To implement two and three dimensional objects using single inheritance.
14. To calculate area of different shapes using function overloading.
15. To process the banking transaction using this keyword.
16. To prepare inventory details using structure.

17. To sort an array.
18. To perform binary operator overloading
19. To prepare book details using interface.

ASP.Net

20. Program for Image map.
21. To prepare the product details using table.
22. Program for the validation control.
23. To display the student information in database grid view control.
24. To display the book details using Sql database control.
25. To display the items in tree view control using XML data source.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**INTERNET OF THINGS**	Hours/Week: 5	
DSEC-2		Credits: 5	
Course Code		Internal	External
18PITE21		40	60

COURSE OUTCOMES

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

- understand the Physical and logical design of IoT systems.
- know the IoT System Management with netconf protocol.
- understand Logical Design using Python programming.
- comprehend the working model for Raspberry Pi IoT devices.
- apprehend the Hadoop tool for big data analytics.

UNIT I

Introduction to Internet of Things: Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT & Deployment Templates.

Domain Specific IoTs: Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestye. (13 Hours)

UNIT II

IoT and M2M: Introduction: M2M – Difference between IoT and M2M – SDN and NFV for IoT.

IoT System Management with NETCONF-YANG: Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Network Operator Requirements – NETCONF- YANG – IoT Systems Management with NETCONF_YANG.

(17 Hours)

UNIT III

IoT Platforms Design Methodology: Introduction – IoT Design Methodology – Case Study on IoT System for Weather Monitoring – Motivation for using Python.

IoT Systems – Logical Design using Python: Introduction – Installing Python – Python Data types & Data Structures – Control Flow – Functions – Modules – Packages – File Handling – Date/Time Operations – Classes – Python packages of Interest for IoT. (15 Hours)

UNIT IV

IoT Physical Devices & Endpoints: What is an IoT Device – Exemplary Device: Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoTdevices.

IoT Physical Servers & Cloud Offerings : Introduction to Cloud Storage Models & Communication APIs – WAMP-AutoBahn for IoT – Xively Cloud for IoT – Python Web application Framework-Django – Designing a RESTful Web API – Amazon Web Services for IoT – SkynetIoT messaging platform. (16 Hours)

UNIT V

Case Studies Illustrating IoT Design: Introduction – Home Automation – Cities – Environment – Agriculture – Productivity applications.

Data Analytics for IoT : Introduction – Apache Hadoop – Using HadoopMapReduce for Batch Data Analysis – Apache Oozier – Apache Spark – Apache Storm – Using Apache Storm for Real-time Data Analysis. (14 Hours)

TEXT BOOK

Arshdeep Bahga, Vijay Madisetti (2015), *Internet of Things*, Universities Press (INDIA) Private Ltd.

REFERENCE BOOKS

1. Qusay F. Hassan, Atta urRehman Khan (2018), Sajjad A. Madani,*Internet of Things: Challenges, Advances, and Applications*,CRC Press.
2. Nasreddine Bouhai & ImadSaleh (2017), *Internet of Things: Evolutions and Innoations*, John Wiley & Sons Publications.
3. RajkumarBuyya, Amir VahidDastjerdi (2016), *Internet of Things:Principles and Paradigms*, Elsevier.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**DATA MINING**	Hours/Week: 5	
DSEC-2		Credits: 5	
Course Code		Internal	External
18PITE22		40	60

COURSE OUTCOMES

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

- introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication.
- deal with core topics like classification, clustering and association rules.
- know concept of data warehousing with special emphasis on architecture and design.
- know the Multidimensional data model.

UNIT I

Introduction: Motivation of Data Mining–Importance of Data Mining - So, Definition of Data mining - Data Mining – kinds of data - Data Mining Functionalities – Kinds of Patterns Mined - Interesting Patterns - Classification of Data Mining Systems - Data Mining Task Primitives - Integration of a Data Mining System with a Database or Data Warehouse System - Major Issues in Data Mining.

Data Preprocessing: Need of Preprocessor of Data - Descriptive Data Summarization.

(15 Hours)

UNIT-II

Data Warehouse: An Overview Data Ware House - A Multidimensional Data Model- Data Warehouse Architecture.

Mining Frequent Patterns and Associations: Basic Concepts and a Road Map - Efficient and scalable frequent item set mining method- Mining various kinds of association rules. (10 Hours)

UNIT III

Classification and Prediction: Classification – Prediction – Issues regarding Classification and prediction-Classification by Decision tree induction-Bayesian Classification-Lazy Learners-Other classification methods-Prediction. (15 Hours)

UNIT IV

Cluster Analysis: Cluster analysis-Types of Data in Cluster Analysis-Partitioning Methods-Hierarchical Methods-Density Methods-Grid Based methods-Outlier analysis.

(15 Hours)

UNIT V

Graph Mining, and Multi relational Data Mining: Graph Mining – Multi relational Data Mining.

Mining Objects, spatial, Multimedia, Text, and Web Data: Multidimensional analysis and Descriptive Mining of complex data objects.

Spatial data Mining: spatial Data cube Construction and Spatial OLAP - Mining Spatial Association and Co-location Patterns.

Multimedia Data Mining: Similarity Search in Multimedia Data – Multidimensional Analysis of Multimedia Data.

Applications of Data Mining: Data Mining Applications**.** **(**20 Hours)

TEXT BOOK

Jiawei Han and Micheline Kamber (2006), *Data Mining Concepts and Techniques*, Second Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS

1. Prabu.C.S.R (2007), *Data warehousing, concepts, Techniques, Products and Applications*, PHI.
2. Gupta.G.K. (2006), *Introduction to Data mining with Case Studies*, PHI.
3. BPB (2014), *Data Mining, Typical Data Mining Process for Predictive Modeling*, BPB Publications.

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M.Sc. INFORMATION TECHNOLOGY
(2018 -19 onwards)

Semester II	**ADVANCED SOFTWARE ENGINEERING**	Hours/Week: 5	
DSEC-2		Credits: 5	
Course Code **18PITE23**		Internal 40	External 60

COURSE OUTCOMES

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

- aware of different life cycle models
- aware of analysis modeling and specification
- aware of architectural and detailed design methods
- aware of implementation and testing strategies
- aware of verification and validation techniques
- aware of Reengineering and Reverse Engineering.

UNIT I

Software Engineering: Software Engineering-The Software Process-Software Engineering Practice.

Process Models: A Generic Process Model – Process Assessment and Improvement - Prescriptive Process Models. (15 Hours)

UNIT II

Understanding Requirement: Requirements Engineering – Establishing the Groundwork – Eliciting Requirements – Developing Use cases – Building Requirements Model – Negotiating Requirements – Validating Requirements.

Requirements Modeling: Requirements Analysis – Scenario- Based Modeling– UML Models that supplement the Use Case- Data Modeling Concepts – Class Based Modeling.

(20 Hours)

UNIT III

Design Concepts: The Design Process- Design Concepts-The Design Model.

Architectural Design: Software Architecture- Architectural Styles – Architectural Design. (15 Hours)

UNIT IV

Software Testing Strategies: A Strategic Approach to Software Testing – Strategic Issues – Test Strategies for Conventional Software – Test Strategies for Object Oriented Software – Validation Testing – System Testing

Testing Conventional Applications: White Box Testing – Basis Path Testing– Control Structure Testing – Black Box Testing. (10 Hours)

UNIT V

Software Quality Assurance: Elements of Software quality assurance –SQA Tasks, Goals, and Metrics – Software Reliability.

Maintenance and Reengineering: Software Maintenance- Software supportability- Software Re engineering- Reverse Engineering. (15 Hours)

TEXT BOOK

Roger S Pressman, *Software Engineering, A Practitioners Approach*, Seventh Edition, MC Graw Hill Education.

REFERENCE BOOKS

1. Waman S Jawedkar (2005), Software Engineering Principles and Practice, TMH.
2. Leth Bridge, Timochy (2004), *Object Oriented Software Engineering*, TMH.
3. Hans Van Vliet (2008), *Software Engineering: Principles and Practices*, Jhon Wiley & Sons Publications.