

**(P.G. DEPARTMENT OF COMPUTER SCIENCE)**

**OUTLINES OF TESTS,  
SYLLABI AND COURSES OF READING**

**FOR**

**B.SC.(HONS.) IN ARTIFICIAL INTELLIGENCE AND DATA SCIENCE  
(SEMESTER SYSTEM)**

**THIRD YEAR (Semester V & VI)  
(2021-22, 2022-23 and 2023-24 Sessions)**

**FACULTY OF COMPUTING SCIENCES**



**SRI GURU TEG BAHADUR KHALSA COLLEGE**

Sri Anandpur Sahib

An Autonomous College

Affiliated to Punjabi University, Patiala

**APPROVED**

Board of Studies Meeting held on 19<sup>th</sup> June, 2021

**SYLLABI, OUTLINES OF PAPERS AND TESTS FOR**  
**B.Sc.(Hons.) in ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**  
**Third Year - Fifth Semester Examinations**  
**For Session 2021-22, 2022-23 and 2023-24**

CODE NO.	TITLE OF THE PAPER	Schedule of Teaching (Hrs/Week)			TOTAL HOURS	CREDITS	MARKS	
		L	T	P			Internal	External
<b>BSCHAI-151</b>	R Programming & Machine Learning	4	0	0	4	4	30	70
<b>BSCHAI-152</b>	Data Warehousing and Mining	4	0	0	4	4	30	70
<b>BSCHAI-153</b>	Operating Systems	5	1	0	6	6	30	70
<b>BSCHAI-154</b>	Computer Networks	5	1	0	6	6	30	70
<b>BSCHAI-155</b>	Software Lab-II (Based on BSCHAI-151)	0	0	4	4	2	30	70
<b>BSCHAI-156</b>	Workshop in LINUX	0	0	4	4	2	30	70
	Total	18	2	8	28	24	180	420

**Note:**

**1. The break up of marks for the practical will be as under:**

i. Internal Assessment	30 Marks
ii. Viva Voce (External Evaluation)	30 Marks
iii. Lab Record Program Development and Execution(External Evaluation)	40 Marks

**2. The breakup of marks for the internal assessment for theory Subjects will be as under:**

Mid semester test – I	10 Marks
Mid semester test – II	10 Marks
Attendance	5 Marks
Assignment	5 Marks

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**SYLLABI, OUTLINES OF PAPERS AND TESTS FOR  
B.Sc.(Hons.) in ARTIFICIAL INTELLIGENCE AND DATA SCIENCE  
Third Year - Sixth Semester Examinations  
For Session 2021-22, 2022-23 and 2023-24**

CODE NO.	TITLE OF THE PAPER	Schedule of Teaching (Hrs/Week)			TOTAL HOURS	CREDIT S	MARKS	
		L	T	P			Internal	External
<b>BSCHAI-161</b>	Big Data Analysis and Visualization	4	0	0	4	4	30	70
<b>BSCHAI-162</b>	Web development Using PHP	4	0	0	4	4	30	70
<b>BSCHAI-163</b>	Cyber Security	5	1	0	6	6	30	70
<b>BSCHAI-164</b>	Software Lab-III (Based on BSCHAI-161)	0	0	4	4	2	30	70
<b>BSCHAI-165</b>	Software Lab-IV (Based on BSCHAI-162)	0	0	4	4	2	30	70
<b>BSCHAI-166</b>	Minor Project (2 Weeks In House Industrial Training)	0	0	0	-	6	30	70
	<b>Total</b>	<b>13</b>	<b>1</b>	<b>8</b>	<b>22</b>	<b>24</b>	<b>180</b>	<b>420</b>

**Note:**

**1. The break up of marks for the practical will be as under:**

- |  |          |
|--|----------|
| i. Internal Assessment   | 30 Marks |
| ii. Viva Voce (External Evaluation)                                    | 30 Marks |
| iii. Lab Record Program Development and Execution(External Evaluation) | 40 Marks |

**2. The breakup of marks for the internal assessment for theory Subjects will be as under:**

- |                        |          |
|------------------------|----------|
| Mid semester test – I  | 10 Marks |
| Mid semester test – II | 10 Marks |
| Attendance             | 5 Marks  |
| Assignment             | 5 Marks  |

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## BSCHAI – 151 : R Programming & Machine Learning

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 4L**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

### Instructions for the Paper Setter

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

### Instructions for the Candidates

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

### Course Objectives:

1. Introduce R for Machine Learning.
2. Demonstrate the use of various libraries offered by R to manipulate, preprocess and visualize data.
3. To introduce students to the basic concepts and techniques of Machine Learning.
4. To introduce the concepts of regression methods, classification methods, clustering methods.

### Section A

**Introduction** :Introduction to R & R studio; installing R and R packages ; **Basic data types**: numeric, integer, complex, character, logical ;**R Strings**; R Comments ;Conversion of data types ; **data structures**: Vector ,List , Matrices , Arrays ,Data Frames ,Factors; R Operators ,R Conditional Statements ,R Looping Statements ,R Functions.

**R Input & Output**: Reading from the Keyboard, Printing to the Screen, Reading a Matrix or Data Frame from a File, Reading a single File One Line at a Time ,Writing a Table to a File. **R Date & Time Classes**

**Reading & Writing files (csv file, jsonfile)**, Basic manipulation functions: filter(), distinct(), arrange(), select(), rename(), mutate() and transmute(), summarise(); visualizing data in R : R Plot, R Line , R Scatter Plot , R Pie charts , R Bars.

### Section B

**Introduction to Machine Learning**: Basic definitions, ML applications, Life Cycle of machine learning , types of learning, hypothesis space and inductive bias ,bias-variance trade off , over fitting & under fitting, Hyperparameters , evaluation, cross-validation .

**Linear Regression**: Introduction, Definition, (Linear functions and other functions), **Types of Linear Regression**: Simple Linear Regression, multiple linear Regressions, Linear regression Applications. Model Performance evaluation.

**Classification Techniques**: K-Nearest Neighbors, Support Vector Machines, Linear SVM , Nonlinear SVM, Decision Trees, Naïve Bayes classifier.

**Unsupervised Learning**: Hierarchical Clustering, K-means Clustering, Expectation Maximization (EM) Algorithm.

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**Learning Outcomes:**

Students will be able to:

1. Gain knowledge about basic concepts of Machine Learning.
2. Identify machine learning techniques suitable for a given problem.
3. Solve the problems using various machine learning techniques
4. Implement machine learning techniques using R.

**Text Books:**

1. Cory Lesmeister, Mastering Machine Learning with R, Packt Publishing
2. Abhijit Ghatak, Machine Learning with R, Springer

**Reference Books:**

1. Kevin Murphy, Machine Learning, MIT Press
2. Sebastian Raschka and Vahid Mirjalili, Python Machine Learning, Packt Publishing 28
3. Shai Shalev-Shwartz, Shai Ben-David, Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press
4. Stephen Marsland, Machine Learning: An Algorithmic Perspective CRC Press
5. Machine Learning Online Course: <http://nptel.ac.in/courses/106105152/>
6. Chio, Machine Learning & Security Protecting Systems with Data, Shroff Publications and Distributors
7. Conway, Machine Learning for Hackers, Shroff Publications and Distributors

## **BSCHAI – 152 : Data Warehousing & Mining**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 4L**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

### **Course Objectives:**

1. To identify the scope and essentiality of Data Warehousing and Mining.
2. To analyze data, choose relevant models and algorithms for respective applications.
3. To study spatial and web data mining.
4. To develop research interest towards advances in data mining.
5. To demonstrate the use of WEKA.

### **Section A**

**Data Warehousing:** Basic Concepts, Characteristics of Data Warehouse, Need for Data Warehouse, Components of Data Warehouse, Why to have a separate Data Warehouse, Difference between Operational Database and Data Warehouse, Data Warehouse Architecture, ETL (Extract, Transform, and Load) Process, ETL vs ELT.

**Data Warehouse Modeling:** Data warehouse Model, Data Modeling Life Cycle, types of Data Warehouse Models.

**Data warehouse Design:** Approaches to Data Warehouse design: Top-Down Approach, Bottom-Up Approach, Difference between Top-Down and Bottom-Up Approach. **Data Warehouse Implementation.**

**OLAP:** What is OLAP (Online Analytical Processing), Need of OLAP, Characteristics of OLAP, OLAP vs OLTP, OLAP operations, Types of OLAP.

### **Section B**

**Data Mining:** Introduction, Why Data Mining, Types of data and patterns that can be mined, Applications, Issues, Data Mining Techniques, Data Mining Implementation Process & Architecture, KDD Process, Data Mining Tools, Integration of a Data Mining System with a Data Warehouse.

**Data Pre-Processing:** An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

**Association Rule Mining and Classification:** Basic Concepts, Market Basket Analysis, Frequent Itemsets, Closed Itemsets and Association Rules. Frequent Itemset Mining Methods (Apriori Algorithm), From Association Analysis to Correlation Analysis, **Classification:** Basic Concepts, Decision Tree Induction, Bayesian Classification, Rule Based Classification.

**WEKA:** Introduction, Installation, Launching Explorer, Loading Data, File Formats, Preprocessing the Data, Classifiers, Clustering.

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**Learning Outcomes:**

Students will be able to:

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modelling and apply OLAP operations.
3. Identify appropriate data mining algorithms to solve real world problems
4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
5. Describe complex data types with respect to spatial and web mining.
6. Use WEKA tool efficiently.

**References:**

1. Han, Kamber “Data Mining: Concepts and Techniques” Morgan Kaufmann
2. Romez Elmasri, Shamkant B.Navathe, ‘*Fundamentals of Database Systems*’ Pearson Education.
3. Silberschatz, Korth, Sudershan “Database System Concepts” 4th Ed. McGraw Hill
4. Connolly & Begg “Database Systems – A practical approach to design, Implementation and Management, 3rd Ed. Pearson Education

## **BSCHAI – 153 : Operating Systems**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 5L+1T**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 6H per week**

### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

### **Course Objectives:**

1. To introduce basic concepts and functions of operating systems.
2. To understand the concept of process, thread and resource management.
3. To understand the concepts of process synchronization and deadlock.
4. To understand various Memory, I/O and File management techniques.

### **SECTION-A**

Operating System – Definition, Need, Services, Types of operating systems: simple batch system, multi programmed batch system, time sharing system, parallel system, distributed system, real time system, personal computer system. Operating system components, operating system services, system calls.

Process Management – Process definition, Process state, Process scheduling, Operations on processes, Basic concepts of thread, Difference between process and thread.

CPU Scheduling – Basic concepts, Scheduling Criteria, Scheduling Algorithms – FCFS, SJF, Round Robin and Multilevel Queue Scheduling.

### **SECTION-B**

Deadlocks – Characteristics of deadlocks, methods for handling deadlocks, deadlock prevention, deadlock avoidance

Memory Management – Logical versus Physical address space, swapping, contiguous allocation, Paging, Concept of Virtual memory, Implementation by Demand Paging, Page replacement algorithms – FIFO, Optimal, LRU, Concept of thrashing.

File Management – Allocation methods: Contiguous allocation, Linked allocation and Indexed allocation;

Device Management – Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK.

### **Learning Outcomes:**

1. Understand role of Operating System in terms of process, memory, file and I/O management.
2. Apply and analyse the concept of a process, thread, mutual exclusion and deadlock.
3. Evaluate performance of process scheduling algorithms.
4. Apply and analyse the concepts of memory management techniques.
5. Evaluate the performance of memory allocation and replacement techniques.
6. Apply and analyze different techniques of file and I/O management.

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**Text Book:**

1. Abraham Silberschatz, Peter B. Galvin, Operating System Concepts, Addison –Wesley Publishing Co. Engineering, Third Edition 2005,Pankaj Jalote, Narosa Publications. 5th Edition.

### **BSCHAI – 154 : Computer Networks**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 5L+1T**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 6H per week**

#### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

#### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

#### **Course Objectives:**

1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
3. Study Session layer design issues, Transport layer services, and protocols.
4. Gain core knowledge of Network layer routing protocols and IP addressing.
5. Study data link layer concepts, design issues, and protocols.
6. Read the fundamentals and basics of Physical layer, and will apply them in real time applications.

#### **SECTION-A**

Introduction to Computer networks, Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture- point to point, multicast, broadcast, Classification of networks- LAN, MAN and WAN. Reference models, the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models. LAN Protocols: CSMA, CSMA/CD, Data Link Layer: Design issues, Services to network layer, Framing, Error control, Flow control.

#### **SECTION-B**

Network layer: Design issues, Services to the transport layer, Routing algorithms- Static/ non-adaptive and dynamic/adaptive algorithms. Congestion control algorithms – the leaky bucket algorithm, the token bucket algorithm.

Transport layer protocols- TCP, UDP.

Application layer: The DNS Name Space, Electronic Mail, The World Wide Web, Network security: Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles, public-key algorithms (RSA), digital signatures.

#### **Course Outcomes:**

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Classify the routing protocols and analyze how to assign the IP addresses for the given network.

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3. Explain the types of transmission media with real time applications.
4. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory.
5. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
6. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.

**Text Book:**

1. B Forouzan, Introduction to data communication and networking

**Reference Books:**

1. A S Tanenbaum, Computer Networks.

**BSCHAI – 155 : Software Lab-II (Based on BSCHAI-151)**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 2P**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

This course will mainly comprise of exercises on the basis of the following theory paper BSCHAI-151:  
**R Programming & Machine Learning.**

**\*The splitting of marks is as under:**

**Maximum Marks for Continuous Assessment: 30**  
**Maximum Marks for University Examination: 70**

### **BSCHAI – 156 : Workshop in Linux**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 2P**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

#### **Course Objectives:**

- 1 To understand and make effective use of linux utilities and shell scripting language to solve problems
- 2 To implement standard linux utilities like mv,cp,ls etc...
- 3 To Develop the skills the necessary for systems programming including file system programming, process and signal management and interprocess communication

In this workshop, students are required to perform activities based on Linux:

1. Commands wd, cd, mkdir, cat,more,less,head,tail,ls,date, cal, rmdir, mv,rm,cp
2. Demonstration of chmod command
3. How to list hidden files/directories
4. How to skip current (.) and previous directory (..) entries in the output
5. How to display files/directories in reverse order
6. How to sort ls command output based on file extensions
7. How to sort files based on modification time
8. How to list subdirectories recursively
9. How to list filenames along with their inode numbers
10. How to display detailed information about files and directories
11. How to display author information
12. Write a Shell Script to check entered number is negative positive or zero.
13. Write a Shell Script For Cheking Even/Odd numbers Using && Operator
14. Write a Shell Script For Removing Duplicate Lines from Files.

#### **Learning Outcomes:**

1. Students will be able to understand the basic commands of linux operating system and can write shell scripts.
2. Students will be able to create file systems and directories and operate them

#### **Reference Books:**

1. Tim Parker : Linux Unleashed Third Edition, Techmedia, 1999.
2. Tackett, J : Special Edition using LINUX, PHI.
3. Norton, P. : Complete guide to LINUX, Techmedia.
4. Komarinski, M : LINUX System Administration Handbook, AW.
5. SUMITABHA DAS : UNIX Concepts & Application 2nd Edition, Tata McGraw-Hill

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## **BSCHAI – 161 : Big Data Analysis and Visualization**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 4L**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

### **Course Objectives:**

1. To provide an overview of an exciting growing field of big data analytics.
2. To introduce the tools required to manage and analyze big data like Hadoop, MapReduce.
3. To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
4. To enable students to have skills that will help them to solve complex real-world problems in for decision support.

### **Section A**

**Data Gathering and Preparation:** Data formats, parsing and transformation, Scalability and real-time issues, Data Cleaning: Consistency checking, Heterogeneous and missing data, Data Transformation and segmentation

**Exploratory Analysis:** Descriptive and comparative statistics, Clustering and association, Hypothesis Generation,

**Visualization:** Designing visualizations, Time series, Geo-located data, Correlations and connections, Hierarchies and networks, interactivity

### **Section B**

**Big Data Technology:** Definition , Evolution Of Big Data, Characteristics Of Big Data , Challenges , Application Domains ,Big Data Life Cycle, Big Data Analytics - Methodology , Core Deliverables Fundamental of Big Data Types, Big data Technology Components, Big Data Architecture, Models for Big Data.

**Big Data Tools:** Hadoop: Introduction to Hadoop Ecosystem, HDFS, Map-Reduce programming, Spark, PIG, JAQL, Understanding Text Analytics and Big Data, Predictive Analysis of Big Data, Role of Data Analyst

### **Learning Outcomes:**

1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce NO SQL in big data analytics.
3. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.

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4. Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

**Reference Books:**

1. Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, WileyBlackwell.
2. Anil Maheshwari, Data Analytics Make Accesible, Orilley Publications.
3. A. Croll and B. Yoskovitz Lean Analytics: Use Data to Build a Better Startup Faster, Oreilley Publications,st Edition.

## **BSCHAI – 162 : Web Development using PHP and MYSQL**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 4L**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

### **Course Objectives:**

The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP, HTML and MYSQL.

### **SECTION A**

**PHP:** A Brief History of PHP, Introduction to PHP, Client Server Environment, Install & Configure Server on windows. Syntax of php, Scope of Variables: Global and Local Variables, Super Global Variables, Data types, Operators- Arithmetic, Logical, Relational and Bit-Wise operators. Control Statements.

**Functions:** Defining a Function, Calling Functions, Built -in Functions.

**Array:** Numeric Array, Associative array, Multidimensional Arrays.

**String:** Quoting String Constants, Printing Strings, Accessing Individual Characters, Cleaning Strings, Encoding and Escaping, Comparing Strings, Manipulating and Searching Strings.

### **SECTION B**

**Scripting Languages:** Server side Scripting, Client Side Scripting, HTML Form Fields (Controls), PHP Form Handling, Form Validations.

**Class Object:** Declaring a Class, Creating an Object, Accessing Properties and Methods.

**File Handling:** Opening File, Reading File, Writing File, Closing File, Appending File.

**Connecting to MYSQL from PHP:** Database Connection, Execute Queries.

**Introduction to MySql:** Data Types, Sql Queries: Creating Database, Creating Table, Dropping Database, Inserting, Updating, Deleting Data, Altering table, Dropping Table.

### **Learning Outcomes:**

Upon successful completion of the course, students should be able to:

1. List the major elements of the PHP & MySQL work and explain why PHP is good for web development
2. Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL.
3. Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.

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4. Learn how databases work and how to design one, as well as how to use php MyAdmin to work with MySQL.
5. Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other data sources.

**Reference Books:**

1. Robin Nixon, Learning PHP, MySQL, and JavaScript, Shroff/O'Reilly.
2. Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
3. Matt Zandstra, Sams Teach Yourself PHP in 24 Hours, Sams Publishing.
4. Steven M. Schafer, HTML, CSS, JavaScript, Perl, Python and PHP, Wiley India

### **BSCHAI – 163 : Cyber Security**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 5L+1T**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

#### **Instructions for the Paper Setter**

The question paper will consist of three sections: A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus carrying 10.5 marks for each question. Section C will have 5-10 short-answer type questions carrying at total of 28 marks, which will cover the entire syllabus uniformly.

#### **Instructions for the Candidates**

Candidates are required to attempt two questions each from the sections A & B of the question paper and the entire section C.

#### **Course Objectives:**

1. To make students familiar with the fundamental concepts of computer ethics.
2. To know the linkage between computer, professional, philosophical ethics and decision making.
3. To give emphasis on how cyber security operations are carried out.
4. To introduce the linkage between technology, law and ethics and IT Act.

#### **Section A**

**Introduction to Cyber Security:** Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

**Cyberspace and the Law :** Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

#### **Section B**

**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, Organizational security Policies and Measures in Mobile Computing Era, Laptops.

**Privacy Issues: Basic Data Privacy Concepts:** Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

#### **Learning Outcomes:**

After completion of this course the student will be able to:

1. Understand the fundamental concepts of computer ethics.
2. Know the linkage between computers, professional, philosophical ethics and decision making.
3. Develop the concepts in computer forensics.
4. Understand how cyber security operations are carried out.
5. Understand the linkage between technology, law and ethics and IT Act

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**TEXT BOOKS:**

1. Nina Godbole and SunitBelpure, Cyber Security Understanding Cyber Crimes,Computer Forensics and Legal Perspectives,Wiley
2. B.B.Gupta,D.P.Agrawal,HaoxiangWang,ComputerandCyberSecurity:Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335,2018.

**REFERENCES:**

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&FGroup.

**BSCHAI – 164 : Software Lab-III(Based on BSCHAI-161)**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 2P**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

This course will mainly comprise of exercises on the basis of the following theory paper BSCHAI-161:  
**Big Data Analysis and Visualization.**

**\*The splitting of marks is as under:**

**Maximum Marks for Continuous Assessment: 30**  
**Maximum Marks for University Examination: 70**

**BSCHAI – 165 : Software Lab-IV (Based on BSCHAI-162)**

**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 2P**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

This course will mainly comprise of exercises on the basis of the following theory paper BSCHAI-162:  
Web Development using PHP and MYSQL

Students are required to do followings:

**Lab Assignments** - Installing and Configuring PHP on Windows, Installing web site on web server- Apache, WAMP. HTML tag based, Advanced HTML based, Database, Simple PHP, Advanced PHP, HTML-DBMS-PHP, Dynamic Web Pages/Sites.  
Creation of Web pages using HTML, DHTML.  
Creation of Web pages using JavaScript.  
Creating web pages using PHP.

**Programs:**

1. Write a program to print any text in PHP.
2. Write a program to print the data types of PHP i.e. using String, Integer, Floating point numbers, Boolean, Array, Object, NULL.
3. Write a program of arithmetic operators.
4. Write any program of using conditional Statements.
5. Write a program to implement switch case in PHP.
6. Write a program to add two numbers using functions.
7. Write a program to implement while loop .
8. Print different values using for each loop.
9. Create a Date From a String With PHP strtotime() function
10. Write a program to open, read and close file in PHP.
11. Write a function to connect and create database using PHP.
12. Write a program to implement mail function.
13. Write a program to implement WHERE clause in php MySQL?
14. Write a program to implement file upload using PHP.
15. Write a program to start, store and delete session variable.

**Reference Books:**

1. WAMP Tools, LAMP Tools,
2. Apache Web Server, PHP compiler

**APPROVED**

Board of Studies Meeting held on 19<sup>th</sup> June, 2021

**BSCHAI – 166 : Minor Project (2 Weeks In House Industrial Training)**




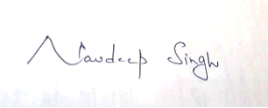
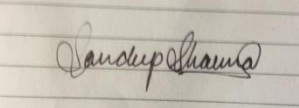
**Maximum Marks: 100**  
**External Examination: 70**  
**Internal Assessment: 30**  
**Credits: 6**

**Time Allowed: 3 Hours**  
**Pass Percentage: 35%**  
**Teaching Hours: 4H per week**

In this course student will have to do 2 weeks In-House Industrial training and have to make a minor project based on the technologies learnt so far. The student have to submit Project Report of their training to the supervisor.

- a. Project Report and Presentation 45 Marks  
b. Viva Voce 25 Marks

**Members of Board of Studies**

- |   |  |   |
|---|--|---|
| <br><b>1. Dr. Surender Kumar</b> | <br><b>2. Dr. Dharamveer Sharma</b> | <br><b>3. Dr. Major Singh Goraya</b> |
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Board of Studies Meeting held on 19<sup>th</sup> June, 2021