SYLLABUS FOR B.E. VII &VIII SEMESTER

(With effect from 2017 - 18 Academic year)

ಪಠ್ಯಕ್ರಮ

(ಶೈಕ್ಷಣಿಕವರ್ಷ 2017–18)

BACHELOR DEGREE

IN

COMPUTER SCIENCE & ENGINEERING

OUT COME BASED EDUCATION

WITH

CHOICE BASED CREDIT SYSTEM

P.E.S. COLLEGE OF ENGINEERING,

MANDYA - 571 401, KARNATAKA

(An Autonomous Institution Affiliated to VTU, Belagavi,
Grant -in- Aid Institution (Government of Karnataka), World Bank Funded College (TEQIP)
Accredited by NBA, New Delhi and Approved by AICTE, New Delhi.)

ಪಿ.ಇ.ಎಸ್. ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ

ಮಂಡ್ಯ–571 401, ಕರ್ನಾಟಕ

(ವಿ.ಟಿ.ಯು, ಬೆಳಗಾವಿ ಅಡಿಯಲ್ಲಿನ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ)

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PREFACE

P.E.S. College of Engineering, Mandya, started in the year 1962, has become autonomous in the academic year 2008-09. Since, then it has been doing the academic and examination activities successfully. The college is running Eight Undergraduate and Six Postgraduate programs. It consists of four M.Tech programs, which are affiliated to VTU. Other postgraduate programs are MBA and MCA.

India has become a Permanent Member by signing the Washington Accord. The accord was signed by the National Board of Accreditation (NBA) on behalf of India on 13th June 2014. It enables not only the mobility of our degree globally but also establishes equivalence to our degrees with that of the member nations such as Taiwan, Hong Kong, Ireland, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Turkey, Australia, Canada and Japan. Among other signatories to the international agreement are the US and the UK. Implementation of Outcome Based Education (OBE) has been the core issue for enabling the equivalence and of Indian degrees and their mobility across the countries.

Our Higher Educational Institution has adopted the CBCS based semester structure with OBE scheme and grading system.

The credit based OBE semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching.

The OBE, emphasize setting clear standards for observable, measurable outcomes of programs in stages. There lies a shift in thinking, teaching and learning processes moving towards Students Centric from Teacher Centric education. OBE standards focus on mathematics, language, science, attitudes, social skills & moral values.

The key features which may be used to judge, if a system has implemented an outcome based education system is mainly Standard based assessments that determines whether students have achieved the stated standard. Assessments may take any form, so long as the process actually measure whether the student knows the required information or can perform the required task. Outcome based education is a commitment that all students of all groups will ultimately reach the same minimum standards. Outcome Based Education is a method or means which begins with the end in mind and constantly emphasizes continuous improvement.

Choice Based Credit System (CBCS) provides choice for students to select from the prescribed courses (core, Foundation, Foundation Elective, elective, open elective and minor or soft skill courses). The CBCS provides a 'cafeteria' type approach in which the students can Choose electives from a wide range of courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, adopt an interdisciplinary approach to learning which enables integration of concepts, theories, techniques, and, perspectives from two or more disciplines to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline. These greatly enhance the skill/employability of students.

In order to increase the Industry/Corporate readiness, many Soft Skills, Personality Development modules and Technical Skills have been added to the existing curriculum of the academic year 2018-19. Internship have been made compulsory to enhance the field experience. In order to enhance creativity and innovation Technical Skills and Skill Oriented Lab are included in all undergraduate programs.

Dr.Umesh D.R.
Deputy Dean (Academic)
Associate Professor,
Dept. of Computer Science &Engg.

Dr.Nagarathna
Dean (Academic)
Professor,
Dept. of Computer Science &Engg.

P.E.S. College of Engineering, Mandya

VISION

"PESCE shall be a leading institution imparting quality Engineering and Management education developing creative and socially responsible professionals

MISSION

- Provide state of the art infrastructure, motivate the faculty to be proficient in their field of specialization and adopt best teaching-learning practices.
- Impart engineering and managerial skills through competent and committed faculty using outcome based educational curriculum.
- Inculcate professional ethics, leadership qualities and entrepreneurial skills to meet the societal needs.
- Promote research, product development and industry-institution interaction.

Department of Computer Science and Engineering

The Vision of the department is:
"The Department of Computer Science and Engineering shall create professionally competent and socially responsible engineers capable of working in global environment.*"*

The mission of the department is:
DM1: Enforce best practices in teaching-learning, with dedicated faculty and supportive infrastructure to impart the knowledge in emerging technologies.
{Required to create professionally competent engineers}
DM2: Improve Industry-Institute relationship for mutual benefit.
{Required to create professionally competent engineers}
DM3: Inculcate ethical values, communication and entrepreneurial skills.
{Required to create professionally competent and socially responsible engineers}
DM4: Sensitize social, legal, environmental and cultural diversity issues through professional training and balanced curriculum.
{Required to create engineers capable of working in global environment}

Program Educational Objectives (PEOs)

Graduates of the program shall

1. Have Successful computer professional career in IT industry and related areas.
2. Pursue higher education in engineering or management with the focus on intensive research and developmental activities.
3. Develop computing systems in a responsible, professional and ethical manner to serve the society**.**

The National Board of Accreditation (NBA) has defined twelve Program Outcomes for Under Graduate (UG) engineering programs as listed below.

Program Outcomes (POs)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problem.
2. **Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess Societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The Under Graduate (UG) of B.E Computer Science & Engineering Program has defined **Program Specific Outcomes (PSO**) which are listed below.

The students shall have the

1. Ability to design and develop network based systems in emerging technology environments like Cloud Computing, Security, Internet of Things and embedded systems.
2. Ability to develop knowledge based data management system in the areas like data analytics, data mining, business intelligence, pattern recognition and knowledge discovery in solving engineering problems.

P.E.S. COLLEGE OF ENGINEERING, MANDYA
(An Autonomous Institution)
Scheme of Teaching and Examination [CBCS with OBE]
VII Semester B.E. (CS & E)

Sl. No.	Course Code	Course Title	Teaching Dept.	Hours Pattern L:T:P:H	Total Credit	Examination Marks		
						CIE	SEE	Total
1.	P17CS71	Machine Learning	CS	4:0:0:4	4	50	50	100
2.	P17CS72	Multi-core architecture & Parallel Programming	CS	4:0:0:4	4	50	50	100
3.	P17CS73	Managing Big Data	CS	4:0:0:4	4	50	50	100
4.	P17CS74X	Elective-IV	CS	4:0:0:4	3	50	50	100
5.	P17CSO75X	Open Elective -I	CS	4:0:0:4	3	50	50	100
6.	P17CSL76	Parallel Programming Laboratory	CS	0:0:3:3	1.5	50	50	100
7.	P17CSL77	Machine Learning Laboratory	CS	0:0:3:3	1.5	50	50	100
8.	P17CS78	Project Work Phase-I	CS	0:0:4:2	2	--	50	50
				Total	23	350	400	750

List of Electives

Elective-IV			Open Elective-I		
Sl.No.	Course code	Course Title	Sl.No.	Course code	Course Title
1	P17CS741	Cyber Security	1	P17CSO751	Object Oriented Programming with JAVA
2	P17CS742	Block Chain Technology	2	P17CSO752	Web Technologies
3	P17CS743	Wireless Sensor Networks			
4	P17CS744	Object Oriented Modeling & Design with UML			

P.E.S. COLLEGE OF ENGINEERING, MANDYA
(An Autonomous Institution)
Scheme of Teaching and Examination
VIII Semester B.E. (CS & E)

Sl. No.	Course Code	Course Title	Teaching Dept.	Hours Pattern L:T:P:H	Total Credit	Examination Marks		
						CIE	SEE	Total
1.	P17CS81	Cryptography & Network Security	CS	4:0:0:4	3	50	50	100
2.	P17CS82X	Elective-V	CS	4:0:0:4	3	50	50	100
3.	P17CS83X	Elective-VI	CS	4:0:0:4	3	50	50	100
4.	P17CSO84X	Open Elective-II	CS	4:0:0:4	3	50	50	100
5.	P17CS85	Project Work Phase-II	CS	0:0:16:16	8	50	100	150
6.	P17CS86	Internship	CS	---	2	50	50	100
				Total	22	300	350	650

List of Electives

Elective-V			Elective-VI			Open Elective-II		
Sl. No.	Course code	Course Title	Sl. No.	Course code	Course Title	Sl. No.	Course code	Course Title
1	P17CS821	Mobile Computing	1	P17CS831	Network Management Systems	1	P17CSO841	Data Base Systems
2	P17CS822	Computer Vision	2	P17CS832	Software Project Management	2	P17CSO842	Mobile Application Development
3	P17CS823	Software Testing	3	P17CS833	Agile Technologies	3	P17CSO843	Unix and Shell Programming
4	P17CS824	Web Security	4	P17CS834	Business Intelligence & Applications	4	P17CSO844	Python Programming

Course Title : Machine Learning			
Course Code: P17CS71	**Semester : 7**	**L:T:P: H - 4 : 0 : 0 : 4**	**Credits: 4**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

A Quick Introduction to Machine Learning: What Is Machine Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning, What Can Machine Learning Accomplish.

K-Nearest Neighbour: What Is a Neighbourhood, K-Nearest Neighbours, Mr. K's Nearest Neighborhood', Distances, Triangle Inequality, Geometrical Distance, Computational Distances, Statistical Distances, Curse of Dimensionality, How Do We Pick K, Guessing K, Heuristics for Picking K, About the Data, General Strategy, Mathematical Notation Used Throughout the Book, Coding and Testing Design.

Self study Component: KNN Regressor Construction, KNN Testing.

10 Hours

Unit-2

Naive Bayesian Classification: Using Bayes' Theorem to Find Fraudulent Orders, Conditional Probabilities, Probability, Inverse Conditional Probability (aka Bayes Theorem) Naive Bayesian Classifier ,The Chain Rule, Naiveté in Bayesian Reasoning, Pseudocount, Spam Filter, Setup Notes, Coding and Testing Design, Data Source, Email class, Tokenization and Context.

Self Study Component: Spam Trainer, Error Minimization through Cross- Validation.

10 Hours

Unit-3

Decision Tree and Random Forest: The Nuances of Mushrooms, Classifying Mushrooms using folk theorem, Finding an optimal switch point, Information Gain, GINI Impurity, Variance Reduction, Pruning Tree, Ensemble Learning, **Hidden Markov Models:** Tracking User Behaviour Using State Machines, Emissions/Observations of Underlying States, Simplification Through the Markov Assumption, Using Markov Chains Instead of a Finite State Machine, Hidden Markov Model, Evaluation: Forward-Backward Algorithm, Mathematical Representation of the Forward-Backward Algorithm Using User Behaviour.

Self Study Component: The Decoding Problem Through the Viterbi Algorithm, The Learning Problem.

11 Hours

Unit-4

Support Vector Machines: Customer Happiness as a Function of What They Say, Sentiment Classification Using SVMs , The Theory Behind SVMs Decision Boundary, Maximizing Boundaries, Kernel Trick: Feature Transformation, Optimizing with Slack, Sentiment Analyzer, Setup Notes Coding and Testing Design, SVM Testing Strategies,

Self Study Component: Sentiment Classifier.

10 Hours

Unit-5

Neural Networks: What Is a Neural Network, History of Neural Nets, Boolean Logic Perceptrons, How to Construct Feed-Forward Neural Nets, Input Layer Hidden Layers Neurons Activation-Functions, Output-Layer, Training-Algorithms, The Delta Rule, Back-Propagation, Quick Prop, R-Prop, Building Neural Networks How Many Hidden Layers, How Many Neurons for Each Layer, Tolerance for Error and Max Epochs Using a Neural Network to Classify a Language.

Self Study Component: Using a Neural Network to Classify a Language.

11 Hours

Course Outcomes:

1. Students Can Understand the Basics & algorithms of Machine Learning
2. Students Can do Classification using thermos
3. Students Can Observe the Principals & hidden layers
4. Students Can test and implement Applications
5. Student Can Construct & classify Neural networks.

Textbook:

1. Thoughtful Machine Learning with Python A Test-Driven Approach. By Matthew Kirk, Published by O'Reilly Media, Inc.2017

Reference Books:

1. Machine Learning using Python Kindle Edition by Manaranjan Pradhan & U Dinesh Kumar, Wiely publication.

CO-PO Mapping

Semester : 7	**Course code : P17CS71**						**Title : Machine Learning**								
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	Understand the Basics	1	2	2											2
CO2	Classification using thermos	2	2	2		2									2
CO3	Observe the Principals & hidden layers	2	2	2	2		2	2							2
CO4	Can test and implement Applications	1	2	2	2	2	1	3		2			2		2
CO5	Construct Neural Networks			2		2				2			2		2

Course Title : Multi-Core Architecture & Parallel Programming			
Course Code : P17CS72	**Semester : 7**	**L :T:P:H : 4:0:0:4**	**Credits: 4**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Prerequisites: Knowledge of Computer Architecture.

Course Content

Unit-1

Introduction to Multi-core Architecture: Motivation for Concurrency in software, Parallel Computing Platforms, Parallel Computing in Microprocessors, Differentiating Multi-core Architectures from Hyper- Threading Technology, Multi-threading on Single-Core versus Multi-Core Platforms Understanding Performance, Amdahl's Law, Growing Returns: Gustafson's Law. **System Overview of Threading:** Defining Threads, System View of Threads, Threading above the Operating System, Threads inside the OS, Threads inside the Hardware, What Happens When a Thread Is Created, Application Programming Models and Threading

Self Study Component: Virtual Environment: VMs and Platforms, Runtime Virtualization, System Virtualization.

11 Hours

Unit-2

Fundamental Concepts of Parallel Programming :Designing for Threads, Task Decomposition, Data Decomposition, Data Flow Decomposition, Implications of Different Decompositions, Challenges You'll Face, Parallel Programming Patterns, A Motivating Problem: Error Diffusion, Analysis of the Error Diffusion Algorithm, An Alternate Approach: Parallel Error Diffusion, Other Alternatives. **Threading and Parallel Programming Constructs**: Synchronization, Critical Sections, Deadlock, Synchronization Primitives, Semaphores, Locks, Condition Variables, Messages, Implementation-dependent Threading Features

Self Study Component: Flow Control- based Concepts, Fence, Barrier.

11 Hours

Unit-3

Threading APIs: Threading APls for Microsoft Windows, Win32/MFC Thread APls, Threading APls for Microsoft. NET Framework, Creating Threads, Managing Threads, Thread Pools, Thread Synchronization, POSIX Threads, Creating Threads, Managing Threads, Compilation and Linking.

Self Study Component: Thread Synchronization, Signaling.

10 Hours

Unit-4

OpenMP: A Portable Solution for Threading : Challenges in Threading a Loop, Loopcarried Dependence, Data-race Conditions, Managing Shared and Private Data, Loop Scheduling and Portioning, Effective Use of Reductions, Minimizing Threading Overhead, Work-sharing Sections, Performance-oriented Programming, Using Barrier and No wait, Interleaving Single-thread and Multi-thread Execution, Data Copy-in and Copy-out, Protecting Updates of Shared Variables, Intel Task queuing Extension to OpenMP, Compilation, Debugging, performance

Self Study Component: OpenMP Library Functions, OpenMP Environment Variables.

10 Hours

Unit-5

Programming using the Message-Passing Paradigm: Principles of Message-Passing Programming, The Building Blocks: Send and Receive Operations, MPI: the Message Passing Interface, Topologies and Embedding, Overlapping Communication with Computation, Groups and Communicators.

Self Study Component: Collective Communication and Computation Operations.

10 Hours

Text Books:

1. Multicore Programming, Increased Performance through Software Multi-threading by Shameem Akhter and Jason Roberts , Intel Press , 2006
2. Introduction to Parallel Computing (2nd Edition) by Ananth Grama, George Karypis, Vipin Kumar and Anshul Gupta

Reference Books:

1. Thomas Rauber and Gudula Runger Parallel Programming for Multicore and cluster systems, Springer International Edition, 2009 .
2. Hennessey and Patterson Computer Architecture: A quantitative Approach, Morgan Kaufman Publishers
3. Michael J.Quin "Parallel Programming in C with MPI and Open MP", McGraw Hill, 2004

Course outcomes: The students shall able to:

1. **Analyze** the salient features of different multicourse architectures.
2. **Define** fundamental concepts of parallel programming and its design issues
3. **Compare** the different threading API"S.
4. **Demonstrate** the role of OpenMP and programming concept.
5. **Demonstrate** MPI programs.

CO-PO Mapping

Semester: 7		**Course code : P17CS72**					**Title : Multi-Core Architecture & Parallel programming**								
CO'S	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	**Analyze** the salient features of different multi-core architectures	2													
CO2	**Define** fundamental concepts of parallel programming and its design issues	3	2												1
CO3	**Compare** the different threading API"S	3	2												
CO4	D**emonstrate** the role of OpenMP and programming concept	2	2	3	2	1				2					2
CO5	**Demonstrate** MPI programs	2	3	2											1
		2.4	**2.2**	**2.5**	**2**	**1**				**2**					**1.3**

Course Title : Managing Big Data			
Course Code: P17CS73	**Semester : 7**	**L:T:P: H - 4 : 0 : 0 : 4**	**Credits: 4**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Getting an Overview of Big Data: What is Big Data? , History of Data Management – Evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics, Careers in Big Data, Future of Big Data. **Exploring the Use of Big data in Business Context:** Use of Big data in Social Networking, Preventing Fraudulent activities, Detecting Fraudulent activities in Insurance sector.

Self Study Component: Use of big data in Retail Industry.

10 Hours

Unit-2

Introducing Technologies for Handling Big Data and Hadoop Ecosystem: Distributed and Parallel Computing for Big Data, Introducing Hadoop, Cloud Computing and Big Data, In-Memory Computing Technology for Big Data, Hadoop Ecosystem, Hadoop Distributed File System, Map Reduce, Hadoop YARN, HBase, Hive, Pig, Sqoop, Flume. **Understanding Map Reduce Fundamentals and HBase:** The Map Reduce Framework, Techniques to Optimize Map Reduce Jobs, Uses of Map Reduce.

Self Study Component: Zoo Keeper, OoZie, Role of HBase in Big Data Processing.

11 Hours

Unit-3

Understanding Hadoop YARN Architecture: Background, Advantages, Architecture and working of YARN, YARN schedulers, backward compatibility with YARN. **NoSQL Data Management:** Introduction to NoSQL, Characteristics of NoSQL, types of NoSQL data models, Schema-Less Databases, Materialized Views, Distribution Models, Sharding.

Self Study Component: YARN configuration, commands, containers.

10 Hours

Unit-4

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics, Points to Consider during Analysis, Developing an Analytic Team, Understanding Text Analytics. **Analytical Approaches and Tools to Analyze Data:** Analytical Approaches, History of Analytical Tools, Introducing Popular Analytical Tools, Comparing Various Analytical Tools.

Self Study Component: Flume and Sqoop.

10 Hours

Unit-5

Exploring R: Installing R , R Studio, Exploring Basic Features of R, Exploring RGui, Exploring RStudio, Handling Basic Expressions in R, Variables in R, Calling Functions in R, Working with Vectors, Storing and Calculating Values in R, Creating and Using Objects, Interacting with Users, Handling Data in R Workspace, Executing Scripts, Creating Plots, Accessing Help and Documentation in R. **Reading Datasets and exporting data from R:** Using the c( ) command, Using the scan( ) command, reading multiple data values from large files, reading data from Rstudio, Exploring data from R.

Self Study Component: Merging datasets in R, Sorting data

11 Hours

Text Book:

1. Big Data: Black Book, DT Editorial Services, Wiley India Pvt Ltd, 2015 Edition.

Reference Books:

1. Tom White, "Hadoop: The Definitive Guide", 4thEdition, O'reilly, 2015.
2. Big Data Analytics with R and Hadoop, Vignesh Prajapati, -Packt Publishing 2013

Course Outcome:

1. Overview of Big Data and Related Technologies
2. Analyze Technologies for Handling Big Data and Hadoop Ecosystem
3. Acquire clear understanding of Hadoop YARN and NoSQL Data Management
4. Acquire a clear understanding of Analytics and Big Data
5. Explore R Tool to Analyze Data

CO-PO Mapping

Course Outcomes (CO's)	Program outcomes(PO's)												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO -1	2	1				1	1							2
CO 2	2	2	1		2	1	1							2
CO -3	2	2	1		2	1	1							2
CO-4	2	1	1			1	1							2
CO-5	2	2	1	1	2	1	1							2

ELECTIVE - IV

Course Title : Cyber Security			
Course Code: P17CS741	**Semester : 7**	**L:T:P: H - 4 : 0 : 0 : 4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Prerequisites: Computer Networks.

Course Content

Unit-1

INTRODUCTION TO CYBERCRIME: Introduction, Cybercrime definition and origins of the word, Cybercrime and information security, who are Cybercriminals, Classifications of cybercrimes, Cybercrime: The legal perspectives, Cybercrimes: An Indian perspective, Cybercrime and the Indian ITA 2000, A global Perspective on cybercrimes.

CYBEROFFENSES: HOW CRIMINALS PLAN THEM: Introduction**,** How criminal plan the attacks, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack vector, Cloud computing.

Self Study Component: Social Engineering, Cyber stalking.

10 Hours

Unit-2

CYBERCRIME: MOBILE AND WIRELESS DEVICES : Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

TOOLS AND METHODS USED IN CYBERCRIME : Introduction**,** Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

Self Study Component: Proxy Servers and Anonymizers.

11 Hours

Unit-3

PHISHING AND IDENTITY THEFT: Introduction, Phishing, Identity Theft (ID Theft)

CYBERCRIMES AND CYBERSECURITY: THE LEGAL PERSPECTIVES: Introduction, Why do we need Cyber law: The Indian Context, , Digital Signature and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyber law, Technology and Students: Indian Scenario.

Self Study Component: The Indian IT Act, Challenges to Indian Law and cybercrime scenario in India.

10 Hours

Unit-4

UNDERSTANDING COMPUTER FORENSICS: Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics

Investigation, Setting of a Computer Forensics Laboratory: Understanding the Requirements, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to the Computer

Forensics and Social Networking Sites: The Security/Privacy Threats, Forensics Auditing, Anti Forensics.
Self Study Component: Cyber forensics and Digital Evidence.

10 Hours

Unit-5

FORENSICS OF HAND HELD DEVICES : Introduction, Understanding cell phone working characteristics, Hand-held devices and digital forensics, Techno legal challenges with evidence from handheld devices, Organizational guidelines on cell phone forensics.
CYBERSECURITY: ORGANIZATIONAL IMPLICATIONS: Cost of Cybercrimes and IPR Issues: Lesson for Organizations, Web Treats for Organizations: The Evils and Perils, Security and Privacy Implications from Cloud Computing, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy.
Self Study Component: Toolkits for handheld device forensics, forensics of iPods and digital music devices.

11 Hours

Text Book:

1. Nina Godbole, Sunit Belapure, Cyber Security, Wiley India, 2014.

Reference Books:

1. Nina Godbole, Information Systems Security, Wiley India, New Delhi.
2. Kennetch J. Knapp, Cyber Security & Global Information Assurance Information Science Publishing.
3. William Stallings, Cryptography and Network Security, Pearson Publication.

Course Outcomes:

1. **Describe** cybercrime, legal perspectives and **Identify** different types of cyber-attacks.
2. **Analyze** security challenges presented by mobile devices and information systems access in the cybercrime world and **Use** tools and methods used in cybercrime.
3. **Demonstrate** phishing, identity theft and **illustrate** the challenges faced in punishing the cybercriminals.
4. **Summarize** the fundamental concepts in cyber forensics.
5. **Implement** tools used for the forensics of hand-held devices and **Develop** data

Course Articulation Matrix(CAM)														
Course Outcomes (CO's)	**Program Outcomes(PO's)**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO – 1	3	1		2			1	2	3			1	1	
CO – 2	1	2	2	1		1		2	2	1	1	1	1	
CO – 3		2	2	2		1	1	1	1	1		2	2	
CO – 4		2	2	1	3	2	1		1		2	2	2	
CO – 5	2	2	2		2	1	1		1		1	1	2	

Course Title : Block Chain Technology			
Course Code: P17CS742	**Semester : 7**	**L:T:P: H - 4 : 0 : 0 : 4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Prerequisite:

Expertise In Programming, Basic Knowledge Of Computer Security, Cryptography, Networking, Concurrent Or Parallel Programming.

Course Learning Objectives:

1. Be Able to explain what is blockchain
2. Be able to explain why we need blockchain? What is the real world problems that blockchain is trying to solve?
3. Understand and describe how blockchain works
4. Explain the underlying technology of transactions, blocks, proof-of-work, and consensus building
5. How does blockchain exist in the public domain (decentralized, distributed) yet maintain transparency, privacy, anonymity, security, immutability, history
6. How is blockchain incentivized without any central controlling or trusted agency
7. How bitcoin crypto currency works
8. Why people value a 'digital' currency, how it can be protected against scam, fraud, hacking and devaluation
9. Design and implement new ways of using blockchain for applications other than crypto currency
10. Explore platforms such as Ethereum to build applications on blockchain

Course Content

Unit: 1

Introduction to Block chain: Backstory of Block chain, what is Block chain? Centralized vs. Decentralized Systems, Layers of Block chain, why is Blockchain Important? Limitations of Centralized Systems, Blockchain Adoption So Far, Blockchain Uses and Use Cases **How Blockchain Works-1:** Laying the Blockchain Foundation, Cryptography, Symmetric Key Cryptography, Cryptographic Hash Functions.

Self Study: MAC and HMAC **10 Hours**

Unit-2

How Blockchain Works-2: Asymmetric Key Cryptography, Diffie-Hellman Key Exchange, Symmetric vs. Asymmetric Key Cryptography, Nash Equilibrium, Prisoner's Dilemma, Byzantine Generals' Problem, Zero-Sum Games, Why to Study Game Theory, Computer Science Engineering, The Blockchain, Merkle Trees, Putting It All Together, Properties of Blockchain Solutions, Blockchain Transactions, Distributed Consensus Mechanisms, Blockchain Applications, Scaling Blockchain, Off-Chain Computation, Sharding Blockchain State

Self Study: Game Theory **10 Hours**

Unit-3

How Bitcoin Works: The History of Money, Dawn of Bitcoin, What Is Bitcoin? Working with Bitcoins, The Bitcoin Blockchain, Block Structure, The Genesis Block, The Bitcoin Network, Network Discovery for a New Node, Bitcoin Transactions, Consensus and Block Mining, Block Propagation, Bitcoin Scripts, Bitcoin Transactions Revisited, Scripts, Full Nodes vs. SPVs, Full Nodes, SPVs,Bitcoin Wallets.

Self Study: Putting it All Together **10 Hours**

Unit-4

How Ethereum Works: From Bitcoin to Ethereum, Ethereum as a Next-Gen Blockchain, Design Philosophy of Ethereum, Enter the Ethereum Blockchain, Ethereum Blockchain, Ethereum Accounts, Trie Usage, Merkle Patricia Tree, RLP Encoding, Ethereum Transaction and Message Structure, Ethereum State Transaction Function, Gas and Transaction Cost, Ethereum Smart Contracts, Contract Creation, Ethereum Virtual Machine and Code Execution, Ethereum Ecosystem, Swarm, Whisper, DApp, Development Components

Self Study: Ethereum Ecosystem **10 Hours**

Unit 5

Blockchain Application Development : Decentralized Applications, Blockchain Application Development, Libraries and Tools, Interacting with the Bitcoin Blockchain, Setup and Initialize the bitcoinjs Library in a node.js Application, Create Keypairs for the Sender and Receiver, Get Test Bitcoins in the Sender's Wallet, Get the Sender's Unspent Outputs, Prepare Bitcoin Transaction, Sign Transaction Inputs, Create Transaction Hex, Broadcast Transaction to the Network, Interacting Programmatically with Ethereum—Sending Transactions, Set Up Library and Connection, Set Up Ethereum Accounts, Get Test Ether in Sender's Account, Prepare Ethereum Transaction, Sign Transaction, Send Transaction to the Ethereum Network, Interacting Programmatically with Ethereum—Creating a Smart Contract, Prerequisites, Program the Smart Contract, Compile Contract and Get Details, Deploy Contract to Ethereum Network, Interacting Programmatically with Ethereum—Executing Smart, Contract Functions, Get Reference to the Smart Contract, Execute Smart Contract Function, Blockchain Concepts Revisited, Public vs. Private Blockchains, Decentralized Application Architecture.

Self Study: Public Nodes vs. Self-Hosted Nodes, Decentralized Applications and Servers **12 Hours**

Text Book:

1. Beginning Blockchain: A Beginner's Guide to Building Blockchain Solutions by Bikramaditya Singhal, Gautam Dhameja and Priyansu Sekhar Panda

Reference Books:

1. Blockchain Technology: Cryptocurrency and Applications by S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, Oxford University Press 2019.
2. Bitcoin and cryptocurrency technologies: a comprehensive introduction by Arvind Narayanan et. Al, Princeton University Press 2016

3. https://www.coursera.org/specializations/introduction-to-blockchain
4. https://nptel.ac.in/courses/106/104/106104220/

Course Outcome's

1. Understand the structure of a blockchain and why/when it is better than a simple distributed database
2. Explain the significance of cryptographic algorithms in blockchain
3. Describe the features and importance of Bitcoin
4. Explain about the principles of Ethereum Virtual Machine
5. Design, build, and deploy smart contracts and distributed applications,

Course Articulation Matrix (CAM)															
Course Outcomes	**Program Outcomes (PO's)**												**PSO's**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	2	1			1							1		
CO 2	1	2	2	1		1							1		
CO 3	2	2	2			2							2		
CO 4	2	1	2			1							1		
CO 5	2	3	3	2	2	2			2				2		

Course Title : Wireless Sensor Networks			
Course Code: P17CS743	**Semester : 7**	**L:T:P: H - 4 : 0 : 0 : 4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Introduction: The vision of Ambient Intelligence, Application Examples, Types of applications, Challenges for WSNs, Enabling Technologies for wireless sensor networks. **Single-node architecture:** Hardware components, Operating systems: and execution environments: Embedded OS, Programming paradigms and application programming interfaces. **Network Architecture:** Sensor network scenarios, Optimization goals and figures of merit, Design principles for WSNs: Distributed organization, data centricity, Gateway concepts.

Self Study Component: In-network processing

11 Hours

Unit-2

Physical Layer: Introduction, Spread spectrum communications:, Packet transmissions and synchronization, quality of wireless channels and measures for improvement. **MAC protocols:** Fundamentals of MAC protocols: Requirements and design constraints for wireless MAC protocols, important classes of MAC protocols. MAC Protocols for WSNs: LEACH. IEEE802.15.4 MAC protocol

Self Study Component**:** SMAC protocol

10 Hours

Unit-3

Routing protocols: The many faces of forwarding and routing, Gossiping and agent based unicast forwarding – Basic idea, Randomized forwarding, Random walks, Energy efficient Unicast : Multipath Unicast routing, Broadcast and Multicast : Overview, Mesh-based Protocols, Mobile nodes.

Self Study Component: Geographic routing

11 Hours

Unit-4

Data Aggregation in WSN: Challenges in data aggregation, data aggregation techniques, **Localization and Positioning:** Properties of localization and positioning procedures, Possible approaches, Mathematical basics for the lateration problem, Single hop localization,

Self Study Component**:** Positioning in multihop environments.

10 Hours

Unit-5

Naming and addressing: Fundamentals, Address and name management in wireless sensor networks, Assignment of MAC addresses, Distributed assignment of locally unique addresses: Address assignment algorithm. **Time Synchronization**: Introduction to time synchronization problem, Protocols based on sender/receiver synchronization: Light weight time synchronization protocol

Self Study Component**:** Timing –Sync protocol

10 Hours

Text Book:

1. Holger Karl, Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks”, 2013, Wiley Publications

Reference Books:

1. Wireless Sensor Network by KazemSohraby,Daniel Minoli, & TaiebZnati Pub: Wiley
2. Wireless sensor networks Edited by C. S. Raghavendra Pub: Springer

3. C. Siva Ram Murthy & B. S. Manoj, "Adhoc Wireless, Networks – Architecture and Protocols", Prentice Hall, 2004, ISBN – 013-147-023x

Course Outcomes:

1. Explain Fundamental Concepts, applications and network architectures of WSN.
2. Describe the physical layer and MAC protocol concepts for communication in WSN
3. Discuss the different routing protocols and issues
4. Discuss the different data aggregation techniques and different positioning and localization algorithms
5. Describe the naming, addressing and time synchronization in WSN

CO-PO Mapping

Semester: 7	Course code : P17CS743												Title : Wireless Sensor Networks		
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS 01**	**PS 02**
CO1	Explain Fundamental Concepts, applications and network architectures of WSN.	1											1	1	
CO2	Explain the physical layer and MAC protocol concepts for communication in WSN	1	1										1	1	
CO3	Analyze the different routing protocols and issues	1	1										1	1	
CO4	Analyze the different data aggregation techniques and different positioning and localization algorithms	1	1	1									1	1	
CO5	Explain the naming, addressing and time synchronization in WSN	1	1										1	1	
		1	0.8	0.2									1	1	

Course Title : Object Oriented Modeling & Design with UML			
Course Code: P17CS744	**Semester : 7th**	**L:T:P: H - 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Prerequisites: 1. Object oriented Programming.
2. Object & Class concepts.

Course Content

Unit-1

Introduction, Modelling Concepts, class Modelling: Object Orientation, OO development, OO modelling history Modelling as Design Technique: Modelling, abstraction, The three models. Class Modelling: Object and class concepts, Link and associations concepts, Generalization and inheritance, A sample class model, Navigation of class models.

Advanced Class Modelling, State Modelling: Advanced object and class concepts, Association ends, N-ary associations, Aggregation, Abstract classes, multiple inheritance, Metadata, Reification, Constraints, Derived data, Packages, Practical tips. State Modelling: Events, States, Transitions and Conditions, State diagrams, State diagram behaviour.

Self Study Component**:** OO themes, Evidence for usefulness of OO development.

10 Hours

Unit-2

Advanced State Modelling, Interaction Modelling: Advanced State Modelling: Nested state diagrams, A sample state model, Relation of class and state models, Practical tips. Interaction Modelling: Use case models, Sequence models, Activity models. Use case relationships, Procedural sequence models

Process Overview, System Conception, and Domain Analysis: Process Overview: Development stages, Development life cycle. System Conception: Devising a system concept, elaborating a concept, Preparing a problem statement. Domain Analysis: Overview of analysis, Domain class model, Domain state model, Domain interaction model.

Self Study Component**:** Nested states, Signal generalization, Concurrency.

11 Hours

Unit-3

Application Analysis, System Design: Application Analysis: Application interaction model, Application class model, Application state model, Adding operations. Making a reuse plan, Breaking a system in to sub-systems, Identifying concurrency, Allocation of sub-systems, Management of data storage, Handling global resources, Choosing a software control strategy, Handling boundary conditions, Setting the trade-off priorities, Common architectural styles.

Self Study Component**:** Overview of system design, Estimating performance.

10 Hours

Unit-4

Class Design, Implementation Modelling, Legacy Systems: Class Design: Overview of class design, Bridging the gap, Realizing use cases, Designing algorithms, Recursion downwards, Refactoring, Design optimization, Reification of behaviour, ATM example. Implementation Modelling: Overview of implementation, Fine-tuning classes, Fine-tuning generalizations, realizing associations, testing. Legacy Systems: Reverse engineering, Building the class models, Building the interaction model, Building the state model, Reverse engineering tips.

Self Study Component**:** Adjustment of inheritance, Organizing a class design.

11 Hours

Unit-5

Design Patterns – 1: What is a pattern and what makes a pattern? Pattern categories, Relationships between patterns, Pattern description Communication Patterns: Forwarder-Receiver, Client-Dispatcher-Server.

Design Patterns – 2, Idioms: Management Patterns: Command processor, View handler. Idioms: Introduction, what can idioms provides? Idioms and style, Where to find idioms, Counted Pointer example.
Self Study Component**:** Publisher-Subscriber.

10 Hours

Text Books:

1. Michael Blaha, James Rumbaugh: Object-Oriented Modeling and Design with UML, 2nd Edition, Pearson Education, 2005. (Chapters 1 to 17, 23)
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern- Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2007. (Chapters 1, 3.5, 3.6, 4)

Reference Books:

1. Grady Booch et al: Object-Oriented Analysis and Design with Applications, 3rd Edition, Pearson Education, 2007.
2. Brahma Dathan, Sarnath Ramnath: Object-Oriented Analysis, Design, and Implementation, Universities Press, 2009.

Course Outcomes:

At the end of the course the student would have the:

1. The Knowledge of the basic concepts of Object oriented modeling and Design.
2. Will be able to use the Object Oriented notations and process that extends from analysis through design to implementations.
3. Be able to use all the standard UML notations.
4. Capable to model the requirements with use cases and describe the dynamic behavior and structure of the design.
5. Easily create a modular design with components and relate the logical design to the physical environment.

CO-PO Mapping

Course Outcomes (CO's)	Program Outcomes(PO's)												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO – 1	3			3	2	1	1	1			1	2		1
CO – 2	3	1	2	1	1		1						1	
CO – 3	1	2	2	2	2				1		1		2	
CO – 4	1	2	3	2	2		1		2		1		2	1
CO – 5	2	1		2	2	2		1		1		1	2	1

Open Elective-I

Course Title : Object Oriented Programming with Java			
Course Code : P17CSO751	**Semester : 7**	**L :T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

Object Oriented Concepts: Introduction to Object Oriented Concepts: A Review of structures, Procedure–Oriented Programming system, Object Oriented Programming System, Comparison of Object Oriented Language with C.

Program Structure in Java : Introduction - Importing Packages and Classes ,Writing Simple Java Programs , Installing and Configuring Java Compiling and Running Java Program, Elements or Tokens in Java Programs, Java Statements , Command Line Arguments ,Data Types, Declaration of Variables, User Input to Programs, Sample Programs. Data types, variables and arrays, Operators,

Self Study Component: Type casting in Java

11 Hours

Unit-2

Classes and Objects- Introduction, Class Declaration and Modifiers, Class Modifiers, Declaration of Class Objects, Assigning One Object to Another ,Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods , Passing Arguments by Value and by Reference, Keyword this.

Methods- Introduction, Defining Methods, Overloaded Methods, Class Objects as Parameters in Methods, Access Control, Overriding Methods, Attributes Final and Static.

Self Study Component: Overloaded Constructor Methods

11 Hours

Unit-3

Inheritance: Inheritance-Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class, Inhibiting inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Abstract Classes, Interfaces and Inheritance.

Interfaces- Introduction- Similarities between Interface and Class, Declaration of Interface, Implementation of interface, Multiple Interfaces.

Packages: Defining, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes

Self Study Component: Dynamic Method Dispatch

10 Hours

Unit-4

Exception Handling - Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions

String Handling in Java -Introduction, ,Interface CharSequence , Class String, Methods for Extracting Characters from Strings, Methods for Comparison of Strings, Methods for Modifying Strings

Self Study Component: Methods for Searching Strings

10 Hours

Unit-5

Generic Programming-Introduction: General Benefits of Using Generics, Generics and Primitive Types, Declaration of Generic Class and Constructor Use of Object Class vs Generic

Class, Generic Class with Multiple Type Parameters, Generic Method, Generic Method Overloading ,Generic Interface, Upper Bound on Types, Multiple Bounds on Types ,Wildcard Bounded Wildcard

Applets-Introduction, Applet Architecture, Applet Class and Methods, Creating Applets, HTML Tags, Simple Applet Display Methods, Passing Parameters to Applets, Passive Applet Programs, Adding Images to Applet Windows, Display of Numerical Values on Applet Windows, Managing Colours in Applet Window, Interactive Applets with AWT Graphical Components, AWT Text fields in Applets, Animation in Applet Windows

Self Study Component: Overriding Methods in Generics Class

10 Hours

Text Books:

1. Java: One Step Ahead by Anita Seth , B.L. Juneja, OXFORD University press - First Edition 2017.

Reference Books:

1. Herbert Schildt, Java The Complete Reference, 9th Edition, Tata McGraw Hill.
2. E Balagurusamy Programming With Java: A Primer 5th Edition Tata McGraw Hill.

Course outcomes:

1. CO1: Explain the object-oriented concepts and Java features
2. CO2: Apply the concepts of Class to develop simple Java programs.
3. CO3: Demonstrate the usage of Inheritance, Interfaces and Packages.
4. CO4: Develop programs using Exception Handling and String handling
5. CO5**:** Develop applications using Generic concepts and Applet.

CO-PO Mapping

Semester: 7	**Course code : P17CSO751**			**Title : Object Oriented Programming with Java**											
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO-1	Explain the object-oriented concepts and Java features	1	1	1											1
CO-2	Apply the concepts of Class to develop simple Java programs	2	2	2			1								2
CO-3	Demonstrate the usage of Inheritance, Interfaces and Packages.	2	2	2			1								2
CO-4	Develop programs using Exception Handling and String handling	2	2	2			1								2
CO-5	Develop applications using Generic concepts and Applet.	2	2	2			1								2
		1.8	1.8	1.8			1								1.8

Course Title : Web Technologies			
Course Code : P17CSO752	**Semester : 7**	**L :T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

Fundamentals of Web: Internet, WWW, Web Browsers and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox.

Introduction to HTML/XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text mark-up, Images, Hypertext Links.

Self-study component***:*** security, The Web Programmers Toolbox

10 Hours

Unit-2

Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML.

Cascading Style Sheets: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Colour, Alignment of text, The Box model, Background images, The and tags.

Self-study component: Frames

10 Hours

Unit-3

The Basics of JavaScript: Overview of JavaScript, Object orientation and JavaScript, General syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructor.

Self-study component*:* Pattern matching using regular expressions, Errors in scripts.

10 Hours

Unit-4

JavaScript and HTML documents: The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements

Dynamic Documents With JavaScript: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click;

Self-study component: Slow movement of elements; Dragging and dropping elements.

12 Hours

Unit-5

PHP: Origins and uses of PHP, Overview of PHP, General syntactic characteristics, Primitives, Operations and expressions, Output, Control statements, Arrays, Functions, Pattern matching , Form Handling, Files.

Self-Study Component: Cookies, Session tracking

10 Hours

Text Book:

1. Programming the World Wide Web – Robert W. Sebesta, 8th Edition, Pearson Education, 2015.

Reference Books:

1. Internet & World Wide Web How to program – M. Deitel, P.J Deitel, A. B. Goldberg, 3rd Edition, Pearson Education / PHI, 2004.
2. Web Programming Building Internet Applications – Chris Bates, 3rd Edition, Wiley India, 2006.
3. The Web Warrior Guide to Web Programming – Xue Bai et al.

Course Outcomes

1. Develop web pages using various XHTML tags.
2. Design effective web pages using various style properties.
3. Design interactive web pages using java script.
4. Create dynamic documents using DOM object model.
5. Implement web pages using PHP scripts.

CO-PO Mapping

Semester: 7		Course code : P17CSO752					Title : Web Technologies								
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	Develop web pages using various XHTML tags.	2	2	2									1		
CO2	Design effective web pages using various style properties	2	2	2									1		
CO3	Design interactive web pages using java script.	2	1	1									1		1
CO4	Create dynamic documents using DOM object model	2	1	1								1	1		1
CO5	Implement web pages using PHP scripts.	2	1	1								1	1		1
		2.0	**1.4**	**1.4**								**1.0**	**1.0**		**1.0**

Course Title : Parallel Programming Laboratory			
Course Code : P17CSL76	**Semester : 7**	**L :T:P:H : 0:0:3:3**	**Credits: 1.5**
Contact Period: 3Hr/Week, Exam: 3 Hr		**Weightage: CIE:50%, SEE:50%**	

Course Contents

PART-A
OPENMP Programs

1. Write an OpenMp program which performs C=A+B & D=A-B in separate blocks/sections where A,B,C& D are arrays.
2. Write an OpenMp program to add all the elements of two arrays A & B each of size 1000 and store their sum in a variable using reduction clause.
3. Write an OpenMp program to multiply two matrices A & B and find the resultant matrix C.
4. Write an OpenMp program to find the number of processors, number of threads, etc (the environment information).
5. Write an OpenMp program to print all the letters of the alphabet A-Z using threads.
6. Write an OpenMp program to show how thread private clause works.
7. Write an OpenMp program to show how first private clause works (Factorial program).
8. Write an OpenMP program to find prime numbers (split)

PART-B
MPI PROGRAMS

1. Write a MPI program to send the message from a process whose rank=3 to all other remaining processes.
2. Write a MPI program where each processor sends an integer number and its rank to the master processor, where the master gathers all the information and prints the data accordingly.
3. Write a MPI program to broadcast a message.
4. Write a MPI program to find sum of 'n' integers on 'p' processors using point-to-point communication libraries call.
5. Write an MPI program where the master processor broadcasts a message “HELLO” to the remaining processors using broadcast system call.

Course Outcomes:

At the end of the course, the student should be able to:

1. Develop the programs using OPENMP.
2. Develop the programs using MPI.
3. Examine the performance of OPENMP, MPI Program.

Course Title : Machine Learning Laboratory			
Course Code : P17CSL77	**Semester : 7**	**L :T:P:H : 0:0:3:3**	**Credits: 1.5**
Contact Period: 3Hr/Week, Exam: 3 Hr		**Weightage: CIE:50%, SEE:50%**	

Course Contents

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/ API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Us e the same data set for clustering using k -Means algorithm Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Course Outcomes

1. Understand the implementation procedures for the machine learning algorithms.
2. Design Java/Python programs for various Learning algorithms.
3. Apply appropriate data sets to the Machine Learning algorithms.
4. Identify and apply Machine Learning algorithms to solve real world problems.

Course Title : Cryptography & Network Security			
Course Code: P17CS81	**Semester : 8**	**L:T:P: H - 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Unit-1

Classical Encryption Techniques Symmetric Cipher Model, Cryptography, Cryptanalysis and Brute-Force Attack, Substitution Techniques, Caesar Cipher, Mono alphabetic Cipher, Play fair Cipher, Hill Cipher, Poly alphabetic Cipher, One Time Pad. Block Ciphers and the data encryption standard: Traditional block Cipher structure, stream Ciphers and block Ciphers, Motivation for the feistel Cipher structure, the feistel Cipher, The data encryption standard, Self Study Component : DES encryption, DES decryption

11 Hous

Unit-2

Public-Key Cryptography and RSA: Principles of public-key cryptosystems. Public-key cryptosystems. Applications for public-key cryptosystems, requirements for public-key cryptosystems. public-key cryptanalysis. The RSA algorithm, description of the algorithm, computational aspects, the security of RSA. **Other Public-Key Cryptosystems**: Diffie-hellman key exchange, The algorithm, key exchange protocols, man in the middle attack.
Self Study Component : Elgamal Cryptographic systems.

10 Hours

Unit-3

Key Management and Distribution: Symmetric key distribution using Symmetric encryption, A key distribution scenario, Hierarchical key control, session key lifetime, a transparent key control scheme, Decentralized key control, controlling key usage, **X-509 certificates**. Certificates, X-509 version 3, public key infrastructure .**User Authentication**: Remote user Authentication principles, Mutual Authentication, one way Authentication, remote user Authentication using Symmetric encryption, Mutual Authentication, one way Authentication, Kerberos, Motivation , Kerberos version 4, Kerberos version 5, Remote user Authentication using Asymmetric encryption.
Self Study Component : Mutual Authentication, one way Authentication

11 Hours

Unit-4

IP Security: IP Security overview, applications of IP-sec, benefits of IP-sec, Routing applications, IP-sec documents, IP-sec services, transport and tunnel modes, IP Security policy, Security associations, Security associations database, Security policy database, IP traffic processing, Encapsulating Security payload, ESP format, encryption and authentication algorithms, Padding.
Self Study Component : Anti replay service.

10 Hours

Unit-5

Transport and tunnel modes, combining security associations, authentication plus confidentiality, basic combinations of security associations, internet key exchange, key determinations protocol, header and payload formats
Self Study Component : cryptographic suits.

10 Hours

Text Book:

1. William Stallings: Cryptography and Network Security, Pearson 6th edition.

Reference Book:

2. V K Pachghare: Cryptography and Information Security, PHI 2nd Edition.

Course Outcomes:

1. Define cryptography and its principles
2. Explain Cryptography algorithms
3. Illustrate Public and Private key cryptography
4. Understand Key management, distribution and certification
5. Implementation authentication protocols and analyze IPSec

CO-PO Mapping

Semester : 8	**Course code : P17CS81**				**Title : Cryptography & Network Security**										
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	Define cryptography and its principles	2				2									2
CO2	Explain Cryptography algorithms	2	2		2										2
CO3	Illustrate Public and Private key cryptography	2	2	2	2	2	2								3
CO4	Understand Key management, distribution and certification	3		2	2	2	2	3							3
CO5	Implementation authentication protocols and analyze IPSec	3		3	2		3	3							2

Elective – V

Course Title : Mobile Computing			
Course Code : P17CS821	**Semester : 8**	**L :T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

Mobile Computing Architecture: Architecture for Mobile Computing, 3-tier Architecture, Design Considerations for Mobile Computing. Emerging Technologies: Wireless broadband (WiMAX), Mobile IP: Introduction, discovery, Registration, Tunneling, Cellular IP, Wireless Networks : Global Systems for Mobile Communication (GSM): GSM Architecture, Entities, Call routing in GSM, PLMN Interface, Network Aspects in GSM, Mobility Management, GSM Frequency allocation. Short Service Messages (SMS): Introduction to SMS, SMS Architecture, SMMT, SMMO, SMS as Information bearer, applications.

Self Study Component: Mobile IP with IPv6, GSM Addresses and Identities.

11 Hours

Unit-2

GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Billing and Charging in GPRS.IS-95, CDMA versus GSM, Wireless Data, Third Generation Networks, Applications on 3G, Mobile Client: Moving beyond desktop, Mobile handset overview, PDA, Design Constraints in applications for handheld devices.

Self Study Components: Spread Spectrum technology, Mobile phones and their features.

10 Hours

Unit-3

Mobile OS and Computing Environment: Smart Client Architecture, The Client: User Interface, Data Storage, Performance, Messaging. The Server: Enterprise Data Source, Messaging. Mobile Operating Systems: WinCE, Palm OS, Symbian OS, Linux, Proprietary OS Client Development: The development process, Need analysis phase, Design phase, Implementation and Testing phase, Deployment phase, Development Tools, Device Emulators.

Self Study Components : Data Synchronization.

11 Hours

Unit-4

Building Wireless Internet Applications: Thin client overview: Architecture, the client, Middleware, messaging Servers, Processing a Wireless request, Protocol (WAP) Overview, Wireless Languages: Markup Languages, HDML, WML, HTML, cHTML, XHTML, VoiceXML.

Self Study Component : Wireless Applications.

10 Hours

Unit-5

J2ME: Introduction, CDC, CLDC, MIDP; Programming for CLDC, MIDlet model, Provisioning, MIDlet life-cycle, Creating new application, MIDlet event handling, Low level GUI Components, Communication in MIDP, Security Considerations in MIDP.

Self Study Components: GUI in MIDP, Multimedia APIs.

10 Hours

Text Books:

1. Ashok Talukder, Roopa Yavagal, Hasan Ahmed: Mobile Computing, Technology, Applications and Service Creation, 2nd Edition, Tata McGraw Hill, 2010.
2. Martyn Mallik: Mobile and Wireless Design Essentials, Wiley India, 2003

Reference Books:

1. Raj Kamal: Mobile Computing, Oxford University Press, 2007.
2. Iti Saha Misra: Wireless Communications and Networks, 3G and Beyond, Tata McGraw Hill, 2009.

Course Outcomes: The student will be able to :

1. Explain architecture of Mobile computing , GSM,SMS.
2. Explain state of art techniques in wireless communication.
3. Describe Mobile OS and Data Synchronization.
4. Discover CDMA, Mobile IP, WImax.
5. Demonstrate program for CLDC, MIDP let model and security concerns

CO-PO Mapping

Course Articulation Matrix(CAM)														
Course Outcomes (CO's)	**Program Outcomes(PO's)**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
Explain architecture of Mobile computing GSM, SMS.	2	2											2	
Explain state of art techniques in wireless communication.	2	2											2	
Describe Mobile OS and Data Synchronization	1	2	2											
Discover CDMA, Mobile IP, WImax.	1	2	2										1	
Demonstrate program for CLDC, MIDP let model and security concerns	2	3	2							2			2	

Course Title : Computer Vision			
Course Code : P17CS822	**Semester : 8**	**L :T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

Introduction: Definition of Computer Vision, Image Formation : Geometric primitives and transformations- Geometric primitives, 2D transformations, 3D transformations; Photometric image formation – Lighting, Reflectance and shading; The Digital Camera – Sampling and aliasing.

Self Study Component: Color, Compression

10 Hours

Unit-2

Image Processing: Point Operators – Pixel transforms, Color transforms, Compositing and matting, Histogram equalization, Tonal Adjustment; Linear Filtering – Separable filtering, Examples of linear filtering, Band pass and steerable filters; More neighborhood operators- Non linear filtering, Morphology, Distance transforms, Connected components; Fourier transforms – Fourier transforms pairs, Two dimensional Fourier transforms, Wiener filtering.

Self Study Component: Application: Sharpening, blur and noise removal.

11 Hours

Unit-3

Feature detection and matching: Points and patches – Feature detectors, Feature descriptors, Feature matching, Feature tracking, applications: Performance-driven animation; Edges – Edge detection, Edge linking, Application: Edge editing and enhancement; Lines – Successive approximation, Hough transforms, Vanishing points.

Self Study Component: Application: Rectangle detection

10 Hours

Unit-4

Segmentation: Active Contours – Snakes, Dynamic snakes and Condensation, Scissors, Level Sets, Application: Contour tracking and rotoscoping; Split and merge – Watershed, Region splitting(divisive clustering), Region merging (agglomerative clustering), Graph based segmentation, Probabilistic aggregation; Mean shift and mode finding – K-means and mixtures of Gaussians, Mean Shift, Normalized cuts; Graph cuts and energy based methods.

Self Study Component: Application: Medical image segmentation.

11 Hours

Unit-5

Feature- based alignment: 2D and 3D feature-based alignment – 2D alignment using least squares, Application-Panography, Iterative algorithms, Robust least squares and RANSAC, 3D alignment; Pose estimation – Linear algorithms, Iterative algorithms, Application: Augmented reality; Geometric intrinsic calibration - Calibration patterns, Vanishing Points.

Self Study Component: Application: Single view metrology.

10 Hours

Text Books:

1. Richard Szeliski, Computer Vision: Algorithms and Applications (CVAA). Springer, 2010.
2. Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson

Course Outcomes : After Learning all the units of the course, the student is able to:

1. Understand image formation through geometric transformation
2. Understand fundamental concepts of image processing
3. Explain various types of feature detection methods

4. Explain different types of segmentation types
5. Understand concepts of feature based alignment

CO – PO Mapping

CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS 1	PS 2
CO1	Understand image formation through geometric transformation	2	2			2				1			1		1
CO2	Understand fundamental concepts of image processing	2	2	2	2	2				1			1		1
CO3	Explain various types of feature detection methods	2	2	2	2	2				1			1		1
CO4	Explain different types of segmentation types	2	2	2	2	2				1			1		1
CO5	Understand concepts of feature based alignment	2	2	2	2	2				1			1		1

Course Title : Software Testing			
Course Code: P17CS823	**Semester : 8th**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Basics of Software Testing and Examples: Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Levels of testing. Examples: Generalized pseudo code, the triangle problem, The NextDate function, the commission problem.

Self Study Component: The SATM (Simple Automatic Teller Machine) problem.

10 Hours

Unit-2

Decision Table-Based Testing: Decision tables, Test cases for the triangle problem, Test cases for the Next Date function, Test cases for the commission problem, Guidelines and observations. Data Flow Testing: Definition-Use testing, Slice-based testing, Guidelines and observations. Levels of Testing: Traditional view of testing levels, Alternative life-cycle models, The SATM system, Separating integration and system testing. Integration Testing: A closer look at the SATM System, Decomposition-based.

Self Study Component: Call graph-based, Path-based integrations, Case study.

10 Hours

Unit-3

System Testing: Threads, Basic concepts for requirements specification, Finding threads, Structural strategies and functional strategies for thread testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions) testing example. Interaction Testing: Context of interaction, A taxonomy of interactions, Interaction, composition, and determinism, Client/Server Testing,. Issues in Object-Oriented Testing: Units for object-oriented testing, Implications of composition and encapsulation, inheritance, and polymorphism, Levels of object-oriented testing, GUI testing, Dataflow testing for object-oriented software, Examples.

Self Study Component: Class Testing: Methods as units, Classes as units.

12 Hours

Unit-4

Object-Oriented Integration Testing: UML support for integration testing, MM-paths for object-oriented software, A framework for object-oriented dataflow integration testing. GUI Testing: The currency conversion program, Unit testing, Integration Testing and System testing for the currency conversion program. Object-Oriented System Testing: Currency converter UML description, UML-based system testing.

Self Study Component: State chart-based system testing.

10 Hours

Unit-5

Exploratory Testing: The context-driven school, Exploring exploratory testing, Exploring a familiar example, Exploratory and context-driven testing observations. Model-Based Testing: Testing based on models, Appropriate models, Use case-based testing, Commercial tool support for model-based testing. Test-Driven Development: Test-then-code cycles, Automated test execution, Java and JUnit example, Remaining questions, Pros, cons, and open questions of TDD.

Self Study Component: Retrospective on MDD versus TDD.

10 Hours

Text Book:

1. Paul C.Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition,

Auerbach Publications, 2013.

Reference Books:

1. Aditya P Mathur: Foundations of Software Testing , Pearson, 2008.
2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, John Wiley & Sons, 2008

Course Outcomes: Upon Completion of the course, students shall be able to

1. **Choose** the right type of software testing process for any given real world problem.
2. **Execute** the software testing process in efficient way.
3. **Illustrate t**he testing process by using several testing tools.
4. **Establish** a quality environment as specified in standards for developing quality software.
5. **Analyze** the quality procedures based on the past experience.

CO-PO Mapping

Semester : 8	Course code : P17CS823						Title : Software Testing							
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	**Choose** the right type of software testing process for any given real world problem.	2	3	2	2	-	-	-	-	-	-	-	2	2	-
CO2	**Execute** the software testing process in efficient way.	2	2	2	2	-	-	-	-	-	-	-	-	2	-
CO3	**Illustrate t**he testing process by using several testing tools.	2	3	3	-	-	-	-	-	-	-	-	-	2	-
CO4	**Establish** a quality environment as specified in standards for developing quality software.	2	2	3	-	-	-	2	-	-	-	-	-	2	-
CO5	**Analyze** the quality procedures based on the past experience.	2	2	2	-	-	-	-	-	-	-	-	-	2	-
		2	**2.4**	**2.4**	**0.8**			**0.4**						**2**	

Course Title : Web Security			
Course Code : P17CS824	**Semester : 8**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hr, Exam: 3 Hr	**Weightage: CIE:50%, SEE:50%**		

Course Content

Unit-1

The Web Security Landscape: The Web Security Landscape: The Web Security Problem, Risk Analysis and Best Practices; **Cryptography and the Web:** Cryptography and Web Security, Working Cryptographic Systems and Protocols, What Cryptography Can't Do?
Self Study Component: Legal Restrictions on Cryptography.

10 Hours

Unit-2

The Web's War on Your Privacy: Understanding Privacy, User-Provided Information, Log Files, Understanding Cookies, Web Bugs, Conclusion**; Privacy-Protecting Techniques:** Choosing a Good Service Provider, Picking a Great Password, Cleaning Up After Yourself, Avoiding Spam and Junk Email, Identity Theft**; Privacy-Protecting Technologies:** Blocking Ads and Crushing Cookies, Anonymous Browsing.
Self Study Component: Secure Email, Backups and Anti Theft: Using Backups to Protect Your Data, Preventing theft.

11 Hours

Unit–3

Physical security for Servers: Planning for the Forgotten Threats, Protecting Computer Hardware, Protecting Your Data, **Host Security for Servers:** Current Host Security Problems, Securing the Host Computer, minimizing Risk by Minimizing Services, Operating Securely, Secure Remote Access and Content Updating, firewalls and the Web, **Securing Web Applications:** A Legacy of Extensibility and Risk, Rules to Code By, Security Using Fields, Rules for Programming languages, Using PHP Securely, Writing Scripts That Run with Additional Privileges, Connecting to Databases.
Self Study Component: Hidden Fields and Cookies

10 Hours

Unit-4

Deploying SSL Server Certificates: Planning for your SSL Server, Creating SSL Servers with FreeBSD, Installing an SSL Certificate on Microsoft IIS, When Things Go Wrong; **Securing Your Web Service:** Protecting Via Redundancy, Protecting Your DNS, Protecting Your Domain Registration.
Self Study Component: Obtaining a Certificate from a Commercial CA.

10 Hours

Unit-5

Controlling Access to Your Web Content: Access Control Strategies, Controlling Access with Apache, Controlling Access with Microsoft IIS; **Client-Side Digital Certificates:** Client Certificates, A Tour of the VeriSign Digital ID Center; **Pornography, Filtering Software and Censorship:** Pornography Filtering, PICS, RSAC, **Privacy Policies, Legislation and P3P:** Policies that Protect Privacy and Privacy Policies.
Self Study Component: Children's Online Privacy Protection Act, P3P.

11 Hours

Text Book :

1. **Web Security, Privacy & Commerce:** Simson Garfinkel, Gene Spafford, SPD O'reilly. Second Edition, 2011

Reference Books:

1. **Web Application Security:** Bryan Sullivan, Vincent Liu, Mc Graw Hill.
2. **Web Application Hacker's Handbook:** Dafydd Stuttard, Marcus Pinto, 2nd Edition, Wiley India.
3. **Hacking Exposed Web Applications 3:** Joel Scambray, Vincent Liu, Caleb Sima, TMH.

Course Outcomes: The students should be able to

1. **Understand** the web security landscape and risks of running a web server on the internet by defending against risks.
2. **Analyze** the hype surrounding web security and use the phrase "secure web server," and discuss overall strategies for reducing the risks of operating a site and publishing.
3. **Apply** Privacy-Protecting Technologies Backups and Anti Theft.
4. **Apply** Physical security, Host Security and Web Application Security for Servers.
5. **Generate & Deploy** SSL Server Certificates, securing the web services.
6. **Controlling** Access to your Web Content, Client-Side Digital Certificates and Privacy Policies, Legislation and P3P.

CO-PO Mapping

Semester : 8	**Course code : P17CS824**						**Title : Web Security**								
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	Understand Security Landscape and Protocols	3	2	3										2	
CO2	Analyze the hype surrounding web security and use the phrase "secure web server," and discuss overall strategies for reducing the risks of operating a site and	2	2	2	3									2	
CO3	Apply Privacy-Protecting Technologies Backups and Anti Theft, Physical security, Host Security and Web Application Security for Servers.	2	2	3										2	
CO4	Generate & Deploy SSL Server Certificates, securing the web services.	2	2	3										2	
CO5	Controlling access to your Web Content, Client-Side Digital Certificates and Privacy Policies, Legislation and P3P	2	2	2	3									3	
		2.2	**2**	**2.6**	**3**									**2.2**	

Elective-VI

Course Title: Network Management Systems			
Course Code: P17CS831	**Semester : 8**	**L:T:P:H: 4:0:0:4**	**Credits : 3**
Contact Period: Lecture: 52 Hrs., Exam: 3 Hrs		**Weightage : CIE:50%, SEE:50%**	

Prerequisites: Computer Networks.

Course Content

Unit-1

Data Communications And Network Management Overview : Analogy of Telephone Network Management, Data and Telecommunication Network, Distributed computing Environment, TCP/IP Based Networks: Internet and Intranet, Communications protocols and Standards, Networks, Systems and Services, Case Histories of Network, System and Service Management, Challenges of IT Managers, Network Management: Goals, Organization, and Functions, Network Management Architecture and Organization, Network Management Perspectives, NMS Platform, Current Status and future of Network Management.

Basic Foundations: Standards, Models and Language: Network Management Standards, Network Management Models, Organization Model, Information Model, Communication Model, Encoding Structure, Macros, Functional Model.

Self Study Component: Abstract Syntax Notation One: ASN.1

10 Hours

Unit -2

SNMPv1 Network Management: Organization And Information Models: Managed Network: Case Histories and Examples, History of SNMP Management, Internet Organizations and Standards, The SNMP Model, The Organization Model, System Overview. The Information Model.

SNMPv1 Network Management: Communication And Functional Models: The SNMP Communication Model – The SNMP Architecture, Administrative Model, SNMP Specifications, SNMP Operations.

Self Study Component: SNMP MIB Group, And Functional Model

10 Hours

Unit-3

SNMP Management: SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

SNMP Management: SNMPv3: SNMPv3 System Architecture, Applications, SNMPv3 MIB, Security.

SNMP Management RMON: What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2.

Self Study Component: ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON.

11 Hours

Unit-4

Telecommunications Management Network: Why TMN, Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, TMN Integrated View, TMN Implementation.

Network Management Applications: Configuration Management, Fault Management, Performance Management, Event Correlation Techniques, Security Management, Accounting Management, Report Management, Policy- Based Management.

Self Study Component: Service Level Management.

11 Hours

Unit-5

Broadband Network Management: Wired And Optical Access Networks: Broadband Access Networks , Broadband Access Technology, Cable Modem Technology, Cable Access Network Management, DSL Access Network, Asymmetric Digital Subscriber Line, ADSL Management, ADSL2, ADSL2+and VDSL2,Passive Optical Network, PON Management.
Advanced Management Topics: Early Web-Based Development.
Self Study Component: XML-Based NM Technology.

10 Hours

Text Book:

1. Mani Subramanian: Network Management- Principles and Practice, 2nd Ed. , Pearson Ed, 2012

Reference Book:

1. J. Richard Burke: N/W management concepts and practices: a Hands-On Approach, PHI, 2008

Course Outcomes: Upon completion of this course, the students will be able to,

1. **Analyze** the issues and challenges pertaining to management of emerging network technologies and apply network management standards to manage practical networks.
2. **Describe** basic foundations of model that are needed to build Network Management architecture, protocols, SMNP and IP network management.
3. **Describe** the management features of SNMP v2, SNMP v3 and RMON for monitoring the behaviour of the network.
4. **Describe** network management for the management of telecommunication, which includes network, systems, operations and business services and management.
5. **Analyze** the various technologies of network management with respect to applications of broadband networks and the latest trends in management technology.

CO-PO Mapping

Semester : 8	**Course code : P17CS831**			**Title : Network Management Systems**											
CO	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	**Analyze** the issues and challenges pertaining to management of emerging network technologies and apply network management standards to manage practical networks.	3	2	3										2	-
CO2	**Describe** basic foundations of model that are needed to build Network Management architecture, protocols, SMNP and IP network management	2	2	2	3									2	-
CO3	**Describe** the management features of SNMP v2, SNMP v3 and RMON for monitoring the behaviour of the network	2	2	3										2	-
CO4	**Describe** network management for the management of telecommunication, which includes network, systems, operations and business services and management	2	2	3										2	-
CO5	**Analyze** the various technologies of network management with respect to applications of broadband networks and the latest trends in management technology	2	2	2	3									3	-
		2.2	2	2.6	3									2.2	-

Course Title : Software Project Management			
Course Code : P17CS832	**Semester : 8**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

Metrics: Introduction, The Metrics Roadmap, A Typical Metrics Strategy, , Set Targets and track Them, Understanding and Trying to minimize variability, Act on data, People and Organizational issues in Metrics Programs, Common Pitfalls to watch out for in Metrics Programs, Matrices implementation checklists and tools, Software configuration management configuration status accounting, configuration audit, software configuration management in geographically distributed teams,

Self Study Component : software configuration management tools and automation.

11 Hours

Unit-2

Risk Management: Introduction, risk management and its importance , Risk management cycle, Risk identification, Project Planning and Tracking Project Closure . An Effective Closure Process.

Self Study Component : Interfaces to the Process Database

10 Hours

Unit-3

Software Requirements gathering, Metrics for requirements phase. Estimation: Design and Development Phases: Some differences in our chosen approach, salient features of design, evolving an architecture/ blueprint, design for reusability, technology choices constraints, design to standards, design for portability, user interface issues, design for testability, design for diagnose ability, design for install ability, inter-operability design, challenges during design and development phases, skill sets for design and development, metrics for design and development phases.

Self Study Component : design for maintainability

11 Hours

Unit-4

Project management in the testing phase, Project management in the Maintenance Phase: Introduction, Activities during Maintenance Phase, management issues during Maintenance Phase, Configuration management during Maintenance Phase, skill sets for people in the maintenance phase, estimating size, effort, and people resources for the maintenance phase, advantages of using geographically distributed teams for the maintenance phase,

Self Study Component : metrics for the maintenance phase.

10 Hours

Unit -5

Globalization issues in project management, Impact of the internet on project management, the effect of internet on project management, managing projects for the internet, Effect on the project management activities. People focused process models: Growing emphasis on people centric models, other people focused models in the literature.

Self Study Component: people capability maturity model (P-CMM),

10 Hours

Text Book :

1. Ramesh Gopalaswamy: “Managing Global Projects ", Tata McGraw Hill, 2013.

Reference Books:

1. Watts Humphrey, “Managing the Software Process “, Pearson Education, New Delhi, 2000

2. Pankaj Jalote, "Software Project Management in practice", Pearson Ed., New Delhi, 2002.

Course Outcomes: At the end of this course students will be able to:

1. Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities
2. Apply risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales
3. Identify the resources required for a project and to produce a work plan and resource schedule
4. Monitor the progress of a project and to assess the risk of slippage, revising targets counteract drift
5. Use appropriate metrics to manage the software development outcome, develop research methods and techniques appropriate to defining, planning and carrying out a research project within your chosen specialist area within the management of software projects.

CO-PO Mapping

Semester: 8	**Course code : P17CS832**							**Title : Software Project Management**						
Statement	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS 01**	**PS 02**
Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities	1	1		2		2			2		3	2	1	
Apply risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project	1	1						1	2		2	1	1	1
Identify the resources required for a project and to produce a work plan and resource schedule	1	1		1					2	1	2		1	
Monitor the progress of a project and to assess the risk of slippage, revising targets counteract drift				2						2		3	1	
Use appropriate metrics to manage the software development outcome, develop research methods and techniques appropriate to defining, planning and carrying out a research project within your chosen specialist area within the management of software projects.	2			2					2		3			2

Course Title : Agile Technologies			
Course Code: P17CS833	**Semester : 8**	**L:T:P: H : 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Prerequisites: Software Engineering

Course content

Unit–1

INTRODUCTION: Software is new product development – Iterative development – Risk (Driven and Client (Driven iterative planning – Time boxed iterative development – During the Iteration, No changes from external stakeholders –Evolutionary and adaptive Development (Evolutionary requirements analysis – Early "Top Ten" high (level requirements and skilful analysis Evolutionary and adaptive planning – Incremental delivery – Evolutionary delivery.
Self Study Component: The most common mistake- Specific iterative and Evolutionary methods.

12 Hours

Unit-2

AGILE AND ITS SIGNIFICANCE : Agile development – Classification of methods – The agile manifesto and Principles – Agile project management – Embrace communication and feedback – Simple practices and project tools – Empirical Vs defined and prescriptive Process – Principle(based versus Rule(Based – Sustainable discipline: The human touch – Team as a complex adaptive system – Agile hype – Specific agile methods. Meeting the requirements challenge iteratively – Problems with the Waterfall. Research evidence – Early historical project evidence – Standards (Body evidence – Expert and thought leader evidence – A Business case for iterative development – The historical accident of waterfall validity.
Self Study Component : The facts of change on software projects –Key motivations for iterative Development

10 Hours

Unit-3

AGILE METHODOLOGY : Method overview – Lifecycle – Work products, Roles and Practices values – Common mistakes and misunderstandings – Sample projects – Process mixtures – Adoption strategies..
Self Study Component : Fact versus fantasy – Strengths versus "Other" history

10 Hours

Unit-4

SCRUM : Concepts –deliverable and methods. XP: Concepts –deliverable and methods Unified process: Concepts- deliverable-methods.EVE: Concepts- Methods-deliverable. EVO: Method Overview, Lifecycle, Work Products, Roles and practices.
Self Study Component : Common mistakes and Misunderstandings, Sample Projects.

10 Hours

Unit-5

AGILE PRACTICING AND TESTING :– Requirements – Test – The agile alliances – The manifesto – Supporting the values – Agile testing – Nine principles and six concrete practices for testing on agile teams.
Self Study Component : Project management– Environment

10 Hours

Text Books:

1. Craig Larman "Agile and Iterative Development – A Manager's Guide" Pearson Education – 2004.
2. Elisabeth Hendrickson, "Agile Testing" Quality Tree Software Inc 2008.

Reference Book:

1. Shore, "Art of Agile Development" Shroff Publishers & Distributors, 2007

Course Outcomes

1. Demonstrate a systematic understanding of current agile techniques and practices used in industry.
1. Apply industry standard agile techniques in develop software in a team.
2. Use group and individual retrospectives to critically evaluate and propose improvements in developing software in a professional context.
3. Apply concepts of XP and EVE in develop a software
4. Managing the changes applying different testing techniques

CO-PO Mapping

Course Articulation Matrix(CAM)														
Course Outcomes (CO's)	**Program Outcomes(PO's)**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO – 1	2	2			1	2	2	1	2		2		2	
CO – 2	1	2	3	2	2		3	2	2		1	1	2	
CO – 3		2	2	3	2	2	2	1	1		2		2	
CO – 4	1	2	2	2	1		2				1	1	2	
CO – 5	1	2		2	1	2	2		1		2	1	2	

Course Title : Business Intelligence & Applications			
Course Code: P17CS834	**Semester : 8th**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Introduction to Business Intelligence: Business enterprise organization, Its functions, and core business processes, Key purpose of using IT in business, The connected world: Characteristics of Internet-Ready IT Applications, Enterprise Applications, Introduction to digital data and its types – structured, semi-structured and unstructured.

Introduction to OLTP and OLAP: On-Line Transaction Processing (OLTP) and On-Line Analytical Processing (OLAP): Different, OLAP architectures, OLTP and OLAP.

Self Study Component: Data models for OLTP and OLAP

11 Hours

Unit-2

Role of OLAP tools in the BI architecture, OLAP performance directly on operational databases, A peek into the OLAP operations on multidimensional data, Leveraging ERP data using analytics.

Getting started with business intelligence: Using analytical information for decision support, Information sources before dawn of BI, Business intelligence (BI) defined, Evolution of BI and role of DSS, EIS, MIS and digital dashboards, BI for past, present and future, The BI value chain, Introduction to business analytics.

Self Study Component: Need for BI at virtually all levels

10 Hours

Unit-3

BI Definitions and concepts: BI Component framework, Need of BI, BI Users, Business Intelligence applications, BI Roles and responsibilities, Best practices in BI/DW, The complete BI professional, Popular BI tools.

Basis of data integration: Need for data warehouse, Definition of data warehouse, data mart, OSS, Raiph Kimball's approach vs. W.H.Inmon's approach, Goals of a data warehouse, constituents of a data warehouse, Extract, transform, load, data Integration, Data integration technologies, Data quality.

Self Study Component: Data profiling

10 Hours

Unit-4

Multidimensional data modelling: Introduction, Data modelling basis, Types of data model, Data modelling techniques, Fact table, Dimension table, typical dimensional models, Dimensional modelling life-cycle, designing the dimensional model, Step-by-step lab guide to analyze data using MS Excel 2010

Measures, metrics, KPIs, and Performance management: Understanding measures and performance, Measurement system terminology, Navigating a business enterprise, and metrics supply chain, "Fact-Based Decision Making" and KPIs

Self Study Component*:* role of metrics

11 Hours

Unit-5

KPI Usage in companies, business metrics and KPIs, Connecting the dots: Measures to business decisions and beyond

Basics of enterprise reporting: Reporting perspectives common to all levels enterprise, Report standardization and presentation practices, Balanced scorecard, Dash boards and its creation,

Scorecards vs. Dashboards, The buzz behind analysis, Step-by-step lab guide to create enterprise reports using MS Acess.
Self Study Component: Enterprise reporting characteristics in OLAP world,

10 Hours

Text Books:

1. "Fundamentals of Business Analytics" – By R N Prasad and Seema Acharya, Publishers: Wiley India.
2. David Loshin- Business Intelligence: The Savvy Manager's Guide, Publisher: Morgan Kaufmann

Reference Books:

1. Larissa T Moss and Shaku Atre – Business Intelligence Roadmap : The Complete Project Lifecycle for Decision Support Applications, Addison Wesley Information Technology Series
2. Brian Larson -Delivering Business Intelligence with Microsoft SQL Server 2005, McGraw Hill

Course Outcomes:

1. **Illustrate** role of business intelligence in the IT applications.
2. **Construct** OLAP operations to analyze business intelligence.
3. **Apply** various ETL techniques of data integration.
4. **Identify** data modeling technique to analyze data for a successful business enterprise.
5. **Construct** enterprise reports for various situations of a business enterprise

CO-PO Mapping

Semester: 8	**Course code : P17CS834**			**Title : Business Intelligence & Applications**											
CO	**Statement**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2
CO1	**Illustrate** role of business intelligence in the IT applications.	2	2												2
CO2	**Construct** OLAP operations to analyze business intelligence.	2	2												2
CO3	**Apply** various ETL techniques of data integration.	2	2												2
CO4	**Identify** data modeling technique to analyze data for a successful business enterprise.				2	2									2
CO5	**Construct** enterprise reports for various situations of a business enterprise		2	2	2	2									2
		2	2	2	2	2									2.6

Open Elective-II

Course Title : Data Base Systems			
Course Code: P17CSO841	**Semester : 8**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course content

Unit-1

Introduction : An example: Characteristics of Database approach; Advantages of using DBMS approach; A brief history of database applications; Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment**.**

Self Study Component : Introduction to structured, semi structured and unstructured data.

11 Hours

Unit-2

Entity-relationship model: Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams.

Self Study Component : Examples on ER diagrams.

10 Hours

Unit-3

Relational model and relational algebra: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations.

Self Study Component : Additional Relational Operations; Examples of Queries in Relational Algebra

11 Hours

Unit-4

Relational Database Design Using ER-to-Relational Mapping.

Database design: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form.

Self Study Component: Properties of relational decompositions, multivalued dependencies and 4NF.

10 Hours

Unit-5

Transaction processing concepts: Introduction to Transaction processing; Transactions and System concepts; Desirable properties of transactions; Characterizing Schedules based on recoverability, Characterizing schedules based on Serializability, Characterizing schedules based on two phase locking technique for concurrency control.

Self Study Component : Concurrency control based on timestamp ordering**.**

10 Hours

Text Books:

1. Fundamentals of Database Systems– Elmasriand Navathe, 6th Edition, Addison-Wesley, 2011

Reference Books:

1. **Database System Concepts**–Silberschatz, Korthand Sudharshan, 5th Edition,Mc-GrawHill, 2006.

2. **An Introduction to Database Systems**– C.J.Date, A.Kannan, S.Swamynatham, 8th Ed., Pearson Education, 2006.
3. **Database Management Systems** –Raghu Ramakrishnan and Johannes Gehrke – 3rd Ed., McGraw-Hill,2003.

Course outcomes : At the end of the course the student should be able to

1. **Design** an ER model for a given example from real world description.
2. **Design** relational models for a given application using schema definition and constraints.
3. **Develop** complex queries using SQL to retrieve the required information from database.
4. **Apply** suitable normal forms to normalize the given database
5. **Determine** the roles of concurrency control in database design.

CO-PO Mapping

Course code : P17CSO841			Title : Database Systems												
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	**Design** an ER model for a given example from real world description	3	3	3	1					2		2	2		3
CO2	**Design** relational models for a given application using schema definition and constraints.	3	2	3	1					2		2	2		3
CO3	**Develop** complex queries using SQL to retrieve the required information from database	3	3	3		2				2		2			3
CO4	**Apply** suitable normal forms to normalize the given database	2	2	2						2		2			2
CO5	**Determine** the roles of concurrency control in database design.	2	1	1											2
		2.6	**2.2**	**2.4**	**1**	**2**				**2**			**2**	**2**	**2.6**

Course Title: Mobile Application Development			
Course Code:P17CSO842	**Semester: 8**	**L:T:P:H : 4:0:0:4**	**Credit: 3**
Contact Period: Lecture: Exam: 52 Hr, Exam: 3Hr		**Weightage : CIE:50% SEE:50%**	

Course content

Unit-1

Preliminary considerations: Why you might be here? Cost of development, Importance of mobile strategies, Why is mobile development difficult?

Diving into mobile: app or website? Mobile Web Presence, Mobile Applications, Marketing

Creating consumable web services for mobile devices: What Is a Web Service? Web Services Languages (Formats), Creating an Example Web Service, Debugging Web Services.

Self study component: Mobile development today, Mobile Myths, Third party Frameworks.

12 Hours

Unit-2

Mobile user interface design: Effective Use of Screen Real Estate, Understanding Mobile Application Users, Understanding Mobile Information Design, Understanding Mobile Platforms, Using the Tools of Mobile Interface Design

Mobile websites: Choosing a Mobile Web Option, Adaptive Mobile Websites, Dedicated Mobile Websites .

Self study component: Mobile Web Apps with HTML5.

10 Hours

Unit-3

Getting started with android: Why Target Android? Who Supports Android? Android as Competition to Itself, Getting the Tools You Need, Connecting to the Google Play, Android Development Practices, Building the Derby App in Android

Getting started with iOS: The iPhone Craze, Getting the Tools You Need, iOS Project, Debugging iOS Apps, Objective-C Basics, Hello World App, Building the Derby App in iOS.

Self study component: Building the Derby App in iOS, Other Useful iOS Things.

10 Hours

Unit-4

Signing and Publishing your Application: Test your application, Attach and end user License Agreement if desired, Create and attach an Icon and Label, clean Up for Release, Version Your Application, Obtaining a signing Certificate and API Key, Signing Your Application, Retesting your Application.

Persistent Data Storage: SQLite Databases and Content Providers: Databases-Basic Structure of the Micro Jobs database Class, Reading Data from the Database, Modifying the Database. Content Providers-Introducing Notepad, Content Providers, consuming a Content Provider.

Self study component: Publishing on Android Market, signing up As an Android Developer.

10 Hours

Unit-5

Location and Mapping : Location-Based services, Mapping, The Google Maps Activity, The Map view and Map Activity, Working with Map views.

Building a View : Android GUI Architecture, Assembling a graphical Interface, Wiring up the Controller.

Self study component: Location without Maps, The Menu. 10 Hours

Text Books:

1. Jeff McWherter, Scott Gowell, Professional Mobile Application Development, WROX, 2012
2. Rogers, Android Application Development, Shroff/O'Reilly Publications, 2009 (chapter 7, 8, 9 and 10)

Reference Book:

1. Neuburg, Programming iOS8, 5th edition, Shroff/O'Reilly Publications, 2014.

Course Outcomes After learning all the units of the course, the student is able to,

1. Develop simple consumable web services for mobile devices
2. Design user interfaces for mobile application.
3. Develop simple mobile app either by using ANDROID mobile development framework or iOS mobile development framework.
4. Apply the number of steps that any application developer has to go through in order to prepare and submit an application to Android Market.
5. Develop views, Location-based services and mapping for a given problem.

Course Articulation Matrix (CAM)														
Course Outcomes	Program Outcomes (PO's)												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2		2		3								1	
CO2	1		1		3									
CO3	2		2		3								1	
CO4	1		1		3									
CO5	2		2		3								1	

Course Title : Unix and Shell Programming			
Course Code: P17CSO843	**Semester : 8th**	**L:T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Background and Basic Commands: Brief history, Salient features of a UNIX System, The UNIX Architecture. Introduction to Linux Operating System, Internal and External Commands, Introduction to system administration, man: Browsing and Manual Pages On-line, cal: The Calendar, date: Displaying and System Date, echo: Displaying a Message, printf: An Alternative to echo, bc: The Calculator, script: Recording Your Session, passwd: Changing Your Password, who, uname: Knowing Your Machine's Characteristics, tty: Knowing Your Terminal.

Self Study Component : stty: Displaying and Setting Terminal Characteristics

10 Hours

Unit-2

The FILE System and FILE handling Commands: The File, The Parent-Child Relationship, The HOME Variable: The Home Directory, pwd: Checking Your Current Directory, cd: Changing the Current Directory, mkdir: Making Directories, rmdir: Removing Directories, Absolute Pathnames, Relative Pathnames, Is: Listing Directory Contents, The UNIX File System. cat: Displaying and Creating Files, cp: Copying a File, rm: Deleting Files, mv: Renaming Files, more: Paging Output, The lp Subsystem: Printing a File, file: Knowing the File Types, wc: Counting Lines, Words and Characters.

Self Study Component : od: Displaying Data in Octal, The spell and ispell, cmp: Comparing Two Files

10 Hours

Unit-3

FILE Attributes : ls -l: Listing File Attributes, The d Option: Listing Directory Attributes, File Ownership, File Permissions, chmod: Changing File Permissions, Directory Permissions, Changing File Ownership. File Systems and Inodes, Hard Links, Symbolic Links and ln, The Directory, umask: Default File and Directory Permissions, Modification and Access Times, find: Locating Files, Converting One File to Other, dos2unix and unix2dos: Converting between DOS and UNIX

Self Study Component : Compressing Files, gzip, gunzip, zip and unzip commands, tar command

10 Hours

Unit-4

The Process : Process Basics, ps: Process Status, System Processes, Mechanism of Process Creation, Internal and External Commands, Running Jobs in Background, nice: Job Execution With Low Priority, Killing Processes with Signals, Job Control, at and batch: Execute Later, cron: Running Jobs Periodically, time: Timing Processes

Simple Filters : The Sample Database, pr: Paginating Files, head: Displaying the Beginning of a File, tail: Displaying the End of a File, tr: Translating Characters, An Example: Displaying a Word-count List

Self Study Component : cut: Slitting a File Vertically, paste: Pasting Files, sort: Ordering a File, uniq: Locate Repeated and Non repeated Lines

10 Hours

Unit-5

SHELL Programming: The Shell's Interpretive Cycle, Pattern Matching The Wild-cards, Escaping and Quoting, Redirection: The Three Standard Files, /dev/null and /dev/tty: Two

Special Files, Pipes, tee: Creating a Tee, Command Substitution, Shell Variables, Environment Variables, Aliases (bash and ksh), Command History (bash and ksh). Shell Scripts, read and read-only commands, Using Command Line Arguments, exit and Exit Status of Command, The Logical Operators && and || -Conditional Execution, The if Conditional, Using test and [ ] to Evaluate Expressions, The case Conditional, expr: Computation and String Handling, $0: Calling a Script by Different names, while: Looping, for: Looping with a List, set and shift: Manipulating the Positional Parameters, The here Document (<<), trap: Interrupting a Program, Debugging Shell Scripts with set -x, export: Exporting Shell Variables, eval: Evaluating Twice, The exec Statement. Development of simple shell scripts to demonstrate the integer and real arithmetic operations, handling of positional parameters, the use of branching and looping constructs in the shell.

Self Study Component: handling of signals using the trap etc.

12 Hours

Text Book:

1. UNIX Concepts and Applications by Sumitabha Das, 4 edition, Tata McGraw Hill, 01-May-2006.

Reference Books:

1. Terrence Chan: UNIX System Programming Using C++, First edition, Prentice Hall India, 2011.
2. W. Richard Stevens: Advanced Programming in the UNIX Environment, Second Edition, Pearson education, 2011

Course Outcomes

1. **Apply** the commands on files and directories to manage UNIX file system
2. **Compare** different types of file supported by UNIX operating system.
3. **Understand** file Permission commands.
4. **Analyze** process control, daemon characteristics, job control**.**
5. **Develop** shell scripts for simple applications.

CO-PO mapping

Semester: 8	**Course code : P17CSO843**			**Title : Unix and Shell Programming**											
CO	**Statement**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**
CO1	**Apply** the commands on files and directories to manage UNIX file system	3	3	2	2	2				2			2	2	3
CO2	**Compare** different types of file supported by UNIX operating system.	3	2											2	2
CO3	**Understand** file Permission commands.	2		1											
CO4	**Analyze** process control, daemon characteristics, job control**.**	3	2											2	2
CO5	**Develop** shell scripts applications for simple	2	2	3	2					2				2	3
		2.6	**2.2**	**2.0**	**2**	**2**				**2**			**2**	**2**	**2.5**

Course Title : Python Programming			
Course Code : P17CSO844	**Semester : 8**	**L :T:P:H : 4:0:0:4**	**Credits: 3**
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		**Weightage: CIE:50%, SEE:50%**	

Course Content

Unit-1

The python programming language, what is programming, the first program, values and types, variables, variable and keywords, operators and operands, expression and statements, string operations, comments, function calls, type conversion functions, math functions, composition, adding new functions, definition and uses, flow of execution, parameters and arguments, variables and parameters are local, stack diagrams.

Self study component: Interface design, Refactoring

11 Hours

Unit-2

Modulus operator, Boolean expression, logical operators, conditional execution (if), alternative execution(if-else) ,chained conditionals (if-elif-else), nested conditionals, iterations: multiple assignment ,updating variables , the while statement, break, square root, String: string slices, immutability, searching, looping and counting ,string methods, The in operator, string comparison.

Self study component: Reading word lists.

10 Hours

Unit-3

Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search. Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list arguments. Tuples: tuples are immutable, tuple assignment, tuples are return values, variable-length argument tuples, list and tuples.

Self study component**:** Markov analysis.

10 Hours

Unit-4

Dictionaries: create dictionary, convert by using dict(), operation on dictionary (add, delete, get copy), set: create set ,convert from other data types with set, use of in , combinations and operators. Classes and objects: what are objects, define a class with class, inheritance, override a method, add a method, get and set values with properties, method types.

Self study component**:** Compare data structures.

11 Hours

Unit-5

Files input/output, structure text files, structured binary files.

Self study component**:** HDF5

10 Hours

Textbooks:

1. Think Python: How to Think Like a Computer Scientist Allen B. Downey Shroff O'Reilly Publishers 2nd edition 2016 (module 1-chapter 1,2,3 module 2-chapter 5,7 and 8, module 3- chapter 10 and 12) (https://greenteapress.com/thinkpython2/thinkpython2.pdf)
2. Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication , 1st edition 2014.(module 4- Chapter 3and 6, module 5- chapter 8) (https://www.academia.edu/39376646/Introducing_Python)

Reference Books:

1. Introduction to Programming in Python: An Inter-disciplinary Approach Robert Sedgewick, Kevin Wayne, Robert Dondero Pearson India Education Services Pvt. Ltd 2016
2. Fundamentals of Python: First Programs Kenneth A. Lambert CENGAGE Learning 2012

Course Outcomes: At the end of the course the student will be able to:

1. Develop python programs using modular approach.
2. Implement python programs for demonstrating Operators, Control statements and Strings
3. Create applications using python data structures.
4. Design user defined data structures.
5. Usage of file system in python

Course Articulation Matrix (CAM)														
Course Outcomes	Program Outcomes (PO's)												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1	2		1									
CO2	2	1	2		1									
CO3	2	1	2		1									
CO4	2	1	2		1									
CO5	2		1		1									

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