

**PG DEPARTMENT OF COMPUTER SCIENCE**

**OUTCOME BASED SYLLABUS**

**PCCSD20 - PRACTICAL I: JAVA PROGRAMMING LAB**

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

## **PCCSE20 - PRACTICAL II: .NET PROGRAMMING LAB**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCCSE20	<b>Title of the Course:</b> Practical II: .Net Programming Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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### **Course Objectives**

1. This course presents the practical aspects of application development using .Net framework.
2. To learn the technologies of the .NET framework.
3. To cover all segments of programming in C# starting from the language basis, followed by the object oriented programming concepts.
4. To update and enhance skills in writing Windows applications, ADO.NET and ASP.NET.
5. Using XML in C#.NET specifically ADO.NET and SQL server.

### **Course Outcomes (COs)**

1. Create user interactive web pages using ASP.NET.
2. Create simple data binding applications using ADO.NET connectivity.
3. Performing Database operations for Windows Form and Web Applications.
4. Create Mobile Application using .NET compact Framework
5. Work with the basic and advanced features of C# language.

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

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

(Low - L, Medium – M, High - H)

## Course Syllabus

### Exercises

1. Write a Program to accept a String and Convert the Case of the Characters. (K1, K5)
2. Write a Program to implement a Calculator with Memory and Recall operations. (K1, K4)
3. Develop a menu based .Net application to implement a text editor with Cut- Copy- Paste- Save and Close operations using Master pages. (K2, K6)
4. “How is the book ASP.NET with C# by DreamTech?” Give the user three choices: i) Good ii) Satisfactory iii) Bad. Provide a VOTE button. After user votes- present the result in percentage using labels next to the choices. (K3, K6)
5. Develop an application to perform timer based quiz of 10 questions. (K1, K6)
6. Develop a database application to store the details of students using ADO.NET (K1, K6)
  - a. Develop a database application using ADO.NET to insert- modify- update and delete operations.
  - b. Develop a .Net application using Datagrid to display records.
  - c. Develop a .Net application using Datagrid to add- edit and modify records. (K1, K4)
7. Develop Windows form to
  - a. Display Product details (Product Id, Name, Category and other details) in DataGridView using Dataset and Data Adapter.
  - b. Fill Combobox for listing all the categories from the database using SqlDataReader and DataTable.
  - c. When user select particular category only that category’s products must be displayed in the Grid.
  - d. Generate xml file from above generated dataset.(K4, K6)

8. Create an application for Accessing a SQL Database by Using ADO.NET by connecting to the SQL Server database and call a stored procedure. You then display the data in a Repeater control. (K2, K5)
9. Develop a web application to read the details of a selected country stored in XML database and display back to the user using Web controls. (K1, K4)
10. Write a Program to implement View State and Session State. (K4, K5)

### **PECSC20 - ELECTIVE II A: CRYPTOGRAPHY AND NETWORK SECURITY**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	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.

<b>CO</b>	<b>PSO</b>					
	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>

<b>CO1</b>	H	M	L	M	M	L
<b>CO2</b>	M	L	M	H	M	M
<b>CO3</b>	L	M	M	M	L	H
<b>CO4</b>	M	M	L	M	L	M
<b>CO5</b>	H	M	L	L	M	L

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	L	H	M	L	H	M
<b>CO2</b>	M	L	M	H	M	L
<b>CO3</b>	M	M	M	L	M	L
<b>CO4</b>	M	L	M	H	M	L
<b>CO5</b>	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)**

- 1.1 Intruders – Intrusion Detection (K2, K3)
- 1.2 Password Management- Malicious Software (K2, K3)
- 1.3 Viruses and Related Threats – Virus Countermeasure (K2, K3)
- 1.4 Distributed Denial Of Service Attacks (K2, K3)
- 1.5 Firewall – Design Principles (K2, K3)
- 1.6 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](http://vssut.ac.in/lecture_notes/lecture1428550736.pdf)
2. [http://uru.ac.in/uruonlinelibrary/Cyber\\_Security/Cryptography\\_and\\_Network\\_Security.pdf](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](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

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

### PCCSK20 - PRACTICAL IV- OPEN SOURCE PROGRAMMING LAB

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)
9.
  - a. Write a shell script to implement the filter commands. (K1, K2)
  - b. Write a shell script to print the multiplication table of the given argument using for loop. (K6)
10.
  - a. Write a shell script to swap two numbers. (K6)
  - b. Write a shell script to find greatest of given three numbers. (K6)

## PECSE20 - ELECTIVE III A: INTERNET OF THINGS

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PECSE20	<b>Title of the Course:</b> Elective III A: Internet of Things	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Objectives

1. To understand smart objects and IoT Architectures.
2. To learn various protocols at the different layers for IoT.
3. To develop prototype systems using Arduino.
4. To learn the design and development process involved in creating a cloud based application.
5. To apply the concept of Internet of Things in the real world scenario.

### Course Outcomes (COs)

1. Understand the fundamentals of IoT.
2. Analyze different connectivity technologies for IoT.
3. Design a portable IoT using Arduino / equivalent boards and relevant protocols.
4. Deploy an IoT application and connect to the Fog.
5. Develop IoT applications with different platform and frameworks.

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

(Low - L, Medium – M, High – H)

## Course Syllabus

### Unit I (17 Hours)

- 1.1 Introduction to Internet of Things: Introduction - Characteristics of IoT(K1)
- 1.2 Applications of IoT - IoT Categories - Sensors (K1, K2)
- 1.3 Actuators - IoT Components and Implementation (K1, K3)
- 1.4 Challenges of IoT - IoT Networking: Connectivity Terminologies (K2)
- 1.5 Gateway Prefix Allotment (K3, K4)
- 1.6 IoT Identification and Data Protocols (K4, K6)

### Unit II (14 Hours)

- 2.1 Connectivity Technologies: IEEE802.15.4 - ZigBee(K2, K3)
- 2.2 RFID - HART and Wireless HART - NFC - Bluetooth (K4, K6)
- 2.3 Z-Wave - Wireless Sensor Networks: Components of Sensor Nodes (K3)
- 2.4 Challenges in WSN - Applications of WSN - Wireless Multimedia Sensor Network (K2)
- 2.5 Wireless Nano sensor Networks - Under Water Acoustic Sensor Networks (K2, K4)
- 2.6 UAV Networks and M2M Communication: UAV Components - UAV Networks -M2M Communication (K2, K6)

### Unit III (15 Hours)

- 1.1 Programming with Arduino: Features of Arduino - Program Elements (K2)
- 1.2 Cloud Computing: Characteristics - Deployment Models - Service Models (K1, K2)
- 1.3 Service Management - Cloud Security (K2, K3)
- 1.4 Sensor Cloud: Comparison with WSN - Sensor Cloud Architecture (K4, K6)
- 1.5 Advantages of Sensor Cloud - Sensor Cloud Services Life Cycle Model (K3)
- 1.6 Sensor Cloud Applications - Issues and Challenges in Sensor Cloud (K1, K3)

**Unit IV (16 Hours)**

- 4.1 Fog Computing: Requirements of IoT - Architecture of Fog (K1, K2)
- 4.2 Working - Advantages - Applications - Challenges in Fog (K2, K3)
- 4.3 Smart Homes: Smart Home Implementations - House Area Networks (K3, K6)
- 4.4 Smart Home benefits and Issues (K4)
- 4.5 Smart Grids: Characteristics of Smart Grid (K2, K3)
- 4.6 Components of Smart Grid - Smart Grid and Cloud(K1, K5)

**Unit V (12 Hours)**

- 5.1 Smart Cities: Characteristics of Smart Cities (K1, K2)
- 5.2 Smart City Framework (K2, K6)
- 5.3 Challenges in Smart City - Data Fusion - Smart Parking (K3, K6)
- 5.4 Industrial IoT: IIoT Requirements (K3, K4)
- 5.5 Applications of IIoT(K1, K4)
- 5.6 Benefits and Challenges of IIoT(K2, K3)

**Text Books:**

1. Dr.Jeeva Jose (2018), "Internet of Things", Khanna Book Publishing Co. (P) Ltd.

**Reference Books:**

1. Jan Holler, VlasiosTsiatsis (2014)," From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence" Academic Press, First Edition.
2. Vijay Madisett, ArshdeepBahga (2014), "Internet of Things - Hands-on Approach", First Edition, VPT.

**Open Educational Resources (OER):**

1. <https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/>
2. <https://www.youtube.com/watch?v=UrwbeOIlc68>

## **PCCSO20 – PRACTICAL V: WEB SERVICES LAB**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCCSO20	<b>Title of the Course:</b> Practical V: Web Services Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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### **Course Objectives**

1. Understand the basic concepts of web services.
2. Understand how the client-server model of programming works.
3. Develop interactive, client-side, executable web applications.
4. Use WSDL Service to implement a variety of presentation effects to the web application.
5. Migrate the web applications to the other platforms like .Net

### **Course Outcomes (COs)**

1. Understand, analyze and evaluate a system using web services.
2. Identify and formulate and solve web related problems.
3. Use techniques and skills to design web based applications.
4. Understand and describe Java-enabled XML technology.
5. Be able to create, deploy, and call Web services using Java, .NET

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

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

(Low - L, Medium – M, High - H)

## Course Syllabus

### Exercises

1. Write a program to implement WSDL Service. (K2)
2. To create a simple Web application using Web services in Java.(K5)
3. To write a factorial application program using Web services in java. (K2)
4. To implement calculator (+ -\* /) web application. (K2)
5. Web Service creation using .NET. (K4)
6. Develop a J2EE client to access a .NET Web Service. (K5)
7. Write a program the service provider can be implement a single getprice(), staticbind() and getproduct() operation. (K2)
8. Write a program to implement the operation can receive request and will return a Response in two ways.
  - a) One-Way operation
  - b) Request – Response (K2, K3)