

<b>II M.SC (CS)</b>	<b>CLOUD COMPUTING</b>	<b>PCS913P</b>
<b>SEMESTER – III</b>		<b>HRS/WK – 4</b>
<b>CORE – II</b>		<b>CREDIT – 3</b>

**Objective:**

To impart the basic concepts of Cloud Computing and its applications.

**COURSE OUTCOMES (COs):**

**CO1:** To understand the basic concepts of Cloud Computing

**CO2:** Understand the concept of Infrastructure as a service in cloud

**CO3:** Ability to Design & develop backup strategies for cloud data based on features.

**CO4:** Gain idea about the Cloud with Map Reducing concept.

**CO5:** Ability to understand the concept of security and key components of AWS

**Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome**

SEMESTER III	COURSE CODE:PCS913P					COURSE TITLE: CLOUD COMPUTING					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO 1	PO 2	PO 3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	3	3	3	2	4	3	3	2	3	4	3.0	
CO2	3	4	3	4	4	3	3	2	3	4	3.3	
CO3	3	3	4	3	3	3	3	2	4	3	3.1	
CO4	4	3	4	3	3	3	3	3	2	3	3.1	
CO5	3	3	4	3	4	3	4	3	3	4	3.4	
<b>Mean Overall Score</b>											3.2	

**Result: The Score of this Course is 3.2(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT -I** [12Hrs]

**INTRODUCTION TO CLOUD COMPUTING:** Roots of Cloud Computing - Layers and Types of Cloud - Features of a Cloud - Infrastructure Management- Cloud Services - Challenges and Risks - Migrating into a Cloud: Introduction - Broad Approaches - Seven Step Model - Integration as a Service - Integration Methodologies - SaaS.

**UNIT-II** [12Hrs]

**INFRASTRUCTURE AS A SERVICE:** Virtual Machines - Layered Architecture - Life Cycle - VM Provisioning Process - Provisioning and Migration Services - Management of Virtual Machines Infrastructure - Scheduling Techniques - Cluster as a Service - RVWS Design - Logical Design - Cloud Storage – Data Security in Cloud Storage - Technologies.

**UNIT- III** [12Hrs]

**PLATFORM AND SOFTWARE AS A SERVICE:** Integration of Public and Private Cloud - Techniques and Tools - Framework Architecture –Resource Provisioning Services - Hybrid Cloud - Cloud Based Solutions for Business Applications - Dynamic ICT Services - Importance of Quality and Security in Clouds - Dynamic Data Center - Case Studies - Workflow Engine in the Cloud - Architecture - Utilization - Scientific Applications for Cloud – Issues - Classification - SAGA - Map Reduce Implementation.

**UNIT- IV** [12Hrs]

**MONITORING AND MANAGEMENT:** An Architecture for Federated Cloud Computing - Use Case - Principles - Model - Security Considerations – SLA Management - Traditional Approaches to SLO - Types of SLA - Life Cycle of SLA - Automated Policy - Performance Prediction of HPC - Grid and Cloud - HPC Performance Related Issues.

**UNIT- V** [12Hrs]

**APPLICATIONS:** Best Practices in Architecting Cloud Applications in the AWS Cloud - Massively Multilayer Online Game Hosting on Cloud Resources - Building Content Delivery Networks using Clouds – Resource cloud Mashups

**TEXTBOOK**

1. “Cloud Computing Principles and Paradigms”, Rajkumar Buyya, James Broberg and AndrzejGoscinski, Wiley Publications, 2011

**REFERENCE BOOKS**

1. “Cloud Application Architectures” George Reese, Shroff O’reilly, ISBN: 8184047142, 2009.
2. “Cloud Computing Web Based Applications that change the way you work and collaborateonline”, Michael Miller - Pearson Education, 2009.

II M.Sc (C.S)	<b>CYBER FORENSICS</b>	<b>19EPCS35A</b>
<b>SEMESTER –III</b>		<b>HRS/WK-4</b>
<b>Elective – 4B</b>		<b>CREDIT-3</b>

**Objectives:**

- ❖ To Explain the responsibilities and liabilities of a computer forensic investigator
- ❖ To collect digital evidences from a crime scene without damaging it or risking it becoming inadmissible in a court of law

**COURSE OUTCOMES (COs):**

After learning this course, the students should be able to expose

**CO1:** Ability to gain knowledge on basic Forensics, its tasks, cybercrime laws

**CO2:** Ability to restrict from crimes, threat and fraud by learning social ethics

**CO3:** Ability to learn about cyber criminals, crime fighters and understanding investigators

**CO4:** Ability to understand local, state, national, international laws and their procedures

**CO5:** Ability to understand how to preserve and recover digital evidence.

**Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome**

SEMESTER III	COURSE CODE: 19EPCS35A					COURSE TITLE: CYBER FORENSICS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	4	4	4	4	5	3	2	5	3.9	
CO2	4	4	4	4	4	4	5	4	3	5	4.1	
CO3	4	4	4	4	4	4	5	4	3	5	4.1	
CO4	4	4	4	4	4	4	5	3	3	5	4.0	
CO5	4	4	4	4	4	4	5	3	2	5	3.9	
Mean Overall Score											4.0	

**Result: The Score of this Course is 4.0(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT-1****[Hrs 11]**

**INTRODUCTION TO COMPUTER FORENSICS:** Computer forensics definitions - Computers' roles in crimes- Computer forensics tasks-Prepare for an investigation- Collect evidence -Preserve evidence -Recover evidence- Document evidence Challenges associated with making "cybercrime" laws-Jurisdictional issues.

**UNIT-1I****[Hrs 12]**

**COMPUTER CRIMES:** Crimes -Violent crimes where computers are used include terrorism- assault threat- stalking- child pornography -Nonviolent crimes where computers are used include trespass- theft- fraud- vandalism -Where evidence often resides for different types of crimes -Address books- chat logs- e-mail- images- movies- Internet browser history- etc.

**UNIT-1II****[Hrs 12]**

**COMPUTER CRIMINALS:** Using evidence to create a crime timeline - Modify Access Create (MAC) dates associated with files- Problems with using these (they don't change in a logical fashion in some cases)-Criminals and crime fighters- Understanding "cyber criminals" and their victims -Understanding "cyber investigators.

**UNIT-1V****[Hrs 13]**

**BUILDING A CYBERCRIME CASE:** Bodies of law- Constitutional law- Criminal law- Civil law- Administrative regulations- Levels of law- Local laws- State laws- Federal laws- International laws- Levels of culpability- Intent –Knowledge- Recklessness- Negligence- Level and burden of proof- Criminal versus civil cases- Vicarious liability- Laws related to computers –CFAA- DMCA- CAN Spam- etc.

**UNIT-V****[Hrs 12]**

**PRESERVING AND RECOVERING DIGITAL EVIDENCE:** Disk imaging -Creating a message digest or hash code for a disk -Where data hides; deleted and erased data -File systems –Files-Modify Access Create (MAC) dates to establish time line -File headers - info about file type.

**TEXT BOOK :**

1. “Guide to Computer Forensics and Investigations”, Bill Nelson, Amelia Phillips, Christopher Steuart, - 4<sup>th</sup> edition, Course Technology- Cengage Learning, 2010

**REFERENCES BOOK:**

1. “Computer Crime Scene Investigation”, John R. Vacca, Computer Forensics-2nd Edition, Charles River Media, 2005

<b>I M.Sc (C.S)</b>	<b>E –BUSINESS</b>	<b>19EPCS35B</b>
<b>SEMESTER –III</b>		<b>HRS/WK-4</b>
<b>ELECTIVE – 4C</b>		<b>CREDIT-3</b>

**Objectives:**

- ❖ This course introduces students to various aspects and models for E-Business.
- ❖ At the end of the course, students should have an understanding of the impacts which E-Business is having on society, markets and commerce.
- ❖ Students should also become aware of the global nature of E-commerce and how traditional means of doing business will need to change in the electronic age.

**COURSE OUTCOMES (COs):**

**CO1:** Essential knowledge on Business Process Model

**CO2.** Learn the working environment functions for E Market places

**CO3.** Learn about the E Business Applications of Outsourcing Industry

**CO4.** Acquired an idea about employment and job Market online different field and Industries

**CO5.** Understood the challenges and dynamics of each E-Learning process Education and Industries to help better manage operations

**Relationship Matrix Course Outcome, Programme Outcome and Programme Specific Outcome**

SEMESTER III	COURSE CODE:19EPCS35B					COURSE TITLE: E-BUSINESS					HOURS: 4	CREDITS: 3
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	5	5	4	4	4	4	3	3	4.0	
CO2	4	4	3	4	4	4	4	3	3	4	3.7	
CO3	4	4	3	3	4	4	4	3	4	4	3.9	
CO4	4	4	3	3	4	4	4	3	4	4	3.7	
CO5	4	3	4	4	3	4	4	3	4	4	3.7	
Mean Overall Score											3.8	

**Result: The Score of this Course is 3.8(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

## **UNIT-I**

**[Hrs 12]**

**INTRODUCTION TO E-BUSINESS AND E-COMMERCE-** Define the E-Commerce and E-Business - Define E-Commerce Types of EC transactions - Define E-Business Models - Internet Marketing and E-Tailing - Elements of E-Business Models- Explain the benefits and limitations of E-Commerce.

## **UNIT-II**

**[Hrs 12]**

**E-MARKETPLACES-** Structures, Mechanisms, Economics, and Impacts- Define E-Marketplace and Describe their Functions- Explain E-Marketplace types and their features - Describe the various types of auctions and list their characteristics - Discuss the benefits, limitations and impacts of auctions - E-Commerce in the wireless environment - Competition in the DE and impact on industry

## **UNIT- III**

**[Hrs 11]**

**E-BUSINESS APPLICATIONS-** E-Procurement and E-Payment Systems - Integration and E-Business suits - ERP, E-SCM, CRM - E-Procurement definition, processes, methods and benefits - E-Payment - Discuss the categories and users of smart cards - Describe payment methods in B2B EC.

## **UNIT-IV**

**[Hrs 12]**

**THE IMPACT OF E-BUSINESS ON DIFFERENT FIELDS AND INDUSTRIES** - E-Tourism - Employment and Job Market Online - Online Real Estate - Online Publishing and E-Books - Banking and Personal Finance Online - On-Demand Delivery Systems and E-Grocers - Online Delivery of Digital Products, Entertainment, and Media

## **UNIT-V**

**[Hrs 13]**

**E-LEARNING AND ONLINE EDUCATION** - Define electronic learning-Discuss the benefits and drawbacks of E-Learning.

**THE E-LEARNING INDUSTRY-** Discuss E-Content development and tools-Describe the major technologies used in E-Learning- Discuss the different approaches for E-Learning Delivery-How E-Learning can be evaluated. Future Trends-e-Government- Definition of E-Governments-Implementation-E-Government Services- Challenges and Opportunities- E-Government Benefit.

## **TEXT BOOK:**

1. "Electronic Commerce: A Managerial Perspective", Turban, E. et al., -Prentice Hall 2008.

## **REFERENCE BOOKS:**

1. "Electronic Business and Electronic Commerce Management", Dave Chaffey, 2nd edition, Prentice Hall, 2006
2. "E-Learning Tools and Technologies", Horton and Horton-Wiley Publishing, 2003

<b>II-MSC (CS)</b>	<b>BASICS OF MACHINE LEARNING</b> <b>For the students admitted from the year 2021</b>	<b>21PCS912</b>
<b>SEMESTER – III</b>		<b>HRS/WK – 4</b>
<b>CORE –10</b>		<b>CREDIT – 4</b>

**Objectives:**

- ❖ This course introduces students to understand fundamentals of Machine Learning.
- ❖ At the end of the course, students should have an understanding of Machine Learning and its various importance in Research.
- ❖ Students will also be aware of the utilization of Machine Learning in building dynamics of Knowledge.

**COURSE OUTCOMES (COs):**

- CO1:** Essential knowledge on Machine Learning.
- CO2.** Learn the Basics of Machine Learning and its concepts.
- CO3.** Acquire the fundamental knowledge on building Machine Learning programs.
- CO4.** Develop an idea about Machine Learning Algorithms
- CO5.** Understand and develop Research Application using Machine Learning.

**Relationship Matrix Course Outcome, Programme Outcome and Programme Specific outcome**

SEMESTER III	COURSE CODE: 21PCS912					COURSE TITLE: BASICS OF MACHINE LEARNING					HOURS: 4	CREDITS: 4
COURSE OUTCOME	PROGRAMME OUTCOME(PO)					PROGRAMME SPECIFIC OUTCOME(PSO)					MEAN SCORE OF CO	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	4	4	5	5	4	4	4	4	3	3	4.0	
CO2	4	4	3	4	4	4	4	3	3	4	3.7	
CO3	4	4	3	3	4	4	4	3	4	4	3.9	
CO4	4	4	3	3	4	4	4	3	4	4	3.7	
CO5	4	3	4	4	3	4	4	3	4	4	3.7	
Mean Overall Score											3.8	

**Result: The Score of this Course is 3.8(High)**

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

This Course is having **High** association with Programme Outcome and Programme Specific Outcome

**UNIT - I** [12Hrs]  
**INTRODUCTION:** Introduction to Machine Learning – Importance of Machine Learning in Research - Applications of Machine Learning – Categories of Machine Learning Techniques – Trends in Machine Learning.

**UNIT- II** [12Hrs]  
**SUPERVISED LEARNING:** Introduction to Supervised Techniques - Algorithms for Supervised Learning - k-Nearest Neighbors - Decision Trees - Naive Bayes- Logistic Regression- Support Vector Machines.

**UNIT- III** [13Hrs]  
**UNSUPERVISED LEARNING:** Introduction to Unsupervised Techniques - Algorithms for Unsupervised Learning- K-Means Clustering Algorithms – Hierarchical Clustering Algorithms – Difference between Supervised and Unsupervised Algorithms.

**UNIT- IV** [11Hrs]  
**ARTIFICIAL NEURAL NETWORKS:** Multilayer Perceptron - The Perceptron - Training a Perceptron - Learning Boolean Functions - MLP as a Universal Approximator – Back propagation Algorithm - Nonlinear Regression - Two-Class Discrimination - Multiclass Discrimination - Multiple Hidden Layers.

**UNIT- V** [12Hrs]  
**DESIGN AND ANALYSIS OF MACHINE LEARNING EXPERIMENTS:** Guidelines for Machine Learning Experiments - Cross-Validation and Resampling Methods - Measuring Classifier Performance - Interval Estimation - Hypothesis Testing - Assessing a Classification Algorithm's Performance - Comparing Multiple Algorithms: Analysis of Variance.

**TEXT BOOK:**

1. “Introduction to Machine Learning”, Ethem Alpaydm, Second Edition, The MIT Press, 2010.

**REFERENCE BOOKS:**

1. “Machine Learning for Absolute Beginners”, Oliver Theobald, Second Edition, OliverTheobald Publications, 2017.
2. Andreas C. Müller & Sarah Guido, “Introduction to Machine Learning with Python”, O’ReillyPublications, 2017.