PG DEPARTMENT OF COMPUTER SCIENCE

OUTCOME BASED SYLLABUS

PECSB20 - ELECTIVE I B: CYBER SECURITY

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: I	PECSB20	Elective I B: Cyber Security	Theory	Elective	5	5	100

Course Objectives

1. Gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
2. Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
3. Examine secure software development practices.
4. Understand principles of web security.
5. Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.

Course Outcomes (COs)

1. Evaluate the computer network and information security needs of an organization.
2. Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
3. Analyze the performance of applications in a variety of system contexts.
4. Implement continuous network monitoring and provide real-time security solutions.
5. Identify physical points of vulnerability in simple networks.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M

CO5	H	M	L	L	M	L

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	L	M	H
CO2	L	M	M	H	M	L
CO3	H	M	M	L	M	L
CO4	M	M	M	L	M	M
CO5	L	M	L	M	H	L

(Low - L, Medium – M, High - H)

Course Syllabus

Unit I **(16 Hours)**

1.1 Digital securities introduction, types of attacks, digital privacy, online tracking, privacy laws (K1, K2)
1.2 Types of computer security risks - malware, hacking, pharming, phishing, ransomware, adware and spyware, trojan, virus, worms, wifi eavesdropping(K1, K2)
1.3 Scareware, distributed denial-of-service attack, rootkits, juice jacking (K1, K2)
1.4 Antivirus and other security solution – password (K1, K2)
1.5 Secure online browsing email security - iot security (K1, K2)
1.6 Physical security threads (K1, K2)

Unit II **(16 Hours)**

2.1 Online anonymity anonymous networks - tor network (K1, K4)
2.2 I2P network – freenet - darknet, anonymous os(K1, K4)
2.3 Tails – secure file sharing – vpn – proxy server (K1, K4)
2.4 Connection leak testing –   secure search engine (K1, K4)
2.5 Web browser privacy configuration (K1, K4)
2.6 Anonymous payment (K1, K4)

Unit III **(15 Hours)**

3.1 Disk Encryption using windows BitLocker(K4)
3.2 Disk Encryption Using open source tools –   multitask encryption tools(K4)

3.3   Attacking cryptographic systems – countermeasures against cryptography attacks (K4)
3.4   Securing data in transit – cloud storage encryption (K4)
3.5   Encrypt DNS Traffic and Email communication (K4)
3.6   Secure IM and video calls (K4)

Unit IV   **(14 Hours)**
4.1   Cyber Crime issues and investigation unauthorized access, computer intrusions (K4, K5)
4.2   White collar crimes – viruses and malicious code –   internet hacking and cracking(K4, K5)
4.3   Virus attacks – pornography –   software piracy –intellectual property –mail bombs (K4, K5)
4.4   Digital evidence collection –   evidence preservation – e-mail investigation (K4, K5)
4.5   E-mail tracking – IP tracking –   e-mail recovery (K4, K5)
4.6   Recovering deleted evidences –   password cracking (K4, K5)

Unit V   **(14 Hours)**
5.1   Digital Forensics introduction to digital forensics – forensic software and hardware (K1, K3)
5.2   Analysis and advanced tools – forensic technology and practices, forensic ballistics and photography (K1, K3)
5.3   Face, iris and fingerprint recognition – audio video analysis (K1, K3)
5.4   Windows system forensics –   linux system forensics (K1, K3)
5.5   WIFI Security (War-driving) –   Network Forensics (K1, K3)
5.6   Mobile Forensics – Cloud Forensics (K1, K3)

Text Books:
1.   Digital Privacy and Security Using Windows: A Practical Guide by Nihad Hassan, Rami Hijazi, Apress, 2017.

Reference Books:
1.   Cybersecurity: The Ultimate Beginners Guide to Learn and Understand Cybersecurity Measures Effectively Kindle Edition by Zach Webber 2018.
2.   Cybersecurity for Beginners by RaefMeeuwisse Lulu Publishing Services, 2017.

Open Educational Resources (OER):
1.   https://www.goodreads.com/book/show/28320795-cybersecurity-for-beginners
2.   2.https://www.academia.edu/40648445/Digital_Privacy_and_Security_Using_Windows_A_Practical_Guide
3.   https://www.slideshare.net/lawitwan112/digital-privacy-and-security-using-windows-a-practical-guide

PCCSD20 - PRACTICAL I: JAVA PROGRAMMING LAB

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: I	PCCSD20	Practical I: Java Programming Lab	Practical	Core	5	3	100

Course Objectives

1. Create a full set of UI widgets and other components, including windows, menus, buttons, Checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.
2. Apply event handling on AWT and Swing components.
3. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).
4. Learn to develop server side programming using servlets.
5. Create dynamic web pages, using JSP.

Course Outcomes (COs)

1. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
2. Update and retrieve the data from the databases using SQL.
3. Develop Applet based programming using IDE.
4. Develop server-side programs in the form of servlets.
5. Design and develop JSP based Web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	H	M	L
CO2	H	M	L	M	H	M
CO3	M	M	L	M	H	M
CO4	L	M	L	M	M	L
CO5	L	M	H	M	L	M

(Low - L, Medium – M, High - H)

Course Syllabus

Exercises

1. Program using Basic User Interface Components and Layouts (K1, K2)
2. Create Payroll Processing form using swing (K1, K3)
3. Student Mark Sheet Processing using JDBC (K2, K4)
4. Bank Account Processing using JDBC (K4, K5)
5. Survey form using applets and JDBC (K2, K5)
6. Creating authentication form using servlets (K1, K3)
7. Creating survey form using servlets (K6)
8. Programs using JSP
   - JSP program that creates a table of power of 2 (K1, K3)
   - Factorial of a number (K1, K2)
9. Registration and Login form using JSP (K1, K3)
10. JSP program to process credit card information. (K5)

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PCCSF20	Machine Learning	Theory	Core	5	5	100

Course Objectives

1. To introduce basic concepts and techniques of Machine Learning.
2. To understands complexity of Machine Learning algorithms and their limitations.
3. To understand modern notions in data analysis oriented computing.
4. To discover patterns in user's data.
5. To make predictions based on user data.

Course Outcomes (COs)

1. Understand the basics of Machine Learning.
2. Explore knowledge about concept learning hypothesis.
3. Illustrate the working of basic classifier models.
4. Develop client/server applications and distributed applications using RMI.
5. Know about parametric methods bias and variance.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	L	M	L	L
CO2	M	L	M	H	L	M
CO3	L	H	M	H	M	L
CO4	M	L	H	M	L	H
CO5	H	L	M	M	M	L

(Low - L, Medium – M, High - H)

Course Syllabus

Unit I **(18 Hours)**
1.1 Introduction to Machine Learning – Well Posed Learning Problems – Designing a Learning system (K1, K2)
1.2 Perspectives and Issues in Machine Learning (K1, K2)
1.3 choosing training experience – target function (K1, K3)
1.4 Essential Libraries and Tools – Jupyter Notebook – Numpy – Scipy – Matplotlib – Pandas (K2, K3)
1.5 Limitations of inference machines, Approximation and estimation errors (K3, K4)
1.6 Simple Application.(K4, K5)

Unit II **(16 Hours)**
1.1 Inductive bias and bias-variance tradeoff (K1,K3)
1.2 Concept Learning and General to Specific Ordering – Introduction – Concept Learning Task (K2, K3)
1.3 Inductive Learning Hypotheisis – Concept Learning as Search. (K2, K3)
1.4 FIND –S: Finding a Maximally Specific Hypothesis (K4, K5)
1.5 Representation – Inductive Bias. (K2, K3)
1.6 Learning theory, Hypothesis and target class. (K3, K5)

Unit III
 (14 Hours)
3.1 Supervised Learning – Learning a Class from Examples (K2, K3)
3.2 Chervonenkis Dimension – Probably Approximately Correct Learning(K1, K2, K3)
3.3 Noise – Learning Multiple Classes (K3, K4)
3.4 Linear separability and decision regions, Linear discriminants (K2, K3)

3.5 Linear regression, Standard and stochastic gradient descent(K4, K6)
3.6 Regression – Model Selection and Generalization. (K5, K6)

Unit IV
(15 Hours)
1.1 Decision Tree Learning – Introduction – Decision Tree Representation (K1, K2)
1.2 Appropriate Problems for Decision Tree Learning (K2, K3)
1.3 Basic Decision Tree Learning Algorithm – Hypothesis Space Search in Decision Tree Learning (K1, K4)
1.4 Restriction Biases and Preferences – Issues in Decision Tree Learning. (K4, K5)
1.5 Overfitting, pruning of decision trees, Bagging and Boosting (K5.K6)
1.6 Dimensionality reduction and Feature selection (K5, K6)

Unit V   (12 Hours)
5.1 Parametric Methods – Introduction – Evaluating and Estimator (K1, K5)
5.2 Bias and Variance – Baye's Estimator (K1, K2)
5.3 Parametric Classification (K3, K5)
5.4 Regression – Model Selection Procedure. (K2, K3, K4)
5.5 Evaluation: Performance evaluation metrics (K3, K4.K5)
5.6 ROC Curves, Validation methods. (K5.K6)

Text Books:
1. Andreas C. Muller and Sarah Guide (2019). Introduction to Machine Learning with Python. FifthEdition. Shroff Publishers.
2. E. Alpaydin, Introduction to Machine Learning, 3rd Edition, Prentice Hall of India, 2014.

Reference Books:
1. Tom M. Mitchell (2019). Machine Learning. Third Edition McGraw Hill
2. EthemAlpaydin (2016). Introduction to Machine Learning Third Edition PHI Learning.

Open Educational Resources (OER):
1. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
2. https://www.youtube.com/watch?v=GwIo3gDZCVQ
3. https://www.youtube.com/watch?v=eiu2eXxeCCU

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PCCSG20	Open Source Programming	Theory	Core	4	4	100

Course Objectives

1. Understand how server-side programming works on the web.
2. PHP Basic syntax for variable types and calculations.
3. Using PHP built-in functions and creating custom functions.
4. Use PHP to access a MySQL database.
5. To gain knowledge in Linux administration- features and multimedia using Red Hat Linux

Course Outcomes (COs)

1. Learned the need of open source technology, open source development model, application of open sources, aspects of open source movement
2. Knowledge about the problems with traditional commercial software.
3. Work with regular expressions, handle exceptions, and validate data.
4. Familiar with basis syntax of PHP, common PHP scripts elements and creating of the server-side scripting using PHP, implement PHP database connectivity, perform operation on database and open source database management system.
5. Familiar with basics of LINUX & SHELL Scripting

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	L	L	M	L	L
CO2	M	M	L	H	M	L
CO3	L	M	L	M	M	H
CO4	M	M	M	L	H	M
CO5	L	M	L	M	M	M

(Low - L, Medium – M, High - H)

Course Syllabus

Unit I (13 Hours)
1.1 Installing and Configuring PHP: The Basics of PHP Scripts (K1)
1.2 The Building Blocks of PHP: Variables – Data Types – Operators and Expression – Constants (K1, K2)
1.3 Flow Control Functions in PHP: Switching Flow – Loops – Code Blocks and Browser Output (K1, K3)
1.4 Working with Functions: Variable Scope – Saving State between Function Calls with the Static Statement (K1, K4)
1.5 More About Arguments – Testing for the Existence of a Function (K1, K5)
1.6 Working with Arrays: Array – Creating Arrays – Some Array-Related Constructs and Functions (K1, K3)

Unit II (14 Hours)
2.1 Working with objects: creating an object – object inheritance (K1, K3)
2.2 Working with strings- dates and time – formatting strings with PHP – investigating strings with PHP – manipulating strings with PHP (K2, K3)
2.3 Using date and time functions in PHP – other strings- date and Time functions (K2, K3)
2.4 Working with Forms: creating a sample input form – accessing form input with User-defines arrays – combing HTML and PHP code on a single page – working with file uploads (K4, K5, K6)
2.5 Working with Cookies and user sessions – introducing cookies – setting and deleting a cookie with PHP (K2, K3)
2.6 Session function overview – starting a session – working with session variables – destroying sessions and unsetting variables – using sessions in an Environment with registered users (K3, K6)

Unit III (11 Hours)
3.1 Working with files and Directories: including files – using include once – validating files (K2, K3)
3.2 Creating and deleting files – opening a file for writing- reading or appending – reading from

files – writing or appending to a file (K1, K2, K3)
3.3 Working with directories (K3, K4)
3.4 Working with images – understanding the image-creation process – necessary modification to PHP (K2, K5)
3.5 Drawing a new image – modifying existing images (K4, K5, K6)
3.6 Image creation from user input – using images created by scripts (K6)

Unit IV (12 Hours)
4.1 Learning Basics SQL commands: Learning the MySQL data Types (K1, K2)
4.2 Learning the Table-creation syntax – using DDL and DML (K2, K3)
4.3 Frequently used string function in MySQL (K1, K4)
4.4 Using Date and Time Function in MySQL (K1, K2)
4.5 Interacting with MySQL using PHP: MySQL or MySQL functions (K5)
4.6 Connecting to MySQL with PHP – Working with MySQL data (K2, K5, K6)

Unit V (10 Hours)
5.1 Case Study: creating a shopping cart mechanism (K5, K6)
5.2 An overview of Red Hat Linux – What is Linux? – Common Linux features – Primary advantages of Linux (K1, K2)
5.3 Using Linux commands: The shell Interface (K3, K6)
5.4 Understanding the Red Hat Linux shell (K2, K3)
5.5 Working with the Red Hat Linux file system (K3, K4)
5.6 Using the vi text Editor (K5, K6)

Text Books:
1. Julie C. Meloni- (2013). PHP- MySQL and Apache. Pearson Education.
2. Christopher Negus (2003). Red Hat Linux 9 Bible. Wiley publishing.
3. Ivan Bayross (2010). Web Enabled Commercial Application Development Using HTML, DHTML Java Script and PHP. BPB Publications. 4th Edition.

Reference Books:
1. AnBayross (2002). Using Linux- Apache MySQL PHP PERL on Linux-IV BPB publications.
2. Ed Lecky-ThompsonSsteven d. Nowicki- Thomas Myer (2012). Professional PHP6. Wiley India Edition.

Open Educational Resources (OER):
1. https://education.fsu.edu/wp-content/uploads/2015/04/Learning-PHP-MySQL-JavaScript-and-CSS-2nd-Edition-1.pdf
2. http://webalgarve.com/books/MySQL%20&%20PHP/Teach%20Yourself%20PHP,%20MySQL%20and%20Apache%20All%20in%20One,%205th%20Edition.pdf
3. https://udaygade.files.wordpress.com/2015/04/linux-bible-by-christopher-negus.pdf
4. https://nish.info/books/PHP.pdf
5. https://www.tutorialspoint.com/php/php_tutorial.pdf
6. https://www.tecmint.com/linux-commands-cheat-sheet/

7. http://linuxcommand.org/index.php
8. https://linuxconfig.org/linux-commands#h1-introduction
9. https://www-uxsup.csx.cam.ac.uk/pub/doc/suse/suse9.0/userguide-9.0/ch24s04.html

PCCSH20 – WIRELESS COMMUNICATION AND NETWORKS

Year: I Sem: II	Course Code: PCCSH20	Title of the Course: Wireless Communication and Networks	Course Type: Theory	Course Category: Core	H/W 5	Credits 5	Marks 100

Course Objectives

1. To provide an overview of Wireless Communication Networks area and its applications
2. To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.
3. To explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
4. List and describe different network standards and protocols.
5. This course introduces the fundamentals of networking and principles of network operations.It also provides knowledge on various generations of cellular systems.

Course Outcomes (COs)

1. To design the various wireless networks.
2. Understand the principles behind the networking operation.
3. Examine the services provided in various layers of networks.
4. Classify different technologies followed in various generation of cellular networks.
5. Analyze different types of networks in wireless technology.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H

CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	L	H	M	L	M
CO2	M	L	M	H	M	L
CO3	H	L	L	M	M	L
CO4	L	M	M	M	L	H
CO5	M	L	M	L	M	H

(Low - L, Medium – M, High - H)

Course Syllabus

Unit I (18 Hours)

1.1 Introduction to Wireless Communications and Networks – Cellular Mobile - Wireless Networks: Description of Cellular Systems (K1, K2)

1.2 Propagation Models for Wireless Networks – Mobile Communication Antennas (K3)

1.3 Evolution of Modern Mobile Wireless Communication Systems: Personal Area Networks (PAN) – Low-Tier Wireless System (K3, K4)

1.4 Public Wide-area Wireless Networks – Wireless Local Area Networks (WLANs) (K2, K5)

1.5 Wireless Technology Divisions – Cellular-WLAN Integration (K1, K2)

1.6 All-IP Networks: Vision for 4G(K1, K6)

Unit II (16 Hours)

2.1 Multiple Access Techniques in Wireless Communications: FDMA (K1)

2.2 TDMA (K2, K3)

2.3 SDMA (K2)

2.4 CDMA (K2)

2.5 GSM: Architecture and Protocols: GSM Network Architecture(K1, K5)

2.6 GSM Authentication and Security (K4, K6)

Unit III (14 Hours)

3.1 2.5G GPRS: Revisited– GPRS Networks Architecture (K1, K2)

3.2 Overview of CDMA - CDMA Evolution (K2)

3.3 CDMA IS-95 Systems – Handoff Process in a CDMA System (K3, K5)

3.4 3G- UMTS: UMTS Network Architecture – UMTS Interfaces (K4)

3.5 UMTS FDD and TDD – UMTS Channels (K5, K6)

3.6 UMTS Network Protocol (K4, K5)

Unit IV   **(15 Hours)**

4.1 Overview of Internet Protocol and Mobile Internet Protocol: – TCP – UDP – DNS(K2)

4.2 Network Address Resolution Protocol (K2, K3)

4.3 IP Routing Protocols – Basic Mobile IP (K4)

4.4 Problems and Limitations of MIP (K3, K6)

4.5 Cellular and WLAN integration (K4, K5)

4.6 Internetworking Network Integration(K6)

Unit V   **(12 Hours)**

5.1 Fundamentals of Wireless Local Area Networks: IEEE 802.11 – WLAN Transmission Technology – Spread Spectrum Technology (K1, K2)

5.2 WLAN System Architecture – IEEE 802.11 Logical Architecture (K3)

5.3 Collision Sense Multiple Access with Collision Detection: CSMA/CD (K4)

5.4 Collision Sense Multiple Access with Collision Avoidance: CSMA/CA – MAC Frame Format and Fragmentation (K4, K5)

5.5 IEEE 802.11 PCF – IEEE 802.11 PHY Layer – 802.11 Systems Performance – Security Issues: Some Basic 802.11 Services (K3, K6)

5.6 Roaming Handover and Mobility Management for WLAN – WLAN Applications – Overview of WiMAXTechnologies: – IEEE 802.16 Standard Architecture(K2, K6)

Text Books:

1. ITI SahaMisra (2013). Wireless Communications and Networks. McGraw Hill Education.

Reference Books:

1. Jochen Schiller (2011). Mobile Communications. PHI/Pearson Education. 2nd Edition.
2. Dharma PrakashAgrawal- Qing-An Zeng (2006). Introduction to Wireless and Mobile SystemsCencage Learning.
3. William Stallings (2002). Wireless Communications and Networks. PHI/ Pearson Education.Second Edition.
4. KavehPahlavan-PrasanthKrishnamoorthy (2003). Principles of Wireless Networks. PHI/ Pearson Education

Open Educational Resources (OER):

1. https://www.tutorialspoint.com/wireless_communication/wireless_communication_overview.htm

2. https://www.youtube.com/watch?v=f2wlHL1Sok8&list=PLuv3GM6-gsE3ypUYh43pPuZsXxJVG1e7F

PECSC20 - ELECTIVE II A: CRYPTOGRAPHY AND NETWORK SECURITY

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PECSC20	Elective II A: Cryptography and Network Security	Theory	Elective	5	5	100

Course Objectives

1. To know about various encryption techniques.
2. To understand the concept of Public key cryptography.
3. To explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms.
4. To understand various protocols for network security to protect against the threats in the networks.
5. To develop the ability to use existing cryptographic utilities to build programs for secure communication.

Course Outcomes (COs)

1. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
2. Understand network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.
3. Analyze and apply system security concept to recognize malicious code.
4. Able to do research in the emerging areas of cryptography and network security.
5. Protect any network from the threats in the world.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L

CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	L	H	M
CO2	M	L	M	H	M	L
CO3	M	M	M	L	M	L
CO4	M	L	M	H	M	L
CO5	M	L	L	M	H	M

(Low - L, Medium – M, High - H)

Course Syllabus

Unit I (16 Hours)
1.1 Introduction – Classical Encryption techniques: Symmetric Cipher Model (K2)
1.2 Substitution Techniques – Transposition Techniques – Steganography(K2)
1.3 Block Ciphers and the Data Encryption Standards: Principles(K2)
1.4 DES – Strength of DES(K2)
1.5 Differential and Linear Cryptanalysis(K2)
1.6 Block Cipher Design principles (K2)

Unit II (16 Hours)
2.1 Advanced Encryption Standard: Evaluation Criteria for AES (K4)
2.2 AES cipher – Multiple Encryption and Triple DES (K4)
2.3 Block Cipher Modes of Operation. Confidentiality Using Symmetric   Encryption.(K4)
2.4 Placement of Encryption Function – Traffic Confidentiality(K4)
2.5 Key Distribution(K4)
2.6 Random Number Generation(K4)

Unit III (15 Hours)
3.1 Introduction to Number Theory – Prime numbers(K2)
3.2 Fermat's and Euler's Theorem – Testing for Primality(K2)
3.3 The Chinese Remainder Theorem Public Key Cryptography and RSA (K2)

3.4 Principles of Public Key Cryptosystems –RSA Algorithm(K2)
3.5 Elliptical Curve Algorithm - Key Management(K2)
3.6 Diffie -Hellman Key Exchange – Kerberos(K2)

Unit IV   (14 Hours)
4.1 Message Authentication and Hash functions(K2, K4)
4.2 Authentication Requirements – Authentication Functions(K2, K4)
4.3 MAC – Hash Functions(K2, K4)
4.4 Security of Hash functions and MACs (K2, K4)
4.5 Digital Signatures and Authentication Protocols: Digital Signatures (K2, K4)
4.6 Authentication Protocols – Digital Signature Standard (K2, K4)

Unit V   (14 Hours)
5.1 Intruders – Intrusion Detection (K2, K3)
5.2 Password Management- Malicious Software (K2, K3)
5.3 Viruses and Related Threats – Virus Countermeasure (K2, K3)
5.4 Distributed Denial Of Service Attacks (K2, K3)
5.5 Firewall – Design Principles (K2, K3)
5.6 Trusted System (K2, K3)

Text Books:
1. William Stallings (2011). Cryptography and Network Security: Principles and Practices. Prentice Hall   India, Fifth Edition.

Reference Books:
1. Charlie Kaufman, Radia Perlman and Mike Speciner (2002). Network Security: Private Communication in a Public World, Prentice Hall India, Second Edition.
2. William Stallings (2010). Network Security Essentials: Applications and Standards. PearsonEducationAsia, Third Edition.

Open Educational Resources (OER):
1. http://vssut.ac.in/lecture_notes/lecture1428550736.pdf
2. http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf
3. https://www.slideshare.net/patisa/cryptography-and-network-security-27006194
4. https://www.cise.ufl.edu/~nemo/crypto/slides/ch01_overview_nemo.ppt
5. https://www.youtube.com/watch?v=UbwhW4Xof9E

PCCSJ20 - PRACTICAL III: MACHINE LEARNING

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PCCSJ20	Practical III: Machine Learning	Practical	Core	5	3	100

Course Objectives

1. To work on important concepts of Machine Learning.
2. Practical implementation of algorithms with sample data.
3. To develop skills of using machine learning algorithms for solving problems.
4. Developing skills in predictive analytics using ML algorithms.
5. To gain experience of doing independent research.

Course Outcomes (COs)

1. Be capable of confidently applying common Machine Learning algorithms in practice and Implementing their own.
2. Be capable of performing distributed computations.
3. To be capable of performing experiments in Machine Learning using sample data.
4. Understand a wide variety of learning algorithms.
5. Understand how to evaluate models generated from data

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	M	L
CO2	H	M	L	L	M	M
CO3	M	H	M	L	L	M
CO4	H	M	M	M	H	L
CO5	L	M	H	L	L	M

(Low - L, Medium – M, High - H)

Course Syllabus

Exercises

1. Linear Regression (K1, K2)
2. Logistic Regression without CSV file (K1, K3)
3. Logistic Regression with CSV file (K2, K4)
4. Classification using SVM (K4, K5)
5. k-means algorithm (K2, K5)
6. Decision Tree Algorithm (K1, K3)
7. Random Forest Algorithm (K6)
8. Naive Bayes Algorithm to find Accuracy. (K1, K3)
9. JSP program to process credit card information(K5)

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PCCSK20	Practical IV: Open Source Programming Lab	Practical	Core	3	2	100

Course Objectives

1. Demonstrate different open source technology like Linux, PHP & MySQL with different packages.
2. To understand the importance of the web as an effective medium of communication
3. Explore programs of PHP with MySQL connection.
4. Use PHP to access a MySQL database.
5. Illustrate Linux commands for programming.

Course Outcomes (COs)

1. Explore different open source technology like Linux, PHP & MySQL with different packages.
2. Implement static, dynamic and interactive web pages and web applications.
3. Develop basic skills in analyzing the usability of a web site.
4. Execute programs of PHP with MySQL connection.
5. Execute Linux commands for programming.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO

	1	2	3	4	5	6
CO1	M	H	L	M	L	L
CO2	L	M	M	L	L	M
CO3	M	L	M	L	H	M
CO4	L	M	L	M	M	L
CO5	L	M	H	M	L	M

(Low - L, Medium – M, High - H)

Course Syllabus

Exercises

1. Write a server side PHP program that displays marks- total- grade of a student in tabular format by accepting user inputs for name- number and marks from a HTML form. (K1, K6)

2. Write a PHP program implement Simple Calculator Operations. (K6)

3. Write a PHP program interface to create a database and to insert a table into it.

   a. Use classes to create a table. (K2)

   b. Create a directory- and to read contents from the directory. (K3)

4. a. Write a PHP program to display a digital clock which displays the current time of the server.(K6)

   b. Write a Program and check message passing mechanism between pages. (K2, K4)

5. Create a MYSQL table and execute queries to read – add- remove and modify a record from that table. (K6)

6. a. Write a shell script to stimulate the file commands. (K1, K2)

   b. Write a shell script program to find out the maximum and minimum number of the given series. (K6)

7. a. Write a shell script to show the system configuration. (K1, K2)

   b. Write a shell script program to check whether the given string is palindrome or not.   (K6)

8. a.Write a shell script to implement the following: pipes-Redirection and tee commands.(K1,K2)

   b. Write a Shell Script program to develop a calculator application. (K6)

PECSF20 - ELECTIVE III B: MULTIMEDIA COMMUNICATION

Year: II	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: III	PECSF20	Elective III B : Multimedia Communication	Theory	Elective	5	4	100

Course Objectives

1. Understanding the Multimedia Communications Systems, Application and Basic Principles.
2. To acquire the basic knowledge of multimedia communication technologies including audio, image, video, text compression techniques and distributed multimedia system.
3. Explanation about signal processing aspects involved in multimedia including signal properties.
4. Application of coding techniques in recent applications for data storage and communication of multimedia.
5. Analysis/comparison of various coding techniques, case study and problem solving as per given data.

Course Outcomes (COs)

1. Understand the current state-of-the-art developments in Internet technologies for multimedia communications
2. Understand and apply the principles used in designing multimedia protocols, and standard protocols that are designed the way that they are.
3. Understand the system design principles of multimedia communications systems.
4. Solve problems and design simple networked multimedia systems
5. Think critically and learn independently.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	M	L	H
CO2	M	M	L	H	L	M
CO3	L	M	M	M	L	M
CO4	L	L	M	L	H	M
CO5	M	L	L	M	L	M

(Low - L, Medium – M, High - H)

Course Syllabus

1.3 Sources of Signal Impairment – Asynchronous Transmission – Synchronous Transmission (K1, K2)
1.4 Error Detection Methods. Circuit Switched Networks: Transmission Systems (K1, K2)
1.5 Analog, PSTN Modems, Digital (K1, K2)
1.6 Switching Systems –Signal Systems (K1, K2)

Unit III   (11 Hours)
3.1 Enterprise Networks: Introduction- Lans(K4, K6)
3.2 Ethernet – Token Ring – Bridges – FDDI (K4, K6)
3.3 High Speed Lans- LAN Protocols. The Internet: IP Datagram (K4, K6)
3.4 IP Address – ARP And RARP (K4, K6)
3.5 Routing Algorithms- Static Routing, Flooding, Vector Routing (K4, K6)
3.6 Shortest Path – ICMP-Ipv6 (K4, K6)

Unit IV   (12 Hours)
1.1 Transport Protocols: TCP/IP Protocol Suite- TCP (K1, K2)
1.2 User Service, Protocol Operations – UDP-User Service (K1, K2)
1.3 Protocol Operations. Application Support Functions: ASN.1-Security (K1, K2)
1.4 Data Encryption- Terminology (K1, K2)
1.5 Basics Techniques- Authentication (K1, K2)
1.6 Pubic Key Certification Authorities (K1, K2)

Unit V   (10 Hours)
5.1 Internet Applications: DNS-Email (K1)
5.2 FTP – TFTP-Internet Telephony – SNTP (K1)
5.3 World Wide Web:Urls And HTTP –HTML (K1)
5.4 Text, List, Color, Images, Tables, Forms (K1)
5.5 Java And Java Script- Security (K1)
5.6 Web Operations (K1)

Text Books:
1. Fred Halsall (2013). Multimedia Communications: Applications, Protocols, and Standards. Pearson Education Asia.

Reference Books:
1. SugataMitra and GauravBhatnagar (2014). Introduction to Multimedia Systems (Communications,
2. Networking and Multimedia).Pearson Publications.
3. Steinmetz (2010). Multimedia: Computing Communications & Applications", Pearson Publications.

Open Educational Resources (OER):
1. http://www.eie.polyu.edu.hk/~enyhchan/mt_intro.pdf
2. https://www.semanticscholar.org/paper/Multimedia-communication-Wolf-Griwodz/495cdd5c738edd847bc965e06b9c01bfa5f336c8

3. https://www.slideshare.net/ayyakathir/multimedia-communication-networks-29753118