



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC-An ISO 9001:2015 Certified Institution

SUNDARAKKOTTAI, MANNARGUDI-614016.

TAMILNADU, INDIA.

M.Sc., INFORMATION TECHNOLOGY CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(For the candidates admitted in the academic year 2023-2024)

CHOICE BASED CREDIT SYSTEM

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our College has moved to CBCS and implemented the grading system.

OUTCOME-BASED EDUCATION (OBE) LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help to formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme, maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility and provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

Some important aspects of the Outcome Based Education

Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC): A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE): Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

Generic Elective Courses: An elective course chosen generally from an **unrelated discipline/subject**, with an intention to seek exposure is called a Generic Elective. Generic Elective courses are designed for the students of other disciplines. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Non Major Elective (NME): A student shall choose at least two Non-major Elective Courses (NME) from outside his/her department.

Skill Enhancement Courses (SECs): These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Field Study/Industrial Visit/Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Postgraduate Programme:

Programme Pattern: The Post Graduate degree programme consists of **FIVE** vital components. They are as follows:

- Part –A : Core Course (Theory, Practicals) Core Industry Module, Core Project
- Part-B (i) : Elective courses
- Part-B (ii) : Non Major Elective, Skill Enhancement course, Professional Competency course
- Part-B (iii) : Internship
- Part –C : Extension activity

EXAMINATION

Continuous Internal Assessment (CIA):

PG - Distribution of CIA Marks

Passing Minimum: 50 %

Assignments – 3 = 30%

Tests- 3(Best 2 out of 3) = 50%

Seminar=10 %

Attendance= 10 %

Question Paper Pattern

Part A: includes two subsections

Part A 1 (10X1=10 marks)

One word question/ Fill in/ Match the following/True or False/ Multiple Choice Questions

Two Questions from Each unit

Part A 2(5X2=10 marks)

Short Answers

One question from Each unit

Total Marks - 20

Part B: (5X5=25 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers

Answer 3 out of 5 Questions

One Question from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S.No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/ Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	The learner distinguishes among different parts
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis/Creating	The learner creates a new product or point of view

WEIGHTAGE of K –LEVELS IN QUESTION PAPER

(Cognitive Level) K-LEVELS →	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
END SEMESTER EXAMINATIONS (ESE)	20	25		30			75
Continuous Internal Assessment (CIA)	20	25		30			75

QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment

PART	MARKS
PART –A I. (No choice ,One Mark) TWO questions from each unit (10x1=10)	20
II. (No choice, Two Mark) ONE question from each unit (5x2=10)	
PART –B (Either/ or type,5-Marks) ONE question from each unit (5x5=25)	25
PART –C (3 out of 5) (10Marks) ONE question from each unit (3x10=30)	30
Total	75

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3.00 Hours.				Max Mark :75			
K-LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
PART							
PART –A (One Mark, No choice) (10x1=10)	10						10
(2-Marks,No choice) (5x2=10)	10						10
PART –B (5-Marks)(Either/or type) (5x5=25)		5	10	10			25
PART –C (10 Marks)(3 out of 5) (3x10=30) Courses having only K5,K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	05	10	10	20	10	75

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

Grade Point Average (GPA) will be calculated from the first semester onwards for all semester. From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), respectively. These two are calculated by the following formulae:

$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$	$\text{WAM(Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$
Where, C _i is the Credit earned for the Course _i G _i is the Grade Point obtained by the student for the Course _i M _i is the marks obtained for the course _i and n is the number of Courses Passed in that semester.	

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

- i. The classification of final results shall be based on the CGPA, as indicated in Table-2.
- ii. For the purpose of Classification of Final Results, the candidates who earn the CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly the candidates who earn the CGPA between 8.00 and 8.99, 7.00 and 7.99, 6.00 and 6.99 and 5.00 and 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good', and 'Above Average' respectively.
- iii. Absence from an examination shall not be taken an attempt.

Table- 1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
Below 50	NA	RA

NA- Not Applicable, RA- Reappearance

The candidates performance in every current semester is indicated by **Semester Grade Point Average (SGPA)** and from the second semester onwards, the continuous performance including previous semester/s is indicated by **Cumulative Grade Point Average (CGPA)**

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average

* The candidates who have passed in the first appearance and within the prescribed duration of the PG Programme are eligible. If the candidate's Grade is O/A+ with more than one attempt, the performance is fixed as "Very Good"

Vision

Attaining Global Recognition in Computer Science Education and to Develop the Software Professionals

Mission

Imparting Quality Education through a Well – Designed Curriculum in tune with the Challenging Software Needs of the Industry

PROGRAMME OUTCOMES FOR M.Sc.,DEGREE PROGRAMMES

PO.No	Programme Outcomes <i>(Upon completion of the M.Sc.,Degree Programme, the Post graduate will be able to)</i>
PO-1	Disciplinary Knowledge: demonstrate in-depth knowledge and understanding of theories, policies, and practices in one or more disciplines that form a part of a Post Graduate program of study in Master of Science.
PO-2	Critical Thinking and Problem Solving: apply analytic thought to a body of knowledge, analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence, identify relevant assumptions or implications, formulate coherent arguments, critically evaluate practices, policies and theories by following scientific approach to knowledge development: solve problems and extrapolate the same to real life situation
PO-3	Information/digital literacy and Communication Skills: use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources, and use appropriate software for analysis of data: communicate thoughts and ideas analytically and effectively in writing and orally using appropriate media, and present complex information in a clear and concise manner to different groups.
PO-4	Research-related skills: conduct independent inquiry in a chosen scientific discipline, demonstrate sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; plan, execute and report the results of an experiment or investigation.
PO-5	Scientific reasoning and Reflective Thinking: analyse, interpret and draw conclusions from quantitative/qualitative data and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective; critically and sensibly evaluate life experiences, with self awareness and reflexivity of both self and society.
PO-6	Multidisciplinary Approach, Innovation and Entrepreneurship: propose novel ideas of interdisciplinary approach in providing better solutions and new ideas for the sustainable developments; identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.
PO-7	Moral and ethical awareness/reasoning: embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work, demonstrate the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights, appreciate environmental and sustainability issues, and adopt objective, unbiased and truthful actions in all aspects of work.
PO-8	Self directed Learning: work independently, identify appropriate resources required for a project, and manage a project till completion.
PO-9	Lifelong Learning: engage in continuous learning for professional growth and development, acquire knowledge and skills, adapt to changing environment and to changing trades and demands of work place through knowledge/skill development/reskilling.
PO-10	Multicultural Competence, Social Interaction and Effective Citizenship: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings, and demonstrate empathetic social concern and equity centred national development

M.Sc., INFORMATION TECHNOLOGY-PROGRAMME SPECIFIC OUTCOME

PSO No.	Program Specific Outcomes (M.Sc., Information Technology)
PSO1:	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
PSO2:	Gain critical understanding of hardware and software tools catering to the contemporary needs of IT industry
PSO3:	Design, Develop and test software systems for worldwide network of computer to provide solutions to real world problems.
PSO4:	Apply standard software engineering principles to develop viable solutions for information technology enabled services.
PSO5:	Analyze and recommend the appropriate IT infrastructure required for the implementation of a project.
PSO6:	Implement the business ideas in IT industry through e-commerce and Management information system concepts.
PSO7:	An ability to understand research methods used to collect and analyze data for decision making.



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M.Sc., INFORMATION TECHNOLOGY

**COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2023-2024)

ELIGIBILITY: 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 with 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 thereto

Sem	Part	Course	Course Code	Title of the Paper	Ins. Hours/ Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
I	Part A	Core Course- I	P23IT101	Python programming	6	4	1	-	1	5	3	25	75	100
		Core Course- II	P23IT102	Cryptography And Network Security	6	4	1	-	1	5	3	25	75	100
		Core Practical- I	P23IT103P	Python Programming Lab	6	-	-	6	-	3	3	25	75	100
	Part B(i)	Elective Course- I	P23ITE1A/ P23ITE1B/ P23ITE1C	Mobile Computing/ Principles of Compiler Design/ Social Networking	5	5	-	-	-	3	3	25	75	100
		Elective Course- II	P23ITE2A/ P23ITE2B/ P23ITE2C	Pervasive Computing/ Advanced Data Structures/ Object Oriented Systems Development	5	4	1	-	-	3	3	25	75	100
	Part B (ii)	NME-I			2	2	-	-	-	2	-	25	75	100
	TOTAL					30	19	3	6	2	21	-	-	-

Sem	Part	Course	Course Code	Title of the Paper	Ins. Hours/ Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
II	Part A	Core Course-III	P23IT204	Advanced Database Systems	6	4	1	-	1	5	-	25	75	100
		Core Course - IV	P23IT205	Open-Source Technologies	6	4	1	-	1	5	-	25	75	100
		Core Practical- II	P23IT206P	RDBMS Lab	6	-	-	6	-	3	-	25	75	100
	Part B(i)	Elective Course- III	P23ITE3A/ P23ITE3B/ P23ITE3C	Biometrics Techniques/ Digital Watermarking and Steganography/ Digital Image Processing	5	5	-	-	-	3	-	25	75	100
		Elective Course- IV	P23ITE4A/ P23ITE4B/ P23ITE4C	Human Computer Interaction/ Computer Security and Privacy/ Operating Systems	5	4	1	-	-	3	-	25	75	100
	Part B (ii)	NME-II			2	2	-	-	-	2	3	25	75	100
	Part B (iii)	Internship/Industrial Activity			-	-	-	-	-	-	-	-	-	-
		TOTAL			30	19	3	6	2	21	-	-	-	600
III	Part A	Core Course-V		J2EE Technologies	6	4	1	-	1	5	3	25	75	100
		Core Course-VI		Software Engineering	6	4	1	-	1	5	3	25	75	100
		Core Practical-III		J2EE Technologies Lab	6	-	-	6	-	3	3	25	75	100
		Core Industry Module		Data Science and Data Analytics	5	4	1	-	-	3	3	25	75	100
	Part B (i)	Elective Course- V		Internet of Things/ Intelligent Systems/ Virtual and Augmented Reality	5	4	1	-	-	3	3	25	75	100
	Part B (ii)	Skill Enhancement Course		Animation in Flash lab	2	2	-	-	-	2		25	75	100

Sem	Part	Course	Course Code	Title of the Paper	Ins. Hours/Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
	Part B (iii)	Internship/Industrial Activity			-	-	-	-	-	2	-	-	-	-
		TOTAL			30	18	4	6	2	23	-	-	-	600
IV	Part A	Core Course-VII		.Net	5	4	1	-	-	5	-	25	75	100
		Core Course-VIII		Artificial Intelligence	5	4	1		-	5	-	25	75	100
		Core Practical-IV		.Net Lab	6	-	-	6	-	3	-	25	75	100
		Core Project		Project with Viva Voce	8	-	2	6	-	7	-	25	75	100
	Part B(i)	Elective Course- VI		Research Methodology / Trends in Computing/ Introduction to Robotics	4	3	1	-	-	3	-	25	75	100
	Part B (ii)	Professional Competency Course		Computer Science for NET/SET	2	2	-	-	-	2	3	25	75	100
	Part C	Extension Activity			-	-	-	-	-	1	-	-	-	-
		TOTAL			30	13	5	12	-	26	-	-	-	600
		GRAND TOTAL			120	-	-	-	-	91				2400
* Extra Credit				MOOC/SWAYA M/NPTEL (Atleast one)	-	-	-	-	-	2	-	-	-	-
				Value Added Courses (Atleast one per year)	-	-	-	-	-	2	-	-	-	-

CREDIT DISTRIBUTION FOR M.SC., INFORMATION TECHNOLOGY

S.No	Part	Subject	Total Credits
1	Part A	Core Course [8 Courses X 5 Credits]	40
2		Core Practical [4 Courses X 3 Credits]	12
3		Core Project Work VIVA VOCE	7
4		Core Industry Module	3
5	Part B (i)	Elective Course [6 Courses X 3 Credits]	18
6	Part B (ii)	Non Major Elective [2 Course X 2 Credits]	4
7		Skill Enhancement Course [1 Courses X 2 Credits]	2
8		Professional Competency Course [1 Course X 2 Credits]	2
9	Part B (iii)	Internship	2
10	Part C	Extension Activity	1
Total Credit			91

Part A component and Part B (i) will be taken into account for CGPA calculation for the postgraduate programme and the other components of Part B and Part C have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the PG degree.

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
I		NME-I	P23NMEIT11	Web Design
II	Part B (ii)	NME-II	P23NMEIT22	Multimedia and its Applications

SEMESTER - I



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(For the candidates admitted in the academic year 2023 – 2024)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: I–CC-I: Python Programming

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code: P23IT101

OBJECTIVES

- To acquire programming skills in core Python
- To learn Strings and function
- To develop object oriented skills in Python

UNIT I: INTRODUCTION

(18 Hours)

Fundamental ideas of Computer Science - Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions – Loops and Selection Statements: Definite iteration: the for Loop - selection: if and if-else statements - Conditional iteration: the while Loop .

UNIT II: STRINGS AND TEXT FILES

(19 Hours)

Accessing Characters and substrings in strings - Data encryption-Strings and Number systems- String methods – Text - Lists and Dictionaries: Lists – Dictionaries – Design with Functions: A Quick review - Problem Solving with top-Down Design - Design with recursive Functions - Managing a Program's namespace - Higher-Order Functions

UNIT III: DESIGN WITH CLASSES

(20 Hours)

Getting inside Objects and Classes – Data-Modeling Examples – Building a New Data Structure – The Two – Dimensional Grid - Structuring Classes with Inheritance and Polymorphism - Graphical User Interfaces - The Behavior of terminal-Based programs and GUI-Based programs - Coding Simple GUI-Based programs - Windows and Window Components - Command Buttons and responding to events.

UNIT IV: WORKING WITH PYTHON PACKAGES

(17 Hours)

NumPy Library-Ndarray – Basic Operations – Indexing, Slicing and Iteration – Array manipulation Pandas –The Series – The DataFrame - The Index Objects – Data Visualization with Matplotlib – The Matplotlib Architecture – pyplot – The Plotting Window – Adding Elements to the Chart – Line Charts – Bar Charts – Pie charts

UNIT V: DJANGO

(16 Hours)

Installing Django – Building an Application – Project Creation – Designing the Data Schema - Creating an administration site for models - Working with QuerySets and Managers – Retrieving Objects – Building List and Detail Views.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to,

1. Comprehend the programming skills in python and develop applications using conditional branches and loop
2. Create python applications with strings and functions
3. Understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism
4. Evaluate the use of Python packages to perform numerical computations and data visualization
5. Design interactive web applications using Django

TEXT BOOK(S)

1. K.A. Lambert, “Fundamentals of Python: first programs”, Second Edition, Cengage Learning, 2018.
2. Fabio Nelli, “Python Data Analytics: With Pandas, NumPy, and Matplotlib”, Second Edition, Kindle Edition, 2018.
3. Antonio Mele, “Django 3 By Example”, Third Edition, 2020.

REFERENCE BOOK(S)

1. Jeff McNeil, “Python 2.6 Text Processing: Beginners Guide”, 2010, PacketPublications
2. Mark Pilgrim, “Dive into Python “, 2nd edition 2009, A press

E_RESOURCES

1. <https://www.computer-pdf.com/>
2. <https://rb.gy/mnhgz5>
3. <http://www.oreilly.com/programming/free/functional-programming-python.csp>



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

Semester: I–CC-II: Cryptography and Network Security

Ins. Hrs./Week:6

Course Credit:5

Course Code: P23IT102

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 – Play fair Cipher – Hill Cipher – Polyalphabetic Ciphers – One Time Pad. Transposition Techniques–Rotor Machines–Steganography.

UNIT II: BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARDS (18 Hours)

Traditional Block Cipher Structure-Stream Ciphers and block Ciphers – Motivation for the Feistel Cipher Structure – The Feistel 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 –SHA-3.

UNIT III: TRANSPORT LEVEL SECURITY (18 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 Payload – Combining Security Associations – Internet Key Exchange.

UNIT V: SYSTEM SECURITY

(18 Hours)

System Security: Intruders-Intrusion Detection-Password Management- Malicious Software: Types of Malicious Software(Malware)-Advanced Persistent Threat-Viruses- Worms-Spam E-mail, Trojans-SystemCorruption-Zombie, Bots - Information Theft - Keyloggers, Phishing, Spyware-Countermeasures-Distributed Denial of Service attacks- Firewalls: The Need for Firewalls-Firewall characteristics and AccessPolicy- 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. Analyze and design classical encryption techniques and block ciphers.
3. Acquire knowledge about Public Key cryptography.
4. Evaluate Hash Functions in network security.
5. Analyze about IP security, Wireless Network security.

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.

REFERENCE BOOK(S)

1. Johannes A. Buchaman, 2004, “Introduction to cryptography” (2nd edition), 2004. ISBN 0387207562, Springer Publications, United States.
2. Robert Collins,2017, “Network Security Monitoring: Basics for Beginners”.
3. William Stalings, 2016, “Network Security Essentials-Applications and Standards”,Sixth Edition,Pearson Publications, India.

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1. https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf
2. <https://annauniversityedu.blogspot.com/2020/08/cryptography-and-network-security-notes-AU.html>
3. <http://surya.ac.in/wp-content/uploads/2020/09/Unit-1-5-CS8792-CNS-Notes.pdf>



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

SUNDARAKKOTTAI, MANNARGUDI - 614016.
(For the candidates admitted in the academic year 2023 – 2024)

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

Semester: I–CP-I: Python Programming Lab

Ins. Hrs./Week: 6

Course Credit:3

Course Code: P23IT103P

COURSE OBJECTIVES

- To master the fundamentals of writing python scripts
- To create program using elementary data items
- To implement Python programs with conditionals and loops

EXERCISE

1. Program using elementary data items, lists, dictionaries and tuples
2. Program using conditional branches, loops
3. Program using functions
4. Program using classes and objects
5. Program using inheritance
6. Program using polymorphism
7. Program using Numpy
8. Program using Pandas
9. Program using Matplotlib
10. Program for creating dynamic and interactive web pages using forms

COURSE OUTCOME

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

1. Comprehend the programming skills in python and write scripts
2. Create python applications with elementary data items, lists, dictionaries and tuples
3. Implement the Object Oriented Programming concepts such as objects and classes, Inheritance and polymorphism
4. Assess the use of Python packages to perform numerical computations and perform data visualization
5. Create interactive web applications using Django

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: I–EC-I (A): Mobile Computing

Ins. Hrs. /Week:5

Course Credit:3

Course Code:P23ITE1A

OBJECTIVES

- To provide hands on experience in developing applications for distributed environments
- To understand the concepts of GSM and GPRS
- To understand the concepts of Android services and Android applications

UNIT I: INTRODUCTION

(15 Hours)

Mobile Computing-Mobility of Bits and Bytes – Networks – Middleware and Gateways – Developing Mobile Computing Applications–**Mobile Computing Architecture:** Architecture for Mobile Computing–Three-Tier Architecture-Mobile Computing through Internet–**Emerging Technologies:** Bluetooth – Radio Frequency Identification (RFID) -Wireless Broadband (WIMAX)- Mobile IP – Internet Protocol Version6 (IPV6)- Java Card.

UNIT II: GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM)

(15 Hours)

Global System for Mobile Communications - GSM Architecture–GSM Entities-Call Routing in GSM– GSM Addresses and Identifiers – Network Aspecting GSM –Mobility Management - GSM Frequency Allocation – Authentication and Security-**Short Message Service (SMS):** Mobile Computing Over SMS– Value Added Services through SMS- MMS.

UNIT III: GENERAL PACKET RADIO SERVICE (GPRS)

(15 Hours)

Introduction - GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations – Data Services in GPRS - Applications for GPRS–Limitations of GPRS.– Wireless Data – Third Generation Networks – Applications on 3G.

UNIT IV: GETTING STARTED WITH ANDROID

(15 Hours)

Android Definition-Android Versions-Features of Android-Architecture of Android – Activities, Fragments and Intents: Understanding Activities – Applying Styles and Themes to an Activity- Hiding the Activity Title- Displaying a Dialogue window-Intent-Fragments – Android User Interface: Understanding the Components of a screen- Adapting to Display Orientation– Designing User Interface with views – Displaying Pictures and Menus with Views – Data Persistence. Content Providers: Sharing Data in Android- Using a Content Provider- Predefined Query String Constants- Projections- Filtering- Sorting- Using the Content Provider.

UNIT V: MESSAGING

(15 Hours)

SMS Messaging- Sending SMS Messages- Receiving SMS Messages – **Location Based Services:** Displaying Maps- Creating the Project- Changing Views- Navigation-Getting Location- Monitoring Location – **Networking:** Consuming Web Services using HTTP-Downloading Binary Data –

Downloading Text Content - **Developing Android Services:** Creating Your Own Services-Performing Long-Running Tasks in a Service -Performing Repeated Tasks in a Service -Executing Asynchronous Tasks on Separate Threads Using Intent Service -Establishing Communication between a Service and an Activity - Binding Activities to Services -Understanding Threading.

Total Lecture Hours-75

COURSE OUTCOME

The students will be able to,

1. Apply the fundamental design paradigms and technologies to mobile computing applications.
2. Design effective mobile interfaces using human interaction principles.
3. Understand the role of mobile applications in software intensive systems.
4. Evaluate the usability of representative mobile devices such as smart phones and tablets.
5. Synthesize new knowledge in the area of mobile computing by using appropriate research methodologies and techniques.

TEXT BOOK(S)

1. Ashok K Talukder, Hasan Ahmed, Roopa R Yavagal, 2010, “Mobile Computing”, 2nd Edition, TataMcGraw Hill Publishing Company Limited, India.
2. Wei Meng Lee, 2012, “Beginning Android 4 Application Development”, Wiley India Pvt. Ltd, New Delhi.

REFERENCE BOOK(S)

1. Pradeep Kotari, 2014, “Android Application Development Black Book”, Dream tech Press.
2. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning.
3. Jochen Schiller, 2008, “Mobile Communications”, Pearson Education, India.
4. Reto Meir, 2012, “Professional Android 4 Application Development”, Wiley India Pvt. Ltd., New Delhi.

E-RESOURCES

1. https://books.google.co.in/books/about/Mobile_Computing.html?id=psAgAQAAIAAJ
2. <https://www.slideshare.net/mobile/ankurkumar983/mobile-computing-part1>
3. <https://www.google.com/amp/s/www.ncertbooks.guru/mobile-computing-pdf/amp/>
4. <https://www.javatpoint.com/mobile-computing>

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

Semester: I–EC-I(B): Principles of Compiler Design

Ins. Hrs./Week: 5

Course Credit: 3

Course Code: P23ITE1B

OBJECTIVES:

- Define the design and intrinsic functioning of compilers
- Identify the purpose and functions of phases of the compiler
- Describe the Contents and data structures for Symbol table with errors

UNIT- I: INTRODUCTION TO COMPILERS: (15 Hours)

Compilers - Analysis - Synthesis model of compilation - Analysis of the source program - The phases of a compiler - Cousins of the compiler - Compiler construction tools - Error handling.

UNIT- II: LEXICAL ANALYZER: (15 Hours)

Lexical analysis - Role of lexical analyzer - Tokens, Patterns and lexemes - Input buffering - Specification of tokens - Regular expressions - Recognition of tokens - Transition diagrams - Implementing a transition diagram - Finite Automata -Regular expression to NFA - Conversion of NFA to DFA

UNIT-III: SYNTAX ANALYZER: (15 Hours)

Syntax analysis - Role of parser - Context-free grammars - Derivations - Writing a grammar - Top-Down parsing - Recursive descent parsing - Predictive parsers - Non-recursive predictive parsers - Construction of predictive parsing tables -Bottom up parsing - Handles - Shift reduce parser - Operator precedence parsing- LR parsers - Canonical collection of LR (0) items -Constructing SLR parsing tables.

UNIT-IV: INTERMEDIATE CODE GENERATION (15 Hours)

Intermediate code generation - Intermediate languages - Graphical Representation - Three Address Code - Assignment statements – Boolean expressions - Flow of Control Statements - Case Statements -. Syntax directed translation of case statements

UNIT-V: CODE OPTIMIZATION AND CODE GENERATION (15 Hours)

An Organization for an Optimizing Compiler - the Principle sources of optimization - Function Preserving Transformations - Common Subexpression - Copy propagation - Optimization of basic blocks - The use of Algebraic identities-Loops in flow graphs - Code generation - issues in the design of a code generator-The target machine.

Total Lecture Hours-75

COURSE OUTCOMES:

On completion of the course, students will be able to

1. Understand the fundamentals of a compiler.
2. Get knowledge about the context-free grammars and various parsing techniques.
3. Understand the lexical analyzer and syntax analyzer of Compiler.
4. Understand the types and sources of errors, from the compilers perspective.
5. Know the procedures and principles involved in the machine code generation.

TEXT BOOK(S)

1. "Compilers : Principles, Techniques, and Tools", Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Second Edition, Pearson Addison Wesley, 2007.
2. Compiler Construction Principles and Practice – D.M.Dhamadhare, McMillanIndiaLtd., Madras, 1983.

REFERENCE BOOK(S)

1. Alfred V. Aho, Ravi Sethi and Jeffrey D Ullman, "Compilers, Principles, Techniques and Tools", Addison Wesley Longman (Singapore Pvt. Ltd.), 2011.
2. Alfred V. Aho, Jeffrey D Ullman, "Principles of Compiler Design", Addison Wesley, 1988.
3. David Galles, "Modern Compiler Design", Pearson Education, 2008

E-RESOURCES

1. https://www.vssut.ac.in/lecture_notes/lecture1422914957.pdf
2. https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPILER%20DESIGN%20NOTES.pdf
3. <https://www.vsm.edu.in/R-16-CSE-III-I/CD.pdf>

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

Semester: I–EC-I(C): Social Networking

Ins. Hrs./Week: 5

Course Credit: 3

Course Code: P23ITE1C

OBJECTIVES

- To learn about Social media, Social networking and Webcasts
- To understanding and building a Word Press Powered Website
- To analysis the Social Networking & Micro-Blogging.
- To learn and analysis the Widgets & Badges.
- To explore the importance of Website optimization.

UNIT I: INTRODUCTION

(15 Hours)

Social Media Strategy-Important First Decisions -Websites, Blogs - RSS Feeds Mapping -Preparation - Multimedia Items Gathering Content for Blog Posts RSS Feeds & Blogs-RSS Feeds-The Feed Reader-The Feed-Options for Creating an RSS Feed-Planning Feed-Blogs-Options for Starting. Blog and RSS Feed-Feed or Blog Content-Search Engine Optimization (SEO)-Feed Burner-RSS Feed and Blog Directories-An Optimization Plan for Blog or RSS Feed

UNIT II: BUILDING A WORD PRESS POWERED WEBSITE

(15 Hours)

Word Press as A CMS - Diversity of Word Press Sites-The Anatomy of a Word Press Site -a Brief Look at the Word Press Dashboard Planning - Site Themes Plug-ins setting up Sidebars Building Pages- Posting Blog Entries. Podcasting, Vidcasting, & Webcasting- Publishing Options for Podcast-Creating and Uploading Podcast Episodes-Publishing Podcast Optimizing Podcast- Webcasting

UNIT III: SOCIAL NETWORKING & MICRO-BLOGGING

(15 Hours)

Facebook-The Facebook Profile -Myspace LinkedIn-Twitter-Niche Social Networking Sites-Creating Own Social Network-Promoting Social Networking Presence- Social Bookmarking & Crowd-Sourcing - Social Bookmarking-A Social Bookmarking Strategy- Crowd-Sourced News Sites-Preparation And Tracking Progress Media Communities-Image Sharing Sites-Image Sharing Strategy-Video Sharing Sites-Video Sharing Strategy-Searching And Search Engine Placement-Connecting With Others.

UNIT IV: WIDGETS & BADGES:

(15 Hours)

Highlighting Social Web Presence-Sharing And Syndicating Content Making Site More Interactive-Promoting Products And Making Money-Using Widgets In Word Press-Widget Communities And Directories- Working Widgets Into Strategy Social Media Newsrooms-Building Social Media

Newsroom - Populating The Newsroom-Social Media News Releases-Social Media Newsroom Examples. More Social Tools-Social Calendars-Social Pages Wikis-Social Search Portals-Virtual Worlds.

UNIT V: WEBSITE OPTIMIZATION:

(15 Hours)

A Website Optimization Plan-Streamlining Web Presence-An Integration Plan- Looking to the Future-Life streaming: The Future of Blogging-Distributed Social Networking-Social Ranking, Relevancy, and —Defriending-Web 3.0 or The Semantic Web-Mobile Technology- Measuring Your Success-A Qualitative Framework-A Quantitative Framework-Tools to Help You Measure-Come to Your Own Conclusions

Total Lecture Hours:75

COURSE OUTCOMES

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

1. To understand, impart and summarize the concepts of Social media, Social networking and Webcasts
2. To comprehend, design and develop a Word Press Powered Website
3. To understand, implement and perform evaluation of Social Networking and Micro-Blogging
4. To collaborate, implement and analyze the Widgets and Badges in social networking environment
5. To understand, illustrate and perform evaluation of web optimization for social networks

TEXT BOOK(S)

1. Deltina hay —A Survival Guide To social media and Web 2.0 Optimization, Dalton Publishing, 2009

REFERENCE BOOK(S)

1. Miriam Salpeter —Social networking for Career Success, Learning Express, 2011.
2. Miles, Peggy, —Internet world guide to webcasting, Wiley, 2008 Professionals”, Wiley Publication, 2015.

E-RESOURCES

1. <https://ils.unc.edu/cws/Handouts/Social%20Networking/Social-Networking.pdf>
2. <https://www.techopedia.com/definition/4956/social-networking-site-sns>
3. https://www.tutorialspoint.com/internet_technologies/social_networking.htm



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

Semester: I-EC-II(A): Pervasive Computing

Ins. Hrs./Week:5

Course Credit:3

Course Code: P23ITE2A

OBJECTIVES

To provide an exposure on the technologies, tools and gadgets of Pervasive and Ubiquitous Computing.

UNIT I: PERVASIVE COMPUTING (15 Hours)

Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

UNIT II: DEVICE TECHNOLOGY (15 Hours)

Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

UNIT III: DEVICE CONNECTIVITY (15 Hours)

Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

UNIT IV: WAP AND BEYOND (15 Hours)

Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speechrecognition-Voice Standards-Speech applications-Speech and Pervasive Computing

UNIT V: PDA: (15 Hours)

Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of PervasiveComputing web applications-Pervasive application architecture

Total Lecture Hours- 75

COURSE OUTCOMES

On completion of the course, students will be able to

1. Understand the fundamentals of a Pervasive Computing.
2. Get knowledge about the Hardware and Software for Pervasive Computing.
3. Understand the architecture and Protocols for Pervasive Computing.
4. Understand the WAP Infrastructure and security issues.
5. Know the concepts of PDA and Pervasive Web application architecture.

TEXT BOOK(S)

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

REFERENCE BOOK(S)

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006

E-RESOURCES

1. <https://lecturenotes.net/home/view2/fundamentals-of-pervasive-computing-lecture-notes/8849>
2. <https://csenotescorner.blogspot.com/2018/01/cp5093-mobile-and-pervasive-computing.html>
3. <https://www.itu.int/en/Lists/consultation2015/Attachments/41/45.3104.pdf>



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

Semester: I-EC-II (B): Advanced Data Structures

Ins. Hrs. /Week: 5

Course Credit: 3

Course Code: P23ITE2B

OBJECTIVES

- To provide the knowledge of advanced data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

UNIT – I: INTRODUCTION (15 Hours)

Arrays – Singly Linked List – Circularly Linked List – Stack – Queues – List AbstractData Type (ADT) – Iterators – Graphs and Sorting 1- Graphs: Graph ADT– Data Structures for Graphs – Graph Traversals – Directed Acyclic Graphs – ShortestPaths – Minimum Spanning Tree - Sorting: Merge Sort – Quick Sort – Selection Sort.

UNIT – II: HASHING (15 Hours)

General Idea, Hash Function, Separate Chaining, Hash Tables without linked lists: Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Hash Tables in the Standard Library, Universal Hashing, Extendible Hashing.

UNIT – III: PRIORITY QUEUES (HEAPS) (15 Hours)

Model, Simple implementations, Binary Heap: Structure Property, Heap Order Property, Basic Heap Operations: insert, delete, Percolate down, Other Heap Operations.

UNIT – IV: TREES (15 Hours)

AVL: Single Rotation, Double Rotation, B-Trees. **Multi-way Search Trees**– Trees: Searching for an Element in a Tree, Inserting a New Element in a Tree, Deleting an Element from a Tree. **Red-Black Trees** – Properties of red-black trees, Rotations, Insertion, Deletion.

UNIT – V: GRAPHS ALGORITHMS (15 Hours)

Elementary Graph Algorithms: Topological sort, Single Source Shortest Path Algorithms: Dijkstra's, Bellman-Ford, All-Pairs Shortest Paths: Floyd-Warshall's Algorithm.

Total Lecture Hours- 75

COURSE OUTCOMES

On completion of the course, students will be able to

1. Understand the fundamentals of a Data Structures.
2. Get knowledge about the concepts of Hashing.
3. Understand the concepts of priority queues.
4. Understand the concepts of AVL and Trees.
5. Know the concepts of Graph algorithms.

TEXT BOOK(S)

1. Mark Allen Weis, Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, 4th Edition, 2014, Pearson.
2. Thomas H Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, 3rd Edition, 2009, The MIT Press.

REFERENCE BOOK(S)

1. Ellis Horowitz, Satraj Sahani and Rajasekharam, Fundamentals of Computer Algorithms, 2nd Edition, 2009, University Press Pvt. Ltd.
2. Reema Thareja, S. Rama Sree, Advanced Data Structures, Oxford University Press, 2018.

E-RESOURCES

1. <https://www.csc.lsu.edu/~kundu/dstr/1-intr.pdf>
2. <https://www.javatpoint.com/advance-data-structures>
3. <https://bphanikrishna.wordpress.com/advanced-data-structures/>

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



Semester: I–EC-II(C): Object Oriented Systems Development

Ins. Hrs./Week: 5

Course Credit:3

Course Code: P23ITE2C

OBJECTIVES

- Introduce the concept of Object-oriented design and understand the fundamentals of OOSD life cycle.
- Familiar with evolution of object-oriented model, classes and its notations
- Practice UML in order to express the design of software projects.

UNIT- I: FUNDAMENTALS OF OOSD (15 Hours)

Overview of Object-Oriented Systems Development: Two orthogonal views of software - OOSD methodology - Object basics: Object Oriented Philosophy- Objects – Attributes – Object response to messages – Encapsulation and information hiding – class hierarchy – Polymorphism – Object relationship and associations. OOSD life cycle: Software development process – OOSD Use case Driven Approach – Reusability.

UNIT-II: METHODOLOGY, MODELLING AND UML (15 Hours)

Object Oriented Methodologies: Rumbaugh et al.'s object modelling technique-The Booch methodology – The Jacobson et al. methodology – Patterns – Frameworks - The Unified approach. Unified Modelling Language: Static and dynamic models -- UML diagrams – UML class diagram – Use case diagram-UML dynamic modelling – packages and model organization.

UNIT- III: OBJECT ORIENTED ANALYSIS (15 Hours)

Object Oriented Analysis process: Business Object Analysis - Use case driven-object oriented analysis – Business process modelling – Use-Case model – Developing effective documentation. Classification: Classifications theory-Approaches for identifying classes – Noun phrase approach – Common class patterns approach – Use-Case Driven approach – Classes, Responsibilities, and Collaborators - Naming classes. Identifying object relationships, attributes, and methods: Association – Super-Sub class relationship – Aggregation – Class responsibility – Object responsibility.

UNIT- IV: OBJECT ORIENTED DESIGN (15 Hours)

Object Oriented Design Process and Design Axioms - OOD process- OOD axioms – Corollaries – Design patterns. Designing classes: Designing classes – Class visibility – Refining attributes – Designing methods and protocols – Packages and managing classes. Access layer: Object Store and persistence – DBMS-Logical and physical Database Organization and access control – Distributed Databases and Client Server Computing — Multi database Systems – Designing Access layer classes. View Layer: Designing view layer classes-Macro level process – Microlevel process – The purpose of view layer interface – Prototyping the user interface.

UNIT-V: SOFTWARE QUALITY

(15 Hours)

Software Quality Assurance: Quality assurance tests – Testing strategies – Impact of Object Orientation on Testing - Test Cases- Test Plan – Continuous testing. System Usability and Measuring User satisfaction: Usability Testing – User satisfaction test – A tool for analyzing user satisfaction. System Usability and Measuring User satisfaction: Introduction – Usability Testing.

Total Lecture Hours- 75

COURSE OUTCOMES

At the end of the course, the students will be able to:

1. Show how the object-oriented approach differs from the traditional approach to systems analysis and design.
2. Analyze, design, document the requirements through use case driven approach
3. Explain the importance of modelling and how the Unified Modelling Language (UML) represents an object-oriented system using a number of modelling views.
4. Recognize the difference between various object relationships: inheritance, association and aggregation.
5. Show the role and function of test cases, testing strategies and test plans in developing object-oriented software

TEXT BOOK(S)

1. Ali Bahrami, “Object Oriented Systems Development using UML”, McGraw-Hill, 2008
2. Booch Grady, Rumbaugh James, Jacobson Ivar, “The Unified modeling Language – User Guide, Pearson Education, 2006

REFERENCE BOOK(S)

1. Brahma Dathan, Sarnath Ramnath, “Object Oriented Analysis, Design and Implementation”, Universities Press, 2010.
2. Mahesh P. Matha, “Object-Oriented Analysis and Design Using UML”, PHI Learning Private Limited, 2012.
3. Rachita Misra, Chhabi Rani Panigrahi, Bijayalaxmi Panda, “Principles of Software Engineering and System Design”, Yesdee Publishing 2019.

E-RESOURCES

1. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_system.htm
2. <https://www.w3computing.com/systemsanalysis/object-oriented-systems-nalysisdesign/>
3. <https://www.geeksforgeeks.org/steps-to-analyze-and-design-object-oriented-system/>

SEMESTER II

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., INFORMATION TECHNOLOGY**

Semester: II–CC-III: Advanced Database Systems

Ins. Hrs./Week:6

Course Credit:5

Course Code: P23IT204

OBJECTIVES

- Acquire Knowledge of Database Models, Applications of Database
- Understand the design of Distributed Databases.
- Understand the emerging Database Models, Technologies and Applications

UNIT-I: RELATIONAL AND PARALLEL DATABASE DESIGN (18 Hours)

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: DISTRIBUTED AND OBJECT BASED DATABASES (18 Hours)

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: SPATIAL DATABASE (18 Hours)

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: XML DATABASES (18 Hours)

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

UNIT-V: TEMPORAL DATABASES (18 Hours)

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 Lecturer Hours:90

COURSE OUTCOMES

At the end of the course, the students will be able to:

- Acquired knowledge for developing holistic solutions based on database systems/database techniques.
- Normalize relational database design of an application
- Critically assess new developments in database technology
- Know about the Various Data models and Works on Database Architecture
- Interpret and explain the impact of emerging database standards

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://www.simplilearn.com/tutorials/sql-tutorial/what-is-normalization- in-sql>
- 2.<https://www.tutorialspoint.com/Spatial-Databases>
- 3.<https://www.oracle.com/database/spatial/>
4. <https://nptel.ac.in/courses/106/106/106106093/>



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: II-CC-IV: Open-Source Technologies

Ins. Hrs./Week: 6

Course Credit:5

Course Code: P23IT205

OBJECTIVES

- To understand Open Source Programming concepts
- To build applications based on Open Source Software
- To understand the basic concepts of PHP

UNIT-I: INTRODUCTION

(18 Hours)

Introduction to Open-Source: Open Source, Need and Principles of OSS, Open- Source Standards, Requirements for Software, OSS success, Free Software, Examples, Licensing, Free Vs. Proprietary Software, Free Software Vs. Open- Source Software, Public Domain. History of free software, Proprietary Vs Open- Source Licensing Model, use of Open- Source Software, FOSS does not mean no cost. History: BSD, the Free Software Foundation and the GNU Project.

UNIT- II: OPEN-SOURCE PRINCIPLES AND METHODOLOGY

(18 Hours)

Open-Source History, Open Source Initiatives, Open Standards Principles, Methodologies, Philosophy, Software freedom, Open-Source Software Development, Licenses, Copyright vs. Copy left, Patents, Zero marginal cost, Income-generation Opportunities, Internationalization. Licensing: What Is A License, How to create your own Licenses, Important FOSS Licenses (Apache,BSD, PL, LGPL), copyrights and copy lefts, Patent.

UNIT-III: OPEN-SOURCE PROJECTS

(18 Hours)

Starting and maintaining own Open-Source Project, Open-Source Hardware, Open-Source Design, Open-source Teaching, Opensource media. **Collaboration:** Community and Communication, Contributing to OpenSource Projects Introduction to GitHub, interacting with the community on GitHub, Communication and etiquette, testing open-source code, reporting issues, contributing code. Introduction to Wikipedia, contributing to Wikipedia or contributing to any prominent open-source project of student's choice

UNIT- IV: OPEN-SOURCE ETHICS AND SOCIAL IMPACT

(18 Hours)

Open source vs. closed source, Open-source Government, Ethics of Open-source, Social and Financial impacts of open-source technology, Shared software, Shared source, Open Source as a Business Strategy

UNIT-V: UNDERSTANDING OPEN-SOURCE ECOSYSTEM

(18 Hours)

Open-Source Operating Systems: GNU/Linux, Android, Free BSD, Open Solaris. Open-Source Hardware, Virtualization Technologies, Containerization Technologies: Docker, Development tools, IDEs, Debuggers, Programming languages, LAMP, Open-Source Database technologies

Total Lecturer Hours:90

COURSE OUTCOMES:

At the end of the course, the students will be able to:

1. Can identify the licensing of open source systems and make decisions on their use, based on an understanding of the legal, economical and technical issues.
2. Can find open source projects related to a given development problem
3. Differentiate between Open Source and Proprietary software and Licensing.
4. Recognize the applications, benefits and features of Open-Source Technologies

Gain knowledge to start, manage open-source projects

TEXT BOOK(S)

1. “Open-Source Technology”, Kailash Vadera & Bhavyesh Gandhi, University Science Press, Laxmi Publications, 2009
2. “Open-Source Technology and Policy”, Fadi P. Deek and James A. M. McHugh, Cambridge University Press, 2008.
3. “Perspectives on Free and Open-Source Software”, Clay Shirky and Michael Cusumano, MIT press.

REFERENCE BOOK(S)

- 1 “Understanding Open Source and Free Software Licensing”, Andrew M. St. Laurent, O’Reilly Media.
- 2 “Open Source for the Enterprise”, Dan Woods, Gautam Guliani, O’Reilly Media

E-RESOURCES

1. <http://kernel.org>
2. <https://opensource.org/>
3. <http://www.linuxfoundation.org/>

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

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the candidates admitted in the academic year 2023 – 2024)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: II–CP-II: RDBMS Lab

Ins. Hrs./Week:6

Course Credit:3

CourseCode: P23IT206P

OBJECTIVES

- To learn and implement SQL& PL/SQL.
- To understand the concepts of Cursors.
- To create triggers

EXERCISE

1. DDL Commands
2. DML Commands
3. DCL Commands
4. Usage of Sub Queries in DML and Create-SQL
5. Solving queries using built-in functions
6. Simple programs in PL/SQL block
7. Exception Handling in PL/SQL
8. Programs using Implicit Cursors
9. Programs using Explicit Cursors
10. Procedures & User-defined functions
11. Creation of Triggers

COURSE OUTCOMES

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

1. Choose appropriate SQL queries and PL/SQL blocks for the database.
2. Implement SQL and PL/SQL blocks for the given problem effectively.
3. Analyse the problem and Exceptions using queries and PL/SQL blocks.
4. Validate the database for normalization using SQL and PL/SQL blocks.
5. Design Database tables, create Procedures, user-defined functions and Triggers.



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

Semester: II–EC-III (A): Biometrics Techniques

Ins. Hrs. /Week:5

Course Credit:3

Course Code: P23ITE3A

OBJECTIVES

- To understand the basics of Biometrics and its functionalities
- To learn the role of biometric in the organization
- To expose the concept of IRIS and sensors

UNIT- I: INTRODUCTION

(15 Hours)

Person Recognition – Biometric systems –Biometric functionalities: verification, identification – Biometric systems errors - The design cycle of biometric systems – Applications of Biometric systems – Security and privacy issues.

UNIT-II: FINGER PRINT AND FACIAL RECOGNITION

(15 Hours)

FINGERPRINT : Introduction – Friction ridge pattern- finger print acquisition :sensing techniques ,image quality –Feature Extraction –matching –indexing. FACE RECOGNITION: Introduction –Image acquisition: 2D sensors ,3D sensors- Face detection- Feature extraction -matching.

UNIT-III: IRIS AND OTHER TRAITS

(15 Hours)

Design of an IRIS recognition system-IRIS segmentation- normalization – encoding and matching IRIS quality –performance evaluation –other traits- ear detection –ear recognition –gait feature extraction and matching –challenges- hand geometry –soft biometrics.

UNIT-IV: BEHAVIORAL BIOMETRICS

(15 Hours)

Introduction –Features- classification of behavioral biometrics –properties of behavioral biometrics – signature –keystroke dynamics –voice- merits –demerits –applications- error sources-types –open issues –future trends.

UNIT-V: APPLICATIONS AND TRENDS

(15 Hours)

Application areas: surveillance applications- personal applications –design and deployment -user system interaction-operational processes – architecture –application development –design validation disaster recovery plan-maintenance-privacy concerns.

Total Lecturer Hours :75

COURSE OUTCOMES:

- At the end of the course, the student should be able to
- Identify the various Biometric technologies.
 - Design of biometric recognition for the organization.
 - Develop simple applications for privacy.
 - Understand the need of biometric in the society

TEXT BOOK(S)

1. James wayman, Anil k. Jain, Arun A. Ross, Karthik Nandakumar, —Introduction to Biometrics, Springer, 2011
2. John Vacca "Biometrics Technologies and Verification Systems" Elsevier 2007
3. James Wayman, Anil Jain, David MAltoni, DasioMaio(Eds) "Biometrics Systems Technology", Design and Performance Evaluation. Springer 2005

REFERENCE BOOK(S)

1. Khalid saeed with Marcin Adamski, Tapalina Bhattasali, Mohammed K. Nammous, Piotr panasiuk, mariusz Rybnik and soharab H.Sgaikh, —New Directions in Behavioral Biometrics, CRC Press 2017
2. Paul Reid "Biometrics For Network Security "Person Education 2004
3. Shimon K. Modi, —Biometrics in Identity Management :concepts to applications, Artech House 2011

E-RESOURCES

1. https://www.tutorialspoint.com/biometrics/biometrics_quick_guide.htm
2. https://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/Biometrics/BiometricUnit-1.pdf
3. https://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/Biometrics/BiometricUnit-1.pdf



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., INFORMATION TECHNOLOGY

Semester: II–EC-III(B): Digital Watermarking and Steganography

Ins. Hrs. /Week: 5

Course Credit:3

Course Code: P23ITE3B

OBJECTIVES

- To provide the importance of digital watermarking and Steganography
- To discuss the properties of watermarking and steganography systems
- To discuss the different models of watermarking and steganography
- To understand the various evaluation metrics
- To examine various applications of watermarking and steganography

UNIT I : INTRODUCTION

(15 Hours)

Information Hiding, Steganography, and Watermarking. History of Watermarking. History of Steganography, Importance of Digital Watermarking. Importance of Steganography

UNIT II : STEGANOGRAPHY

(15 Hours)

Steganographic Communication, The Channel, The Building Blocks, Notation and Terminology, Information - Theoretic Foundations of Steganography, Cachin's Definition of Steganographic Security, Practical Steganographic Methods, Statistics Preserving Steganography, Model-Based Steganography, Steganalysis Scenarios, Detection, Forensic Steganalysis, The Influence of the Cover Work on Steganalysis, Some Significant Steganalysis Algorithms, LSB Embedding and the Histogram Attack.

UNIT III : WATERMARKING

(15 Hours)

Properties – Evaluating watermarking systems. Notation – Communications – Communication based models – Geometric models – Mapping messages into message vectors – Error correction coding – Detecting multi-symbol watermarks – Attacks

UNIT IV: MODELS OF WATERMARKING

(15 Hours)

Notation, Communications, Components of Communications Systems, Classes of Transmission Channels, Secure Transmission, Communication-Based Models of Watermarking, Basic Model, Watermarking as Communications with Side Information at the Transmitter, Watermarking as Multiplexed Communications, Geometric Models of Watermarking, Distributions and Regions in MediaSpace, Marking Spaces, Modeling Watermark Detection by Correlation, Linear Correlation, Normalized Correlation, Correlation Coefficient.

UNIT V APPLICATIONS

(15 Hours)

Applications of Watermarking, Broadcast Monitoring, Copyrights, Proof of Ownership, Transaction Tracking, Content Authentication, Copy Control, Device Control, Legacy Enhancement. Applications of Steganography, Steganography for Dissidents, Steganography for Criminals

Total Lecturer Hours:75

COURSE OUTCOMES

Upon Completion of the course, the students will be able to

- Discuss the need for watermarking and steganography
- Distinguish between watermarking and steganography
- Elaborate on the various models of watermarking and steganography.
- Point out various steganalysis algorithms.
- Show how watermarking and steganography can be applied to various applications and

TEXT BOOK(S)

1. Ingemar J. Cox, Mathew L. Miler, Jeffrey A. Blom, Jesica Fridrich, Ton Kalker, —Digital Watermarking and Steganography, Morgan Kaufmann Publishers, New York, 2008.
2. Ingemar J. Cox, Mathew L. Miler, Jeffrey A. Blom, —Digital Watermarking, Morgan Kaufmann Publishers, New York, 2003
3. Ingemar Cox, Mathew Miler, Jeffrey Blom, Jesica Fridrich and Ton Kalker, —Digital Watermarking and Steganography, Morgan Kaufmann Publishers, Nov 2007.

REFERNCE BOOK(S)

1. Juergen Seits, —Digital Watermarking for Digital Medial, IDEA Group Publisher, New York, 2005.
2. Jesica Fridrich, —Steganography in Digital Media: Principles, Algorithms, and Applications, Cambridge University press, 2010.
3. Michael Arnold, Martin Schmucker, Stephen D. Wolthusen, —Techniques and Aplications of Digital Watermarking and Contest Protection, Artech House, London, 2003.

E-RESOURCES

1. <https://www.albany.edu/~goel/classes/spring2007/itm604/notes/steganography.pdf>
2. http://wiki.cas.mcmaster.ca/index.php/Steganography_and_Digital_Watermarking
3. https://www.fi.muni.cz/usr/gruska/crypto13/crypto_11.pdf



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

Semester: II–EC-III (C): Digital Image Processing

Ins hrs / Week:5

Course Credit:3

Course Code: P23ITE3C

OBJECTIVES

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

UNIT- I: CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS (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-Color Images.

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-DDFT- 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 Filters:** 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 Lecturer Hour=75

COURSE OUTCOME

The students will be able to,

1. Explain the concepts, methods and algorithms of digital image processing
2. Understand the concepts of image transformation
3. Analyze about image enhancement
4. Gain the knowledge of KL transform of image.
5. Describe about image restoration
6. Understand the concept of image compression techniques

TEXT BOOK(S)

1. Anil K. Jain, 2015, “Fundamentals of Digital Image Processing”, 1st Edition, Pearson Education, NewDelhi.
2. Gonzalaz R and Wintz P, 1987, “Digital Image Processing”, 2nd Edition, 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”, Tata McGraw Hill Education Pvt. Ltd, India.
2. Kenneth Castleman. R, 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://www.iare.ac.in/sites/default/files/lecture_notes/DIP-LECTURE_NOTES.pdf
2. https://mrcet.com/downloads/digital_notes/ECE/IV%20Year/6.Digital%20Image%20Processing.pdf
3. https://www.cet.edu.in/noticefiles/272_Digital-Image-Processing.pdf



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

Semester: II–EC-IV (A): Human Computer Interaction

Ins. Hrs. /Week:5

Course Credit:3

Course Code:P23ITE4A

OBJECTIVES

- To describe the concepts of Human Computer Interaction
- To explain about the various models that can be used for designing systems
- To know about concepts of need for computers and evaluate the use of computers

UNIT-I: DESIGN PROCESS

(15 Hours)

Humans – Information process – Computer – Information Process – Differences and Similarities between them – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms– Designing of Interactive systems – Usability – Paradigm shift – Interaction design basics – Design Process – Scenarios – Users need – Complexity of design.

UNIT-II: DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS

(15 Hours)

Software Process – Usability engineering – Issue based Information systems – Iterative design practices – Design rules – maximum usability – Principles – Standards and guidelines – Design patterns – Programming Tools – Windowing systems – Interaction tool kit – User Interface management system – Evaluation techniques – evaluation design – Evaluating implementations – Observational Methods.

UNIT-III: MODELS

(15 Hours)

Universal design principles – Multimodal systems – User Support – Presentation and Implementation Issues – types – requirements – approaches – Cognitive model – Hierarchical model – Linguistic model – physical and device models – Socio-technical models – Communication and Collaboration models – Task models – Task analysis and design

UNIT-IV: EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI

(15 Hours)

Basic Design structure – Single independent variable – multiple independent variable – factorial design – split-plot design – random errors – experimental procedure – Statistical analysis – T tests – Analysis of Variance test – Regression – Chi-Square test – Survey – Probabilistic sampling – Non-probabilistic sampling – developing survey questions.

UNIT-V: THEORIES

(15 Hours)

Dialogue notations and design – Dialogue need – dialogue design notations – Graphical – Textual - representing dialogue – formal descriptions – Dialogue analysis – System models – Interaction models – relationship with dialogue – Formalisms – Formal notations – Interstitial behavior – Virtual reality – Modeling rich interaction – Status Event analysis – Properties – Rich contexts – Sensor-based systems – Groupware – Applications – Ubiquitous computing – Virtual reality.

Total Lecture Hours- 75

COURSE OUTCOMES

The students will be able to,

4. Understand the concepts of design process
5. Understand the appropriate design and evaluation of interactive systems
6. Interpret the Statistical Analysis Of HCI
7. Implement basic design and evaluation of interactive systems in HCI
8. Describe about the theories in HCI

TEXT BOOK(S)

1. Alan Dix, Janet Finlay, 2004, Gregory Abowd, Russell Beale, Human Computer Interaction, Third Edition, Prentice Hall, Hoboken, New Jersey.
2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, 2010, Research Methods in Human-Computer Interaction, Second Edition, Wiley, Hoboken, New Jersey.
3. Human-Computer Interaction, 2019, Samit Bhattachatya, -Centric Computing Design, First Edition, McGraw Hill Publication, Pennsylvania Plaza New York City.

REFERENCE BOOK(S)

1. Ben Shneiderman and Catherine Plaisant, 2009, Designing the User Interface: Strategies for Effective Human-Computer Interaction, Fifth Edition, Addison-Wesley Publishing, Boston.
2. Martin Helander, Landauer. T.K, 1997, Handbook of Human-Computer Interaction, Second Edition, Elsevier Science Ltd, Amsterdam, Netherlands.

E-RESOURCES

1. https://www.iare.ac.in/sites/default/files/lecture_notes/HCI%20LECTURE%20NOTES.pdf
2. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SIT1401.pdf
3. <https://mrcet.com/pdf/Lab%20Manuals/IT/R15A0562%20HCI.pdf>
4. <https://www.cl.cam.ac.uk/teaching/1011/HCI/HCI2010.pdf>

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

Semester: II–EC-IV (B): Computer Security and Privacy

Ins. Hrs./Week: 5

Course Credit: 3

Course Code: P23ITE4B

OBJECTIVES

- To study how threats materialize into attacks.
- To find information about threats, vulnerabilities and attacks.
- To study typical threats, attacks and exploits and the motivations behind them.

UNIT I: INTRODUCTION TO CYBER SECURITY (15 Hours)

Introduction -Computer Security - Threats -Harm - Vulnerabilities – Control-Authentication - Access Control and Cryptography - Web—User Side - Browser Attacks - Web Attacks-TargetingUsers - Obtaining User or Website Data - Email Attacks

UNIT II: SECURITY IN OPERATING SYSTEM & NETWORKS (15 Hours)

Security in Operating Systems - Security in the Design of Operating Systems -Rootkit -Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT III: DEFENCES SECURITY COUNTER MEASURES (15 Hours)

Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases -Reliability and Integrity - Database Disclosure - Data Mining and Big Data.

UNIT IV: PRIVACY IN CYBERSPACE (15 Hours)

Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining -Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies- Where the Field Is Headed.

UNIT V: MANAGEMENT AND INCIDENTS (15 Hours)

Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster - Emerging Technologies - The Internet of Things - Economics - Electronic Voting - Cyber Warfare- Cyberspace and the Law - International Laws - Cyber crime - Cyber Warfare and Home Land Security.

Total Lecturer Hours: 75

COURSE OUTCOMES

At the end of the course, the students will be able to:

1. Enrich the Knowledge about Cyber security
2. Demonstrate the Security in Operating Systems
3. Understand cryptography in network security
4. Study privacy in cyberspace
5. Able to understand cybercrime and incidents

TEXT BOOK(S)

1. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition , Pearson Education , 2015
2. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.
3. Martti Lehto, Pekka Neittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015

E-RESOURCES

1. <https://crysp.uwaterloo.ca/courses/cs489/F07-lectures/lecture01.pdf>
2. <https://cups.cs.cmu.edu/soups/2005/2005tutorials/garfinkel-hour1.pdf>

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

Semester: II–EC-IV(C): Operating Systems

Ins. Hrs./Week: 5

Course Credit: 3

Course Code: P23ITE4C

OBJECTIVES

- To study the characteristics of Multiprocessor and Multi computer
- To understand the advance concepts of distributed operating systems
- To gain knowledge on the design concepts of data base operatingsystems and mobile operating systems

UNIT – I: MULTIPROCESSOR OPERATING SYSTEMS (15 Hours)

System Architectures- Structures of OS – OS design issues –Process synchronization – Process Scheduling and Allocation- memory management.

UNIT – II: DISTRIBUTED OPERATING SYSTEMS (15 Hours)

System Architectures- Design issues – Communication models –clock synchronization – mutual exclusion – election algorithms- Distributed Deadlock detection.

UNIT – III: DISTRIBUTED SCHEDULING (15 Hours)

Distributed shared memory - Distributed File system – Multimedia file systems -File placement – Caching

UNIT – IV: DATABASE OPERATING SYSTEMS (15 Hours)

Requirements of Database OS – Transaction process model – Synchronization primitives - Concurrency control algorithms

UNIT – V: MOBILE OPERATING SYSTEMS (15 Hours)

ARM and Intel architectures - Power Management - Mobile OS Architectures - Underlying OS - Kernel structure and native level programming – Runtime issues- Approaches to power management

Total Lecturer Hours: 75

COURSE OUTCOMES

At the end of the course, the students will be able to:

- Enrich the Knowledge about advance concepts in OS
- Demonstrate the various issues in distributed operating systems
- Identify the different features of data base operating systems
- Able to develop modules for Mobile devices
- Able to develop OS for distributed operating system

TEXT BOOK(S)

1. Mukesh Singhal and Niranjan G. Shivaratri, “Advanced Concepts in Operating Systems Distributed, Database, and Multiprocessor Operating Systems”, Tata McGraw-Hill, 2001
2. A S Tanenbaum, Distributed Operating Systems, Pearson Education Asia, 2001

REFERENCE BOOK(S)

1. Source Wikipedia, Mobile Operating Systems, General Books LLC, 2010
2. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", Wiley, Eighth Edition, 2008.

E-RESOURCES

1. <https://www.javatpoint.com/distributed-operating-system>
2. <https://www.w3schools.in/operating-system/distributed-system>

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(For the candidates admitted in the academic year 2023 – 2024)

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

Semester: II VAC-I Green Computing

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: P23ITVA1

OBJECTIVES

- To explain the role of issues in Green Computing.
- To describe the basic methodology concepts, Reengineering with Green Computing.
- To understand the overview of Green supply chain.

UNIT-I: OVERVIEW AND ISSUES

(6 hours)

Introduction- An overview and Issues related to it: Problems- Toxins- Power Consumption- Equipment Disposal- Company's Carbon Footprint- Measuring and Exercising projects- Define your Borders- Set a Baseline- How to track and analyze data- Other ways to reduce the occurring issues- Hardware- Power. Current Initiatives and Standards: Global Initiatives- Task Forces.

UNIT -II: MINIMIZING POWER USAGE

(6 hours)

Objectives- Introduction- Power Problems- Monitoring Power Usage- Servers- Low-Cost Options- Reducing Power Use- Data De-duplication- Virtualization- Management- Bigger Drives- Involving the Utility Company- Low-Power Computers- PCs, Linux- Components- Servers- Computer Settings- Storage- Monitors- Power Supplies- Wireless Devices- Software.

UNIT -III: CHANGING THE WAY OF WORK

(6 hours)

Objectives-Old Behaviors- Starting at the Top-Process Reengineering with Green in Mind- Analyzing the Global Impact of Local Action-. Steps: Water- Recycling-Energy-Pollutants- Teleworkers and Outsourcing: Telecommuting-Outsourcing-How to Outsource.

UNIT -IV: GOING PAPERLESS

(6 hours)

Objectives-Paper Problems-Paper and Office- Going Paperless-Organizational Realities-Changing Over-Paperless Billing-Handheld Computers vs. the Clipboard-Unified Communications-Intranets- Building an Intranet-Microsoft Office SharePoint Server 2007-Electronic Data Interchange (EDI)- Nuts and Bolts- Value Added Networks-Advantages-Obstacles.

UNIT V: GREENING YOUR INFORMATION SYSTEMS

(6 hours)

Introduction-Initial Improvement Calculations-Selecting Metrics- Tracking Progress-Change Business Processes- Paper Reduction- Green Supply Chain-Improve Technology Infrastructure-. Reduce PCs and Servers-Shared Services-Hardware Costs-Cooling.

Total Lecturer Hours: 75

COURSE OUTCOME

1. Understand the overview and Issues in Green Computing
2. Implement the Virtualization using minimize the duplication.
3. Understand the Process Reengineering with Green Computing.
4. Implement methodology for Going Paperless
5. Analyze the Green supply chain technology.

TEXT BOOK(S)

1. Toby Velte, Anthony Velte, Robert Elsenpeter, "Green IT", McGraw Hill, 2008.
2. Alvin Galea, Michael, Mike Ebberts "Green Data Center: Steps for Journey" Shroff Publishers and Distributors, 2011.

REFERENCE BOOK(S)

1. Bud E. Smith, "Green Computing Tools and Techniques for Saving Energy", Money and Resources, CRC Press 2014.
2. Salahudin S. Sajan, "Introduction to Green Computing", Published by :NIRALI PRAKASHAN, Feb 2019.

E-RESOURCES

1. <https://old.mu.ac.in/wp-content/uploads/2021/06/USIT205-Green-Computing.pdf>
2. <https://www.himpub.com/documents/Chapter1765.pdf>

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(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the candidates admitted in the academic year 2023 – 2024)

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

Semester: I NME-I Web Design

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:P23NMEIT11

OBJECTIVES :

- To understand the concepts of Internet.
- To understand the basic concepts of HTML and DHTML.
- To understand the basic concepts of Table, Forms and Frames.

UNIT I : Web Design Principles

(6 hours)

Basic principles involved in developing a web site -Planning process - Five Golden rules of web designing - Designing navigation bar - Page design - Home Page Layout - Design Concept.

UNIT II :Basics in Web Design

(6 hours)

Brief History of Internet - What is World Wide Web - Why create a web site - Web Standards.

UNIT III: Introduction to HTML

(6 hours)

What is HTML - HTML Documents - Basic structure of an HTML document - Creating an HTML document -

UNIT IV: HTML Tags

(6 hours)

Mark up Tags - Heading -Paragraphs - Line Breaks -HTML Tags. **Elements of HTML:** Introduction to elements of HTML -Working with Text - Working with Lists.

UNIT V: HTML Controls

(6 hours)

Tables and Frames - Working with Hyperlinks, Images and Multimedia - Working with Forms and controls.

Total Lecturer Hours: 30

COURSE OUTCOME

1. Understand the Internet Concepts and its Technologies.
2. Describe importance of HTML Tags using Designing Home Page.
3. Use and Examine Ordered and Unordered Lists using HTML Documents.
4. Understand the Table Handling , Frames and Forms in web page
5. Understand the concepts of CSS using in Web Page.

TEXT BOOK(S)

- 1 .Kogent Learning Solutions Inc. HTML 5 in simple steps Dreamtech Press A beginner's guide to HTML NCSA,14th May,2003
2. Murray,Tom/Lynchburg Creating a Web Page and Web Site College,2002

REFERENCE BOOK(S)

- 1 .Steven M. Schafer HTML, XHTML, and CSS Bible, 5ed Wiley India John Duckett Beginning HTML, XHTML, CSS, and JavaScript Wiley India.

E-Resources:

1. <https://bit.ly/3e6ZrS>
2. <https://bit.ly/3h4e0bp>
3. <https://bit.ly/2QAZa1d>



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

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the candidates admitted in the academic year 2023 – 2024)

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

Semester: II NME-II Multimedia and its Applications

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: P23NMEIT22

COURSE OBJECTIVE

1. To introduce the students the concepts of Multimedia Images & Animation.
2. To introduce Multimedia authoring tools
3. To understand the role of Multimedia in Internet

UNIT I : Introduction

(6 hours)

What is Multimedia?–Introduction to making Multimedia–Macintosh and Windows
Production platforms – Basic Software tools.

UNIT II : Multimedia Tools

(6 hours)

Making Instant Multimedia–Multimedia authoring tools–Multimedia building blocks–Text– Sound.

UNIT III: Animation

(6 hours)

Images–Animation–Video.

UNIT IV : Internet

(6 hours)

Multimedia and the Internet–The Internet and how it works–Tools for World Wide Web–
Designing for the World Wide Web.

UNIT V: Multimedia Systems

(6 hours)

High Definition Television and Desktop Computing –Knowledge based Multimedia systems.

Total Lecturer Hours: 30

COURSE OUTCOME:

1. Describe the Software tools and objects of Multimedia systems.
2. Implement various multimedia tools.
3. Use Animation Tools in Multimedia Applications.
4. Recognize the applications of Multimedia in Internet.
5. Understand the Multimedia Systems in Desktop Computing.

TEXT BOOK

1. TayVaughan, “Multimedia making it work”,Fifth Edition,Tata McGraw Hill.
2. JohnF.Koegel Bufford,“Multimedia Systems”, Pearson Education.

REFERENCE BOOK

1. Judith Jeffloate,“Multimedia in
2. Practice(TechnologyandApplications)”,PHI,2003.

E-RESOURCES

1. https://www.w3schools.com/html/html_media.asp
2. https://www.tutorialspoint.com/html/html_embed_multimedia.htm