

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



(Affiliated to Bharathidasan University)
(Accredited by NAAC; An ISO 9001:2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI – 614016.
TAMILNADU, INDIA.

M.Sc., INFORMATION TECHNOLOGY
LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK(CBCS-LOCF)
(For the candidates admitted in the academic year 2022–2023)



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M.Sc., INFORMATION TECHNOLOGY

CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS – LOCF)

(For the candidates admitted in the academic year 2022 – 2023)

Eligibility: Candidates who have passed B.C.A./ B.Sc. Computer Science/ B.Sc. Information Technology/ B.Sc. Software Development or any other degree (with Mathematics as an allied subject/ Major Subject or (Computer Science Mathematics or Business Mathematics or Statistics at + 2 level) of this University or from a recognized University or an examination accepted by the Syndicate as equivalent there to.

Sem	Course	Course Code	Title of the Paper	Ins. Hours/ Week	Credit	Exam Hours	Marks		Total
							CIA	ESE	
I	Core Course – I (CC)	22PIT101	Distributed Technologies Using Asp.Net	6	5	3	25	75	100
	Core Course – II (CC)	22PIT102	Web Services	6	5	3	25	75	100
	Core Course – III (CC)	22PIT103	Distributed Operating Systems	6	5	3	25	75	100
	Core Practical – I (CP)	22PIT104P	Distributed Technologies Lab	6	3	3	40	60	100
	Elective Course-I (EC)	22PITE1A/ 22PITE1B/ 22PITE1C	Open-Source Technologies / Management Information Systems /Digital Marketing	6	4	3	25	75	100
	Value added course I	22PITVA11	Basics of Business Process Outsourcing		2*	3	25	75	100*
	TOTAL				30	22	-	-	-
II	Core Course – IV (CC)	22PIT205	Internet of Things and Sensor Systems	6	5	3	25	75	100
	Core Course – V (CC)	22PIT206	Mobile Computing	5	5	3	25	75	100
	Core Course – VI (CC)	22PIT207	Cloud Computing	5	5	3	25	75	100
	Core Practical – II (CP)	22PIT208P	Mobile Computing Lab	6	3	3	40	60	100
	Elective Course –II (EC)	22PITE2A/ 22PITE2B/ 22PITE2C	ECommerce/Programming in Python/ Design and Analysis of Algorithms	5	4	3	25	75	100
	Extra Disciplinary Course-I(EDC)	22PITED1A/ 22PITED1B	Cyber Laws and its Applications /Web Application	3	2	3	25	75	100
	TOTAL				30	24	-	-	-
III	Core Course – VII (CC)	23PIT309	Software Engineering	6	5	3	25	75	100
	Core Course –VIII (CC)	23PIT310	J2EE Technologies	5	5	3	25	75	100

Core Course – IX (CC)	23PIT311	Research Methodology	5	5	3	25	75	100	
Core practical -III	23PIT312P	J2EE Technologies Lab	6	3	3	25	75	100	
Elective Course III (EC-III)	23PITE3A / 23PITE3B/ 23PITE3C	Multimedia Technology / Advanced DBMS/ Digital ImageProcessing	5	4	3	25	75	100	
Extra Disciplinary Course-II(EDC)	23PITED2A/ 23PITED2B	Information Technology & Rural Development/Intellectual Property Rights	3	2	3	25	75	100	
TOTAL			30	24	-	-	-	600	
IV	Core Course -X	23PIT413	Cryptography and Network Security	6	5	3	25	75	100
	Core Course -XI	23PIT414	Machine Learning	6	5	3	25	75	100
	Entrepreneurship / Industry Based course	23PITI41	Data Science and Data Analytics	6	5	3	25	75	100
	Project	23PITPW	Project	12	5	-	25	75	100
	Value added course II	23PITVAC42	Principle of Information Security		2*	3	25	75	100
	TOTAL			30	20	-	-	-	400
G. TOTAL			120	90				2100	

CURRICULAM DESIGN

Courses	No. of Courses	Total Credits
Core course	11	55
Core Practical	3	9
Elective Course	3	12
Extra Disciplinary Course	2	4
Entrepreneurship/ Industry Based Course	1	5
Project	1	5
Total	21	90

Note:

- | | | |
|--------------|---------------------------------|----------|
| 1. Theory | 25 marks | 75 marks |
| 2. Practical | Internal 25 marks External | 75 marks |
3. Separate passing minimum is prescribed for Internal and External

- a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10marks)
- b) The passing minimum for University Examinations shall be 40% out of 75marks (i.e. 30marks)
- c) The passing minimum not less than 50% in the aggregate.

ELECTIVE COURSES (EC) OFFERED BY THE DEPARTMENT

S.No.	Semester	Elective Courses (EC)(Any one from the list)
1.	I	Open-Source Technologies
2.	I	Management Information System
3.	I	Digital Marketing
4.	II	Ecommerce
5.	II	Programming in Python
6.	II	Design and Analysis of Algorithms
7.	III	Multimedia Technology
8.	III	Advanced DBMS
9.	III	Digital Image Processing

EXTRA DISCIPLINARY COURSES (EDC) OFFERED BY THE DEPARTMENT

S.No.	Semester	Extra Disciplinary Courses (EDC)(Any one from the list)
1.	II	Cyber laws and its applications
2.	II	Web Application
3.	III	Information Technology & Rural Development
4.	III	Intellectual Property Rights

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**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY
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Question Paper Pattern –(Theory)

Max Time:3 Hours

Max Marks: 75

Section – A (10 x 2 = 20)

Answer all the questions

Answer in One or Two sentences each

1. }
2. } Unit I
3. }
4. } Unit II
5. }
6. } Unit III
7. }
8. } Unit IV
9. }
10. } Unit V

Section – B (5 x 5 = 25)

Answer all the questions

Each answer should not exceed 500 words

10. a (or) }
b } Unit I
11. a (or) }
b } Unit II
12. a (or) }
b } Unit III
13. a (or) }
b } Unit IV
14. a (or) }
b } Unit V

Section – C (3 x 10 = 30)

Answer any THREE questions in 1200 words

16. Unit I
17. Unit II
18. Unit III
19. Unit IV
20. Unit V

SEMESTER III



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY

Semester: III- CC-VII :Software Engineering

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code:23PIT309

OBJECTIVES

- A General understanding of software process models such as the waterfall and Evolutionary models.
- Understanding of software requirements and the SRS documents.
- Understanding of role of project management including planning, scheduling, risk Management.

UNIT I: Need for S/w Engineering

(19 Hours)

About software and S/w engineering – A systems approach – Engineering approach – Members of the development team – Change in S/w engineering. - **Modeling the process and Life cycle:** The meaning of process – S/w process models– Tools and techniques for projects modeling – Practical process modeling.

UNIT II: Planning and managing the process

(20 Hours)

Tracking progress -Milestones-Difference between milestone and activity- Work breakdown and Activity Graphs- Activity Graph- Estimating completion- Tools to track progress-**Project personnel** : Staff roles and characteristics- Work styles- Rational extroverts- **Project Organization:** Chief programmer team- Egoless Approach-**Effort estimation:** Facilities Expert Judgement- Delphi Technique- Algorithmic Methods- COCOMO Model- Machine learning methods - **Risk management:** Risk Management Activities -The project plan-process models and project management.

UNIT III: Capturing the requirements

(17 Hours)

The requirement process – Types of Requirements – Characteristics of requirements – Modeling Notations-Prototyping requirements – Requirements Documentation –validation and verification – Measuring requirements – Choosing a requirements specification Techniques.

UNIT IV: Designing the system

(17 Hours)

Design Introduction - Modeling the Architectures-Decomposition and views – Architectural styles and strategies – Achieving Quality Attributes-Collaborative Design - Architectural Evaluation and Refinement - Documenting software Architectures – Programming standards and procedures – Programming guidelines – Documentation.

UNIT V: Software Testing and Maintenance

(17 Hours)

Testing strategic issues – Test strategies for conventional S/w – Test strategies for object-oriented S/w – Validation testing – System testing – S/w testing. Fundamentals – Black-box and White-box testing – White box testing – Black box testing – McCall's Quality factors – ISO 9126 - QF– S/w engineering – S/w Maintenance.

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to,

1. Describe software engineering layered technology and Process frame work
2. Analyze the role of project management including planning, scheduling, risk management, etc.
3. Analyze implementation issues such as modularity and coding standards.
4. Understand of approaches to verification and validation including static analysis, and reviews.
5. Understand of software testing approaches such as unit testing and integration testing.

TEXT BOOK(S)

1. Roger S. Pressman, "Software Engineering A Practitioner's Approach", 6th Edition, TataMcGraw Hill Publication, New Delhi, India. [(for Unit 5) Chapters : 13, 14, 15, 31]
2. Shari Lawrence P. Fleeger, 2001, "Software Engineering Theory and Practice", 2nd Edition, PearsonEducation, Delhi. [(for Units 1–4) Chapters 1, 2, 3, 4, 5, 7]

REFERENCE BOOK(S)

1. Douglas Bell, 2007, "Software Engineering for Students-A Programming Approach", 4th Edition, Pearson Education, Delhi.
2. Ian Sommerville, 2005, "Software Engineering", 6th Edition, Pearson Education, Delhi.
3. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI learning, Delhi.

E_RESOURCES

1. https://books.google.com/books/about/Software_Engineering.html?id=fadQAAAAMAAJ
2. http://hello.joolz.com/download/pressman-r-software-engineering-a-practitioners-approach-7th-edition-tata-mcgraw-hill-book_pdf
3. <https://www.tutorialspoint.com/sdlc/index.html>

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY

Semester: III–CC-VIII: J2EE Technologies

Ins. Hrs./Week: 5

Course Credit: 5

Course Code:23PIT310

OBJECTIVES

- To Provide Understanding on developing distributed enterprise applications using J2EE
- To implement asynchronous applications and Message Driven Beans using JMS
- Understand how to communicate to Web services, objects and other applications through use of an assortment of java technologies

UNIT I: Client – Server Architecture (16 Hours)

Introduction – Distributive Systems – Real Time Transmission – Software objects – Web Services –The Tier – Client, Resources and Components – Accessing Services - J2EE Multi-Tier Architecture– J2EE Best Practices – Clients – Client Presentation – Client Input Validation- Client Control- Duplicate Client Request- Session Management- Client-side Session State – Server-side Session State.

UNIT II: Presentation Services (15 Hours)

Java and XML – Generating an XML Document – Parsing XML- Document Object model (DOM)- Simple API for XML (SAX)- Java Servlets – Java Servlets and Common Gateway Interface Programming-Benefits of Using a Java Servlet – A Simple Java Servlet- Anatomy of a Java servlet - Java Server Pages-JSP Installation – JSP Tags – Tomcat – Request String-User Sessions – Cookies –Session Objects.

UNIT III: Interaction Services (14 Hours)

Enterprise Java Beans – EJB Container – EJB Classes – EJB Interfaces - Deployment Descriptors – Session Java Bean – Stateless Vs Stateful – Creating a Session Java Bean - Entity Java Bean – Message Driven Bean – The JAR File - Java Mail – Java Remote Method Invocation – Remote method Invocation Concept- Server Side – Client Side.

UNIT IV: Security Services (15 Hours)

Java Message Service – JMS Fundamentals – Components of a JMS Program – Messages – Message Selector – Sending Message to a Queue – Receiving Message from a Queue – Compiling and Running Queue Programs – Creating a Publisher – Creating a Subscriber – Security – J2EE Security Concepts–JVM Security – Security Management – Java API Security – Browser Security – Web Services Security-Web Services Security Classifications – Security Within a WebServices Tier- Programmatic Security.

UNIT V: J2EE Databases (15 Hours)

J2EE Database Concepts – Data – Database – JDBC Objects – Database Connection – The Connection– Timeout - JDBC and Embedded SQL – Tables – Inserting Data into Tables – Selecting Data from a Table – Updating Tables – Deleting Data from Table.

Total Lecture Hours-75

COURSE OUTCOME

The students will be able to,

1. Develop own Web applications with various available resources.
2. Understand different open-source frameworks.
3. Evaluate Java Runtime Environment and Java Virtual Machine.
4. Familiarize the concept of J2EE Architecture and Specifications.
5. Effectively using J2EE Databases.

TEXT BOOK(S)

1. James Holmes, 2007, “The Complete References Struts Second Edition”, Tata McGraw Hill Edition, India.
2. Jim Keogh, 2002, “The Complete Reference J2EE”, Tata McGraw – Hill Edition, India.

REFERENCE BOOK(S)

1. Jusin Couch, Daniel H. Steinberg, 2002, “J2EE Bible”, Wiley India (P) Ltd, New Delhi .
2. Paul Tremblett, 2001, “Instant Enterprise Java Y-Beans”, Tata McGraw Hill Publishing Company, New Delhi.
3. Rick Cattell, 2001, “J2ee Technology in Practice: Building Business Applications with the Java 2Platform”, Enterprise Edition (Enterprise), Addison-Wesley Professional, Boston, USA.

E_RESOURCES

1. http://ptgmedia.pearsoncmg.com/imprint_downloads/informit/sun/032124575X.pdf
2. https://www.lnjpitchapra.in/wp-content/uploads/2020/03/file_5e817ee54956f.pdf
3. <https://people.engr.ncsu.edu/efg/517/f02/common/syllabus/lectures/lec21.pdf>

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY

Semester: III–CC-IX: Research Methodology

Ins. Hrs./Week: 5

Course Credit: 5

Course Code:23PIT311

OBJECTIVES

- To understand the types of research and research problems
- To learn the art of thesis writing
- To understand Research ethics and ethics in Information technology

UNIT-I: Research Fundamentals

(14 Hours)

Motivation and Objectives – Research Methods and Methodology - Research types – Descriptive Vs Analytical, Applied Vs Fundamental, Quantitative Vs Qualitative, Conceptual Vs Empirical, concept of applied and Basic research process – Criteria of good Research.

UNIT-II: Research Formulation and Problems

(16 Hours)

Defining and formulating the Research problem – Selecting the problem – Necessity of defining the problem – Importance of Literature review in defining a problem – Literature collection - Literature review – Primary and secondary sources – Reviews – Monograph – Patents – Research Databases – Web as a source – Searching the web – Critical literature review – Identifying gap areas from literature and research database, Development of working hypothesis.

UNIT-III: Thesis Writing

(14 Hours)

Writing review and journal articles – manuscript publication. **Thesis Writing:** Planning a thesis – general format – page and chapter format – footnotes – tables and figures–references and appendices. Research Tools in Computer Science: LaTeX,R,WEKA,MATLAB,NS2.

UNIT-IV: Research Ethics

(16 Hours)

Philosophy - Definition, nature, scope and concept. Ethics – definition, moral philosophy, nature of moral judgments and reactions - Ethics with respect to science and research-Scientific misconducts– falsification, fabrication and plagiarism software –Turnitin, Urkund and other open source software tools. Redundant publications–duplicate and overlapping publications. Publication ethics- definition and importance. Publication misconduct–definition, concept, problems that lead to unethical behavior, types, Violation of publication ethics, authorship and contributor ship. Software tool to identify predatory publications developed by SPPU. Subject specific ethical issues–authorship, Conflicts of interest.

UNIT-V: Ethics in Information Technology

(15 Hours)

Overview of Ethics: Definition of Ethics - The Importance of Integrity - The Difference Between Morals, Ethics, and Laws - Ethics in the Business World - Corporate Social - Improving Corporate Ethics Creating an Ethical Work Environment - Ethics in Information Technology – **Ethics for IT Workers and IT users:** IT Professionals - Professional Relationships - Professional Codes of Ethics - Professional Organizations – **Ethics of IT organization:** Key Ethical Issues for Organizations - The Need for Nontraditional Workers

Total Lecture Hours - 75

COURSE OUTCOME

The students will be able to,

- Understand the basic concepts of research and its types
- Analyze the research problems in the real world scenario
- Understand scholarly writing and development of the skills to write the same
- Use tools related to research in Computer Science
- Describe the art of thesis writing
- Apply the research ethics and publication ethics
- Apply the ethics in Information technology to justify the morals of professional ethics

TEXT BOOK(S)

1. Garg B.L.Karadia, R.Agarwal, F and Agarwal, “An Introduction to Research Methodology” RBSA Publishers, U.K., 2002
2. Kothari C.R. Research Methodology – methods and techniques, 2nd Edition, Wishwa Prakashjan NewDelhi 1999
3. Sinha.S.C, and Dhiman A.K, 2002, “ Research Methodology”, Ess Ess Publications- Second Volume
4. Trochim W.M.K, “Research Methods: the concise knowledgebase”, 2005, Atomic Dog Publishing.
5. George Reynolds, “Ethics in Information Technology” Thompson Course Technology, 2007 ISBN 13:978-1-4188-3631-3(Chapter:1,2,10)

REFERENCE BOOK(S)

- Anderson, Durston and Poole, ‘Thesis and Assignment writing’, Wiley Eastern Ltd.ND1970
- Misra R.P. Research Methodology–A Hand Book, Concept publishing Company, NewDelhi1988

E_RESOURCES

- 1) <https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf>
- 2) [https://repository.dinus.ac.id/docs/ajar/ethics in information technology2c 5th ed. 0 .pdf](https://repository.dinus.ac.id/docs/ajar/ethics%20in%20information%20technology2c%205th%20ed.%20.pdf)



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M.Sc., INFORMATION TECHNOLOGY

Semester: III–CP-III: J2EE Technologies Lab

Ins. Hrs./Week: 6

Course Credit: 3

Course Code:23PIT312P

OBJECTIVES

1. To provide experience in developing distributed enterprise applications using J2EE.
2. To Create web Application using servlet and JSP.
3. To Understand the importance of extension JDBC Package in Enterprise Java Applications.

EXERCISES

1. To find the marks of the students using Remote Method Invocations.
2. To write a Servlet program to calculate the bonus of an employee
3. To write a Servlet program to implement Session Tracking.
4. To write a Servlet program to check authentication for user using Cookies.
5. To write a Servlet program and use JDBC in it.
6. To write a simple program for JSP.
7. To write a JSP program that works with JDBC.
8. To write a JSP Program with Bean Class.
9. To write a EJB Stateless Program to create bonus of an employee.

Total Lecture Hours - 90

COURSE OUTCOME

The Students will be able to,

1. To master the whole process of designing, implementing, and deploying J2EEApplications.
2. To implement and access web service components using EJB in java EE Applications.
3. To understand the concept of Servlet.
4. To know about the concept of Core Java.
5. Understanding different open source formats

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: III–EC-III (a): Multimedia Technology

Ins. Hrs. /Week: 5

Course Credit: 4

Course Code:23PITE3A

OBJECTIVES

- To understand basic concepts of Multimedia and its Applications.
- To understand about various tools & technologies that provides audio, video data handling capabilities to a computer.
- To understand the concepts of multimedia Networks.

UNIT I

(15 Hours)

Introduction to Multimedia – Multimedia Authoring and Tools – Graphics and Image Data Representations - Color in Image and Video-Applications of Multimedia.

UNIT II

(15 Hours)

Fundamental Concepts in Video– Basics of Digital Audio -Lossless Compression.

UNIT III

(15 Hours)

Lossy Compression Algorithms – Image Compression Standards - Basic video compression techniques.

UNIT IV

(15 Hours)

MPEG Video Coding (MPEG-1 and 2) - Basic Audio Compression techniques - MPEG Audio Compression.

UNIT V

(15 Hours)

Computer and Multimedia Networks- Multimedia network communications and applications –Content based Retrieval in Digital Libraries.

Total Lecture Hours - 75

COURSE OUTCOME:

Upon successful completion the student will be able to

1. To understand basic concepts of Multimedia and its Applications.
2. To understand about various tools & technologies that provides audio, video data handling capabilities to a computer.
3. Identify the basic hardware and software requirements for multimedia development and playback.
4. Identify the basic components of a multimedia project.
5. Understand the concepts of Multimedia Networks.

TEXT BOOK(S):

1. **ZeN-ian Li and Mark S.Drew**, Fundamentals of Multimedia, Pearson education / Prentice Hall of India, First Edition, 2006, (ISBN 81-7758-823-0) [**Unit-I**- Chapters 1,2,3,4); **Unit-II**:(Chapters 5,6,7); **Unit-III** (Chapters 8,9,10); **Unit- IV** (Chapters 11, 13); **Unit-V**(Chapters 15,16,18)]

REFERENCE BOOK(S):

1. Fundamentals of Multimedia Technology, Dr.Ashok Benerji and Dr.Ananda Mohan Ghosh, TataMcGraw Hill Education 2010.
2. Fundamentals of Multimedia, ZeN-ian Li and Mark S.Drew, Jiangchuan Liu, Second Edition, Springer publications 2014.

E_RESOURCES:

1. https://www.tutorialspoint.com/multimedia/multimedia_quick_guide.htm
2. https://books.google.co.in/books?id=jVIEswEACAAJ&source=gbs_book_other_versions
<https://>
3. www.slideshare.net/ABDUmomo/chapter-2-multimedia-authoring-and-tools

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: III–EC-III (b): Advanced DBMS

Ins. Hrs. /Week: 5

Course Credit: 4

Course Code:23PITE3B

OBJECTIVES:

- To understand the foundations of Database Design
- To introduce the idea of Distributed and Object based Database
- To understand the advanced features for the different types of Database

Unit-I

(15 Hours)

Relational and parallel Database Design: Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism.

Unit-II

(15 Hours)

Distributed and Object based Databases: Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multiset, Object Identity and Reference Types, Object Oriented versus Object Relational.

Unit-III

(15 Hours)

Spatial Database: Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.

Unit-IV

(15 Hours)

XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, Illustrative Experiments.

Unit-V

(15 Hours)

Temporal Databases: Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases: Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to,

1. Understand the basics of Database Concepts.
2. Apply the basics concepts of Object Oriented Database System.
3. Understand the controls and features of Spatial Data models.
4. Summarize the advanced features of XML data models.
5. Interprets the concepts of Temporal database design.

TEXT BOOK(S)

1. Abraham Silberschatz, Henry F Korth S Sudarshan, “Database System Concepts”, 6th edition , McGraw-Hill International Edition , 2011
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8th Edition, Pearson Education Reprint 2016.

REFERENCE BOOK(S)

1. Ramez Elmasri, Shamkant B Navathe, “Fundamental of Database Systems”, Pearson, 7th edition 2016.
2. Thomas Connolly, Carolyn Begg., “Database Systems a practical approach to Design , Implementation and Management “, Pearson Education, 2014.

E_RESOURCES

1. <https://tinyurl.com/bdh96w3v>
2. <https://tinyurl.com/bdft5nrj>
3. <https://tinyurl.com/2s39s883>

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: III–EC-III (c): Digital Image Processing

Ins. Hrs./Week: 5

Course Credit: 4

Course Code:23PITE3C

OBJECTIVES

- 1.To explain the various concepts, methods and algorithms of digital image processing
- 2.To illustrate image transformation and image enhancement
- 3.To describe the concept of image restoration and image compression techniques

UNIT I: Continuous and Discrete Images and System

(15 Hours)

Introduction - Digital Image Processing System: Problems and Applications, Image Representation and Modeling – **Two- Dimensional Systems and Mathematical Preliminaries:** Linear Systems and Shift Invariance, Fourier Transform, Z Transform, Matrix Theory Results, Block Matrices and Kronecker Products -**Image Perception:** Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Vision Camera – **Image Sampling and Quantization:** 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd-Max Quantizer, Dither, ColorImages.

UNIT II: Image Transforms

(15 Hours)

Introduction – Two - Dimensional Orthogonal and Unitary Transforms, One – Dimensional Discrete Fourier Transforms (DFT), Properties of DFT/ Unitary DFT - 2- Dimensional DFT, Properties of 2-D DFT, Cosine Transform, Sine Transform, Walsh Transform, Hadamard Transform, Haar Transform, Slant Transform, Karhunen- Loeve(KL) Transform- KL Transform of Images and Properties, Singular value Decomposition transforms.

UNIT III: Image Enhancement

(15 Hours)

Point Operations: Contrast Stretching, Clipping and Thresholding, Intensity Level Slicing - **Histogram Modeling:** Histogram Equalization, Histogram Modification and Histogram Specification - **Spatial Operations:** Spatial Averaging and Spatial Low-pass Filtering, Direction Smoothing, Medium Filtering, Spatial Low-pass, High-pass, Band-pass Filtering, **Transform Operations:** Generalized Cepstrum and Homomorphic Filtering, Edge enhancement using 2-D IIR and FIR filters, Color Image Enhancement.

UNIT IV: Image Filtering and Restoration

(15 Hours)

Introduction - **Image Observation Models:** Image Formation Models, Detector and Recorder Models, Noise Models, Sampled Image Observation Models - Sources of Degradation - Inverse and Wiener Filtering -Geometric Mean Filter - Nonlinear Filters - Smoothing Splines and Interpolation - **Least Squares Filers:** Constrained Least Squares Restoration.

UNIT V: Image Data Compression and Image Reconstruction From Projections

(15 Hours)

Introduction - Image Raw Data Rates, Data Compression versus Bandwidth Compression, Information Rates - Pixel Coding - Predictive Techniques - Transform Coding Theory – Hybrid Coding and Vector DPCM - Block Truncation Coding, Wavelet Transform Coding of images, Color Image Coding – Lossy and Lossless in prediction coding.

Total Lecture Hours- 75

COURSE OUTCOME

The Students will be able to,

1. Learn the concepts, methods and algorithms of digital image processing
2. Understand the concepts of image transformation
3. Analyze about image enhancement
4. Describe about image restoration
5. Understand the concept of image compression techniques

TEXT BOOK(S)

1. Anil K. Jain, 2015, “Fundamentals of Digital Image Processing”, 1st Edition, Pearson Education, New Delhi.
2. Gonzalez R. and Wintz P, 1987, “Digital Image Processing”, 2nd Ed., Addison Wesley, Boston, USA.
3. Sid Ahmed M.A., 1995, “Image Processing”, McGraw Hill Inc, New York, USA.

REFERENCE BOOK(S)

1. Jayaraman.S, Easkkirajan.S, Veerakumar.T, 2017, “Digital Image Processing”, First Edition, Tata McGrawHill Education Pvt. Ltd., India.
2. Kenneth R Castleman, 2007, “Digital Image Processing”, First Edition, Pearson Education, India.
3. Rafael C.Gonzalez, Richard E.Woods, 2018, “Digital Image Processing”, Fourth Edition, Pearson Education, India.

E-RESOURCES

1. https://nptel.ac.in/content/storage2/courses/117104069/chapter_1/1_1a.html
2. <https://rb.gy/yrt9vv>
3. <https://rb.gy/daglt2>
4. <https://rb.gy/jzzafz>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614016

(For the Candidates admitted in the academic year 2022–2023)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY

Semester: III-EDC - II(a): Information Technology & Rural Development

Ins. Hrs. /Week:3

Course Credit: 2

Course Code:23PITED2A

OBJECTIVES

- To provide a basic overview of Advanced Computing Technologies
- To investigate the different types of Informatics and their rural applications

UNIT- I: Importance of Rural Development

(9 Hours)

Introduction to Rural Development- Factors that Affect Rural Development in India-How to Ensure the Rural Development of India- Scope of Rural Development- Strategy and Approaches to Rural Development- Programs for Fastest-Growing Rural Development-

UNIT –II: Grid Computing

(9 Hours)

Introduction to Grid Computing, Anatomy and Physiology of Grid= Early Grid Activities- Current Grid Activities- Grid Standards- Grid Challenges and Application area- Grid Computing Organization, roles

UNIT- III: Cloud Computing Overview

(9 Hours)

Cloud Computing Overview, History, Key Terms and Definitions - Applications, Intranets and the Cloud - Cloud Today, Cloud Computing Services - On Demand Computing, Discovering Cloud Services - Software engineering fundamentals for Cloud Computing -Development Services and Tools

UNIT- IV: Ubiquitous Computing

(9 Hours)

Ubiquitous Computing: Introduction - Basics - Applications and Requirements -Smart Devices and Services - Smart Mobiles - Cards and Device Networks.

UNIT- V: Informatics and Rural Applications

(9 Hours)

Informatics and Rural Applications: Informatics-Health Agriculture-Education-Governance -Finance and other services Rural applications.

Total Lecture Hours-45

COURSE OUTCOME

Students are able to

1. Understand the basic concepts of Grid Computing
2. Gain knowledge on the implementation and applications of Cloud Computing
3. Have a clear insight into Ubiquitous Computing
4. Explore how ICT can support and improve management of Health care, Education Agriculture, PublicGovernance and Rural decision-making.

TEXT BOOK(S):

1. Grid Computing, Joshy Joseph, Craig Fellenstein, IBM Press, Pearson Education, 2004.
2. Cloud Computing: Web based Applications that change the way you work and Collaborate Online, Michael Miller, Que Publishing, 2008.
3. Ubiquitous Computing Fundamentals, John Krumm, CRC Press, 2010

REFERENCE BOOK(S)

1. Agricultural and Environmental Informatics, Governance and Management: Emerging Research Applications, Zacharoula Andreopoulou , Basil Manos, Nico Polman and Davide Viaggi IGI GLOBAL, June 2011. Health Informatics: Practical Guide for Healthcare and Information Technology Professionals , Robert E. Hoyt , Ann K. Yoshihashi, lulu.com, Feb 2014

E-RESOURCES

1. [Rural Development in India - Introduction, Objectives and Affecting Factors \(vedantu.com\)](http://vedantu.com)
2. [Information Technology in Rural Development \(slideshare.net\)](http://slideshare.net)
3. [\(PDF\) Information and Communication Technology for Rural Development \(researchgate.net\)](http://researchgate.net)

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: III-EDC - II(b): Intellectual Property Rights

Ins. Hrs./Week:3

Course Credit: 2

Course Code:23PITED2B

OBJECTIVES

- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
- To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act.
- Further teacher will have to demonstrate with products and ask the student to identify the different types of IPR's.

UNIT- I:

(9 Hours)

INTRODUCTION TO IPR: Meaning of property-Origin-Nature-Meaning of Intellectual Property Rights – Introduction to TRIPS and WTO – Kinds of Intellectual property rights—Copy Right-Patent-Trade Mark-Trade Secret and trade dress-Design-Layout Design-Geographical Indication-Plant Varieties and Traditional Knowledge.

UNIT –II:

(9 Hours)

PATENT RIGHTS AND COPY RIGHTS— Origin-Meaning of Patent-Types-Inventions -which are not patentable-Registration Procedure-Rights and Duties of Patentee-Assignment and licence - Restoration of lapsed Patents-Surrender and Revocation of Patents-Infringement, Remedies & Penalties. – **COPY RIGHT**—Origin, Definition &Types of Copy Right-Registration procedure- Assignment & licence- Terms of Copy Right, Piracy, Infringement, Remedies, Copy rights with special reference to software.

UNIT- III:

(9 Hours)

TRADE MARKS— Origin-Meaning & Nature of Trade Marks-Types-Registration of Trade Marks-Infringement & Remedies-Offences relating to Trade Marks-Passing Off-Penalties – Domain Names on cyber space.

UNIT- IV:

(9 Hours)

DESIGN- Meaning, Definition, Object, Registration of Design, Cancellation of Registration, International convention on design, functions of Design. Semiconductor Integrated circuits and layout design Act-2000.

UNIT- V:

(9 Hours)

BASIC TENENTS OF INFORMATION TECHNOLOGY ACT-2000 – IT Act - Introduction – E-Commerce and legal provisions - E- Governance and legal provisions -Digital signature and Electronic Signature-Cybercrimes.

Total Lecture Hours-45

COURSE OUTCOME

1. The students once they complete their academic projects, they get awareness of acquiring the patent.
2. They also learn to have copyright for their innovative works.
3. They also get the knowledge of plagiarism in their innovations which can be questioned legally.

TEXT BOOK(S):

1. Intellectual Property Rights and the Law, Gogia Law Agency, by Dr. G.B. Reddy.
2. Law relating to Intellectual Property, Universal Law Publishing Co, by Dr. B.L.Wadehra .
3. IPR by P. Narayanan
4. Law of Intellectual Property, Asian Law House, Dr.S.R. Myneni.

REFERENCE BOOK(S):

1. Ahuja V K, Law Relating to Intellectual Property Rights, LexisNexis, 2017
2. Ang Steven, The Moral Dimensions of Intellectual Property Rights, EE, 2013
3. Copyrights, Patents and Trade Secrets, 2nd Ed., West Legal Studies, Canada, 2000
4. D. P. Mittal, Trade Marks, Passing Off & Geographical Indications of Goods: Law and Procedure, Taxmann Allied Services, New Delhi, 2002
5. David Bainbridge, Intellectual Property, 5th Ed., Pearson Education Ltd., 2003

E-RESOURCES:

1. [IPR Intellectual Property Rights Notes pdf Download Lecture \(tutorialsduniya.com\)](http://tutorialsduniya.com)
2. [\(PDF\) A TEXTBOOK OF INTELLECTUAL PROPERTY RIGHTS \(researchgate.net\)](http://researchgate.net)
3. [Intellectual Property Rights | Notes, Cases & Study Material \(legalbites.in\)](http://legalbites.in)

SEMESTER IV

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614016

(For the Candidates admitted in the academic year 2022–2023)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: IV CC-X: Cryptography and Network Security

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:23PIT413

OBJECTIVES

- To provide knowledge for establishing secured network-based computing and information systems
- To learn about how to maintain the Confidentiality, Integrity and Availability of data
- To understand various protocols for network security to protect against the threats in the networks

UNIT I: Computer and Network Security Concepts (18 Hours)

Introduction: The OSI Security Architecture-Security attacks-Security Services- Security mechanisms-A model for network Security- **Classical Encryption Techniques:** Symmetric Cipher model: Cryptography – Cryptanalysis and Brute-Force Attack. **Substitution Techniques:** Caesar Cipher – Monoalphabetic Ciphers – Playfair Cipher – Hill Cipher – Polyalphabetic Ciphers – One Time Pad. Transposition Techniques–Rotor Machines– Steganography.

UNIT II : Block ciphers and the Data Encryption Standards (20 Hours)

Traditional Block Cipher Structure-Stream Ciphers and block Ciphers – Motivation for the Feistel Cipher Structure – The Fiestel Cipher- **The Data Encryption Standard:** DES Encryption DES Decryption. **The Strength of DES:** The use of 56-Bit Keys – The Nature of the DES Algorithm Timing Attacks. **Block Cipher Design Principles:** Number of Rounds – Design of function F Key Schedule Algorithm. **Public-Key Cryptography and RSA:** Public Key Cryptosystems- Applications for Public-Key Cryptosystems – Requirements for public-Key Cryptography – Public Key Cryptanalysis-The RSA Algorithm. **Cryptographic Hash Functions:** Applications of Cryptographic Hash Functions – Secure Hash Algorithm.

UNIT III: Transport level Security (16 Hours)

Web Security Considerations- Web Security Threats- Web Traffic Security Approaches. **Secure Socket Layer :** SSL Architecture – SSL Record Protocol – Change Cipher Spec Protocol - Alert Protocol – Handshake Protocol- Cryptographic Computations. **Transport Layer Security:** Version Number- Message Authentication Code – Pseudorandom Function – Alert Codes – Cipher Suites – Client Certificate types – Certificate_Verify and Finished Messages – Cryptographic Computations- Padding. HTTPS – Secure Shell(SSH) - secure electronic transaction (SET)

UNIT IV : Wireless Network Security and IP Security (18 Hours)

Wireless Security - Wireless Network Threats – Wireless Security Measures. **Mobile Device Security:** Security Threats – **Mobile Device Security Strategy. IEEE 802.11. Wireless LAN Overview:** The Wi-Fi Alliance – IEEE 802 Protocol Architecture – IEEE 802.11 Network Components and Architectural Model – IEEE 802.11 Services. **IEEE 802.11i Wireless LAN Security:** IEEE 802.11i Services – IEEE 802.11i Phases of Operations – Discovery Phase – Authentication Phase – Key Management Phase – Protected data Transfer Phase – The IEEE Pseudo random Function. **IP Security:** Overview-IP Security policy – Encapsulating Security

UNIT V : System Security

(13 Hours)

System Security: Intruders-Intrusion Detection-Password Management- Malicious Software: Types of Malicious Software(Malware)-Advanced Persistent Threat-Viruses-Worms-Spam E-mail, Trojans-System Corruption-Zombie, Bots-Information Theft -Keyloggers, Phishing, Spyware-Countermeasures-Distributed Denial of Service attacks- Firewalls: The Need for Firewalls-Firewall characteristics and Access Policy- Types of Firewalls-Firewall basing-Firewall Location and Configurations

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to,

1. Understand the concepts, methods of Network Security using cryptography basics.
2. List the various data encryption standards
3. Illustrate the Hash Functions in network security
4. Analyze about IP security, Wireless Network Security.
5. Summarize the techniques in Web security
6. Identify the various Viruses and threats encountered by the system through network
7. Apply the system security to prevent the system from various Threats.

TEXT BOOK(S)

1. William Stallings, 2017, “Cryptography and Network Security”-Principles and Practices,Prentice-Hall, Seventh edition, **ISBN:10:1-292-15858-1**, India.
2. Behrouz A. Ferouzan, 2015, “Cryptography & Network Security”, Tata Mc Graw Hill, India.
3. Neal Krawetz, 2007, “Intoduction to Network Security”, Charles River media Publications.
- 4.

REFERENCE BOOK(S)

1. Johannes A. Buchaman, 2004, “Introduction to cryptography” (2nd edition), 2004. ISBN 0 387207562, Springer Publications, United States.
2. Robert Collins,2017, “Network Security Monitoring: Basics for Beginners”.
3. William Stallings, 2003, “Cryptography and Network Security”-Principles and Practices, Prentice-Hall,Third edition, **ISBN:8178089025**, India.
4. William Stalings, 2016, “Network Security Essentials-Applications and Standards”,Sixth Edition,Pearson Publications, India.
5. William Stallings, 2020, “Cryptography and Network Security-Principles and Practices”,Eighth edition, Pearson Publications, India.

E_RESOURCES

1. http://www.cs.vsb.cz/ochodkova/courses/kpb/cryptography-and-network-security_-_principles-and-practice-7th-global-edition.pdf
2. http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf
3. <https://youtu.be/2Z3toEiY5ll>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAL, MANNARGUDI-614016

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: IV-CC-XI: Machine Learning

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code:23PIT414

OBJECTIVES:

- To understand the concepts of Machine Learning.
- To understand the concepts of Supervised and Unsupervised Learning.
- To understand the concepts of Artificial Neural Networks.

Unit-I Introduction to Machine Learning

(20 Hours)

Introduction to Machine Learning-Origins of Machine Learning-Uses of Machine Learning- Machine Learning Ethics-How Machine Learn-Data Storage- Abstraction-Generalization-Evaluation-Types of Input Data-**Managing and Understanding Data:** R Data Structures-Vectors-Factors-Lists-Data Frames-Matrices and arrays-**Exploring and Understanding Data:** Exploring the structure of data-Exploring Numeric Variables-Exploring Categorical Variables-Exploring relationship between variables.

UNIT-II Supervised and Unsupervised Learning

(20 Hours)

Supervised machine learning-Working and steps of supervised learning-Regression analysis-Simple and Multiple linear regression-Classification algorithms in machine learning- **Linear Models:** Logistic Regression-Support Vector Machines-Naïve Bayes Classifier-**Non-Linear Models:** K-Nearest Neighbours- Naïve Bayes- Random Forest Classification-Working of Unsupervised Learning-K-means Clustering-Apriori algorithm-Hierarchical Clustering.

UNIT-III Artificial Neural Networks

(20 Hours)

Introduction to Artificial Neural Networks-Understanding neural networks from Biological to Artificial Neurons-Architecture of Artificial Neural Network-Working of artificial neural networks-**Convolutional Neural Networks(CNN):** Structure of Convolutional Neural Network-Components of CNN Architecture-Convolutional Layer-Pooling Layer-**Recurrent Neural Network:** Fully Recurrent Network-Elman Neural Networks-Training RNNs with Back-Propagation Through Time (BPPT)- Deep Belief Networks.

UNIT-IV Introduction to Deep Learning

(15 Hours)

Introduction to Deep Learning-Deep Learning Models-Single Layer Perceptron Model (SLP)- Multilayer Perceptron Model(MLP)- Restricted Boltzmann Machines (RBMs)-Genetic Algorithm in machine learning- Working of Genetic Algorithm-Difference between Traditional algorithm and genetic algorithm-**Other Local Search Methods:** Hill Climbing search methods-Stimulated Annealing(SA)-Steepest Ascent Hill Climbing.

UNIT-V Problems in Machine Learning

(15 Hours)

Apply KNN Algorithm for Diagnosing Breast Cancer- Apply Naïve Bayes Algorithm for filtering Mobile Phone Spam-Apply Classification Rules for Identifying Poisonous Mushrooms with Rule Learners- Finding Groups of Data and Clustering with K-Means Algorithm for clustering finding teen market segments using k-means Clustering.

Total Lecture Hours-90

Course Outcome:

The Students will be able to,

1. Understand the knowledge about basic concepts of machine learning techniques.
2. Understand the supervised and unsupervised learning algorithms.
3. Understand the basic concepts of Artificial Neural Networks.
4. Understand the basic concepts of Deep Learning and local search methods.
5. Understand the machine learning algorithm and apply the algorithm to a problem and make a prediction.

TEXT BOOK(S)

1. Brett Lantz, “Machine Learning with R: Expert techniques for predictive modeling”, 3rd Edition, April 15, 2019.
2. Taweh Beysolow, “Introduction to Deep Learning Using R: A Step-by-Step Guide to Learning and Implementing Deep Learning Models Using R”, San Francisco, California, USA, 2017.

REFERENCE BOOK(S)

1. Daniel T. Larose, Chantal D. Larose, “Data mining and Predictive analytics”, Second Ed., Wiley Publication, 2015.
2. Jason Bell, “Machine Learning: Hands-On for Developers and Technical Professionals”, Wiley Publication, 2015.
3. Christopher M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.

E_RESOURCES

1. <https://rb.gy/2x75x>
2. <https://rb.gy/xpd7p>
3. <https://rb.gy/m7rcf>



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAL, MANNARGUDI-614016
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**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY**

Semester: IV –Entrepreneurship / Industry Based Course: Data Science and Data Analytics

Ins.Hrs./Week:6

Course Credit:5

Course Code:23PITI41

OBJECTIVES:

- To introduce Data Science, Big data tools and Information Standard formats
- To understand the basic concepts of Data Science and perform data analysis, Datamining tasks & techniques
- To learn Hadoop, HDFS, MapReduce concepts and the importance of NoSQL

Unit I : Introduction to Data Science

(18 Hours)

Data Mining – Kinds of Data and Patterns to be Mined – Technologies used – Kinds of Applications are Targeted - Major Issues –Data objects and Attribute types – Basic statistical Descriptions of Data – Data Visualization - **Data Preprocessing:** Data Cleaning – Data Integration - Data Reduction - Data Transformation.

Unit II: Classification, Association Analysis and Web Data Mining

(18 Hours)

Classification: Basic concepts - Decision Tree Induction: Working of Decision Tree - Building Decision Tree. **Association Analysis:** Basic Concepts - Frequent Itemset Generation - Rule Generation - Compact Representation of Frequent Item sets –FP Growth Algorithm. **Cluster Analysis:** Introduction-Desired Features of Cluster Analysis -Types of Data- Computing Distance - Types of Cluster Analysis Methods. **Web Data Mining:** Introduction - Web terminology and characteristics.

Unit III: Big Data and Analytics

(18 Hours)

Classification of Digital Data: Structured Data- Semi Structured Data and Unstructured Data. Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop. Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments – Basically Available Soft State Eventual Consistency - Top Analytics Tools

Unit IV: Technology Landscape

(18 Hours)

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

Unit V: MongoDB and Mapreduce Programming

(18 Hours)

MongoDB: Mongo DB - Terms used in RDBMS and Mongo DB - Data Types - MongoDB Query Language. MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression. **Hive:** Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements. **Pig:** Introduction - Anatomy – Pig Primitive Data Types - Running Pig - Execution Modes of Pig - HDFS Commands

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to,

1. Outline the basics in data science
2. Interpret and demonstrate the knowledge of data analysis techniques in decision making
3. To understand, illustrate and evaluate the concepts and techniques of Data Science, Big Data Analytics and its tools
4. To collaborate, apply and review the computing for big data in Hadoop, and NoSQL environment
5. To comprehend, implement and review the concepts of data science and big data analytics projects using MapReduce, MongoDB, HIVE and PIG

TEXT BOOK(S):

1. Vipin Kumar - Michael Steinbach - Pang - Ning Tan - (2006) - Introduction to DataMining - Pearson Education.
2. Jiawei Han and Micheline Kamber - (2012) - Data Mining Concepts and Techniques - Third Edition - Morgan Kaufmann.
3. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publications, First Edition, 2015F

REFERENCE BOOK(S):

1. Bhavani M. Thuraisingham - Data Mining: Technologies - techniques - tools and trends -CRC Press
2. Yanchang Zhao (2012 - 2013) - R and Data Mining: Examples and Case Studies - Elsevier.
3. Samir Madhavan, "Mastering Python for Data Science", Packet Publishing, 2015.
4. Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, "Big data for dummies", John Wiley & Sons, Inc. (2013)
5. Tom White, "Hadoop The Definitive Guide", O'Reilly Publications, Fourth Edition, 2015
6. Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss, "Hadoop For Dummies", Wiley Publications, 2014
7. G.K. Gupta, "Introduction to Data mining with case studies", 2nd Edition, PHI Privatelimited, New Delhi, 2011.

WEB REFERENCES:

1. <http://www.thearling.com/text/dmwhite/dmwhite.htm>
2. <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=AD0770256>
3. <https://www.datamentor.io/r-programming#tutorial>
4. <http://www.csis.pace.edu/~ctappert/cs816-15fall/books/2015DataScience&BigDataAnalytics.pdf>
5. <http://www.rdatamining.com/>
6. <https://www.analyticsvidhya.com/blog/2016/02/complete-tutorial-learn-data-science-scratch/>
7. https://www.tutorialspoint.com/data_mining/dm_classification_prediction.htm (Classification)



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY

Semester: IV-VAC- II: Principle of Information Security

Ins. Hrs. /Week:

Course Credit:2

Course Code:23PITVA42

OBJECTIVES

- To introduce fundamental concepts of security.
- To introduce and discuss the relevance of security in operating system, web service.
- To introduce fundamental concepts of secure electronic transactions.

UNIT- I: Introduction

Overview of Computer security, Security concepts, Need of Security- Threats- Deliberate Software Attacks, Deviation in Quality of Service, Attacks- Malicious Code, Brute Force, Timing Attack, Sniffers. **Access Control Mechanisms** - Access Control, Access Control Matrix, Access Control in OS- Discretionary and Mandatory Access Control, Role-based Access Control.

UNIT- II: Security Policies and Models

Confidentiality Policies, Bell- LaPadula Model, Integrity Policies, Biba Model, Clark-Wilson Models, Chinese wall Model, Waterfall Model.

UNIT- III: Malware

Viruses, Worms and Trojans. Topological Worms. Internet Propagation Models for Worms.

UNIT- IV: Security in Current Domains

Wireless LAN Security - WEP details. Wireless LAN Vulnerabilities – Frame Spoofing. Cellphone Security - GSM and UMTS Security. Mobile Malware - Bluetooth Security Issues.

UNIT –V: Secure Electronics Transactions

Framework, Strength and Weakness, Security in Current Applications : Online Banking , Credit Card Payment Systems. **Web Services Security:** XML, SOAP, SAML, RFID

COURSE OUTCOME

The Student will be able to :

1. Appreciate the common threats faced today
2. Interpret the foundational theory behind information security
3. Identify the potential vulnerabilities in software
4. Appreciate the relevance of security in various domains
5. Develop secure web services and perform secure e-transactions

TEXT BOOK(S):

1. Bernard Menezes, Network Security and Cryptography, Cengage Learning India, 2010.
2. M Bishop, Computer Security: Art and Science, Pearson Education, 2003.

REFERENCE BOOK(S):

1. E Whiteman and J Mattord, Principles of information security 4th edn, CengageLearning
2. V K Pachghare, Cryptography and information security, PHI
3. Behrousz A Forouzan, D Mukhopadhyay, Cryptography and network Security, McGraw Hill
4. W Mao, Modern Cryptography: Theory & Practice, Pearson Education, 2004.
5. C P. Fleeger and S L Fleeger, Security in Computing, 3/e, Pearson Education, 2003.

E_RESOURCES

1. <http://ndl.ethernet.edu.et>
2. <http://www.mim.ac.mw>
3. <https://research.lemoyne.edu>