



**4TH SEMESTER**  
**CODE: PCC-CS-602**  
**SUBJECT NAME: COMPUTER NETWORKS**  
**CREDITS: 3**

**SESSIONAL:** 25  
**THEORY EXAM:** 75  
**TOTAL:** 100

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**Course Objectives:**

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement ideas.

**Course Contents:**

**MODULE-1: DATA COMMUNICATION COMPONENTS**

Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, **Transmission Media**, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for **Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division**, Concepts on spread spectrum.

**MODULE-2: DATA LINK LAYER AND MEDIUM ACCESS SUB LAYER**

Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA

**MODULE-3: NETWORK LAYER**

Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

**MODULE-4: TRANSPORT LAYER**

Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

**MODULE-5: APPLICATION LAYER**

Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

**Course Outcomes:**

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component



4. For a given problem related TCP/IP protocol developed the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

**Reference Books:**

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGrawHill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.
3. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
4. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
5. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America



**CODE: BSC-DS-401**  
**SUBJECT NAME: STATISTICS-II**  
**CREDITS: 3**

**SESSIONAL:** 25  
**THEORY EXAM:** 75  
**TOTAL:** 100

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**Course Objectives**

1. Probability distributions and their expectation.
2. Estimation of population parameters using sample statistics and draw appropriate conclusions from the analysis.
3. Null and alternative hypothesis
4. Regression Analysis and models

**Course Contents:**

**UNIT I**

Standard probability distributions: Binomial, Poisson, geometric, negative binomial, hypergeometric, uniform, normal, exponential, Cauchy, beta and gamma along with their properties and limiting / approximation cases.

**UNIT II**

Concept of population and sample, complete enumeration versus sampling, sampling and non-sampling errors. Types of sampling: non-probability and probability sampling, basic principle of sample survey, simple random sampling with and without replacement, definition and procedure of selecting a sample, estimates of: population mean, total and proportion, variances of these estimates, estimates of their variances and sample size determination.

**UNIT III**

Methods of Estimation: Method of moments, method of maximum likelihood estimation, method of minimum Chi-square, basic idea of Bayes estimators.

**UNIT IV**

Principles of test of significance: Null and alternative hypotheses (simple and composite), Type-I and Type-II errors, critical region, level of significance, size and power, best critical region, most powerful test, uniformly most powerful test.

**UNIT V**

Regression analysis: Simple regression analysis, Estimation and hypothesis testing in case of simple and multiple regression models, Concept of model matrix and its use in estimation. Analysis of variance: Definitions of fixed, random and mixed effect models, analysis of variance and covariance in one-way and two way classified data for fixed effect models.

**Course Outcomes**

1. Concept of random variables and its probability distributions.
2. Sampling Techniques
3. Basic concepts of hypothesis testing, including framing of null and alternative hypothesis.

#### 4. Regression analysis and models.

#### **Reference Books:**

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8thEdn. The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
4. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, Seventh Ed, Pearson Education, New Delhi.
5. A.M. Goon, M.K. Gupta and Das Gupta: Fundamentals of Statistics, Vol. 1, The World Press Pvt. Ltd., Kolkata, 1966.
6. Mukhopadhyay, P. : Mathematical Statistics, New Central Book Agency, Calcutta, 1996.



**CODE:PCC-DS-401**  
**SUBJECT NAME: DATA MINING**  
**CREDITS: 3**

**SESSIONAL: 25**  
**THEORY EXAM: 75**  
**TOTAL: 100**

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**3 0 0**

Pre-requisites: Database Management System

Course Objectives:

1. To familiarize the students with the basic roadmap of data mining and various data mining techniques.
2. To introduce the techniques of frequent pattern mining and Clustering
3. To acquaint students with classification and prediction techniques in data mining.
4. To introduce students with time series data, data streams, advance mining applications areas like web mining, social network analysis etc.

**MODULE-1: INTRODUCTION**

Introduction to Data Warehousing, Architecture, Data warehouse schemas, OLAP servers, OLAP operations, KDD process, Data Mining: Architecture, Predictive and Descriptive models, Data Preprocessing: Data cleaning & Discretization, Data Mining primitives and Applications, Major issues in data mining

**MODULE-2: FREQUENT PATTERN MINING AND CLUSTERING**

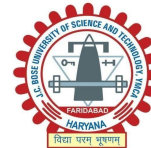
Mining frequent patterns, association and correlations; Association Rule Mining: support & confidence, a-priori algorithm, FP Growth algorithm; Advanced Pattern Mining; Sequential Pattern Mining concepts, Cluster Analysis – Types of Data in Cluster Analysis, Similarity and Distance Measures, Partitioning methods: k-means & k-medoids, Hierarchical Methods: agglomerative and divisive methods; Density-Based Methods, Clustering with Constraints, Outlier Detection

**MODULE-3: CLASSIFICATION AND PREDICTION**

Classification: Basic Concepts, Decision tree induction, Bayesian classification, Bayesian Belief Networks; Lazy Learners, Rule based classification, Model Evaluation and Selection, improve classifier accuracy, back propagation through Neural Networks, Genetic Algorithm, Support Vector Machines, Prediction: linear and non-linear regression techniques.

**MODULE-4: ADVANCED MINING APPLICATIONS**

Mining Complex Data Types: Mining Data Streams: Stream Data Processing and Stream Data Systems, Mining Time series Data: Periodicity Analysis for time related sequence data, Similarity search in Time-series analysis; Web Mining, Web page layout structure; mining web



link structure, content and usage patterns; Recent trends in Distributed Warehousing and Data Mining, Class Imbalance Problem; Graph Mining; Social Network Analysis

### **Course Outcomes:**

After completion of course, students would be able to:

1. Understand and interpret the contribution of data warehousing and data mining to the decision-support level of organizations.
2. Categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, associations and correlations.
3. Design and deploy appropriate classification techniques for different applications.
4. Evaluate various mining techniques on complex data objects and ability to solve real world problems in business and scientific information using data mining.

### **REFERENCES**

1. Jiawei Han and M Kamber, Data Mining Concepts and Techniques, Second Edition, Elsevier Publication, 2011.
2. Introduction to Data Mining - Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Addison Wesley, 2006.
3. G Dong and J Pei, Sequence Data Mining, Springer, 2007.
3. Alex Berson, Stephen J. Smith “Data Warehousing, Data-Mining & OLAP”, TMH
4. Margaret H. Dunham, S. Sridhar,” Data Mining: Introductory and Advanced Topics”Pearson Education



**CODE: PCC-DS-402**  
**SUBJECT NAME: OBJECT ORIENTED PROGRAMMING**  
**CREDITS: 3**

**SESSIONAL:** 25  
**THEORY EXAM:** 75  
**TOTAL:** 100

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**Course Objectives:**

The course will introduce standard tools and techniques for software development, using object-oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

**Course Contents:**

**UNIT - I**

Object Oriented Methodology: Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs, Decomposition & Abstraction, Abstraction Mechanisms – parameterization, specification, Kind of Abstractions.

**UNIT – II**

Java Language Basics: Introduction to Java, Basic Features, Java Virtual Machine Concepts, Primitive Data Type and Variables, Java Operators, Expressions, Statements and Arrays. Object Oriented Concepts: Class and Objects--Class Fundamentals, Creating objects, Assigning object reference variables; Introducing Methods, Static methods, Constructors, Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects, Method overloading, Garbage Collection, The Finalize ( ) Method. Inheritance and Polymorphism: Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword

**UNIT - III**

Packages: Defining Package, CLASSPATH, Package naming, Accessibility of Packages, using Package Members. Interfaces: Implementing Interfaces, Interface, and Abstract Classes, Exceptions Handling: Exception, Handling of Exception, using try-catch, Catching Multiple Exceptions, using finally clause, Types of Exceptions, Throwing Exceptions, and Writing Exception Subclasses. Multithreading: Introduction, The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Interthread Communication.

**UNIT - IV**

I/O in Java: I/O Basics, Streams and Stream Classes, The Predefined Streams, reading from, and writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods.

Strings and characters: Fundamentals of Characters and Strings, the String Class, String Operations, Data Conversion using Value Of ( ) Methods, String Buffer Class and Methods.

Graphical programming with swing: Swing components, laying out components in a container, Panels, Look & Feel, Event listener, concurrency in swing.

**Course Outcomes:**

After taking the course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.

**Reference Books:**

1. E Balagurusamy: Programming in Java.
2. Herbert Schildt: The Complete Reference JAVA, TMH Publication.
3. Beginning JAVA, Ivor Horton, WROX Public.
4. Stephen Potts: JAVA 2 UNLEASHED, Tech Media Publications.
5. Patrick Naughton and Herbertz Schildt, “Java-2 The Complete Reference”, 1999, TMH.

Note: Latest and additional good books may be suggested and added from time to time.





**CODE: HSMC-02**  
**SUBJECT NAME: ECONOMICS FOR ENGINEERS**  
**CREDITS: 3**

**SESSIONAL:** 25  
**THEORY EXAM:** 75  
**TOTAL:** 100

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**Course Objectives:**

The students should be able to:

1. Understand the supply and demand forces.
2. Build an ability to be an efficient engineer by utilizing limited resources to satisfy unlimited wants.
3. Get knowledge about the market environment and take decisions regarding price determination.
4. Develop awareness about the economic forces influencing an organisation.

**Course Contents:**

**MODULE-1:**

Introduction to the subject: Micro and Macro Economics, Relationship between Science, Engineering, Technology and Economic Development. Production Possibility Curve, Nature of Economic Laws.

**MODULE-2:**

Time Value of Money: concepts and application. Capital budgeting; Traditional and modern methods, Payback period method, IRR, ARR, NPV, PI (with the help of case studies)

**MODULE-3:**

Meaning of Demand. Law of Demand, Elasticity of Demand; meaning, factors effecting it and its practical application and importance. Demand forecasting (a brief explanation)

**MODULE-4:**

Meaning of Production and factors of production, Law of variable proportions and returns to scale. Internal and external economies and diseconomies of scale. Concepts of cost of production, different types of costs; accounting cost, sunk cost, marginal cost, and Opportunity cost. Break even analysis, Make or Buy decision (case study). Relevance of Depreciation towards industry.

**MODULE-5:**

Meaning of market, types of market, perfect competition, Monopoly, Monopolistic, Oligopoly. (main features). Supply and law of supply, Role of demand and supply in price determination.

**MODULE-6:**

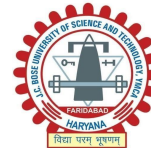
Indian Economy, nature and characteristics. Basic concepts; fiscal and monetary policy, LPG, Inflation, Sensex, GATT, WTO and IMF. Difference between Central bank and Commercial banks

**Course Outcomes:**

After the successful completion of the course, students will be able to:

1. Utilise the understanding of economic forces for different aspects of an organisation.
2. Take decisions about optimum use of different resources.
3. Apply decisions methodologies to decide the different aspects of the product of an organisation

in different market conditions.



4. Utilise the different aspects of economics for understanding the organisational problems and manage it in the best possible way.

**Reference Books:**

1. Jain T.R., Economics for Engineers, VK Publication
2. Chopra P. N., Principle of Economics, Kalyani Publishers
3. Dewett K. K., Modern economic theory, S. Chand
4. H. L. Ahuja., Modern economic theory, S. Chand
5. DuttRudar&Sundhram K. P. M., Indian Economy
6. Mishra S. K., Modern Micro Economics, Pragati Publications
7. Pandey I.M., Financial Management; Vikas Publishing House
8. Gupta Shashi K., Management Accounting, Kalyani Publication



**CODE: MC-03**

**SUBJECT NAME: ENVIRONMENTAL SCIENCES**

**CREDITS: 3**

**SESSIONAL: 25**  
**THEORY EXAM: 75**  
**TOTAL: 100**

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**Course Objectives:**

1. The prime objective of the course is to provide the students a detailed knowledge on the threats and challenges to the environment due to developmental activities.
2. The students will be able to identify the natural resources and suitable methods for their conservation and sustainable development.
3. The focus will be on awareness of the students about the importance of ecosystem and biodiversity for maintaining ecological balance.
4. The students will learn about various attributes of pollution management and waste management practices. The course will also describe the social issues both rural and urban environment and environmental legislation

**Course Contents:**

**MODULE-1: The Multidisciplinary Nature of Environmental Studies**

Definition, scope and importance. Need for public awareness.

**MODULE-2: Natural Resources: Renewable and Non-Renewable Resources**

Natural resources and associated problems:

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources. Case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

**MODULE-3: Ecosystems**

- Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.
- Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

**MODULE-4: Biodiversity and its Conservation**

- Introduction – Definition: genetic, species and ecosystem diversity.



- Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels.
- India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: insitu and ex-situ conservation of biodiversity

#### **MODULE-5: Environmental Pollution Definition**

- Causes, effects and control measures of: Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

#### **MODULE-6: Social Issues and the Environment**

- From Unsustainable to Sustainable development Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products.
- Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation Public awareness.

#### **MODULE-7: Human Population and the Environment**

Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.

#### **MODULE-8: Field Work**

- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc.

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

At the end of the program the students acquired knowledge about:

- 1) Understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development. The students will also be able to introduce the thinking about environmental issues from an interdisciplinary perspective.
- 2) Identify and relate about the renewable and non-renewable resources, their importance and ways of conservation to sustain human life on earth.
- 3) Know about the concepts of ecosystem and its function in the environment, the need for protecting the producers and consumers in various ecosystems and their role in the food web.



- 4) Recognize, relate and become sensitive to the effects of pollution and will be able to contribute his learning towards their prevention or mitigation. The students will also be able to describe the social issues along with the trends of human population growth and the possible means to combat the challenges.
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**Reference Books:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt Ltd.
3. Environmental Science by Daniel B. Botkin & Edwards A. Keller, Wiley INDIA edition.



**CODE: BSC-DS-402**  
**SUBJECT NAME: STATISTICS -II LAB USING R/ SPSS**  
**CREDITS: 2**

**SESSIONAL: 15**  
**END SEMESTER: 35**  
**TOTAL: 50**

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**R/ SPSS Lab**

1. Basic fundamentals, installation and use of software, data editing
2. Use of R as a calculator, functions and assignments.
3. Use of R for matrix operations, missing data and logical operators.
4. Conditional executions and loops, data management with sequences.
5. Data management with repeats, sorting, ordering, and lists.
6. Vector indexing, factors, Data management with strings, display and formatting.
7. Data management with display paste, split and replacement, manipulations with alphabets, evaluation of strings, data frames.
8. Data frames, import of external data in various le formats, statistical functions, compilation of data.
9. Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis.
10. Handling of bivariate data through graphics, correlations, programming and illustration with examples.
11. Parametric and Non Parametric testing of Statistical Hypothesis, t-test
12. One way ANOVA, two way ANOVA
13. Simple Correlation, Linear Regression, Multiple Linear Regression,
14. Testing for overall significance of Model Coefficients,
15. Testing for Individual Regression Coefficients, Outliers Detection, Dealing with multi-collinearity

**Reference Books**

1. Learning Statistics using R By Rndall, E.Schumacker, Sage Publication
2. R for Everyone By Jared P.Lander, Pearson Education





**CODE: PCC-DS-403**  
**SUBJECT NAME: DATA MINING LAB USING R/SPSS/PYTHON**  
**CREDITS: 2**

**SESSIONAL: 15**  
**END SEMESTER: 35**  
**TOTAL: 50**

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**Course Objectives:**

1. To familiarize the students with the basics of Python and SPSS modeler.
2. To introduce Python Libraries: Numpy, Pandas, Matplotlib, Scipy, Seaborn and SKLearn
3. To acquaint students with implementation of various data mining and visualization techniques in Python.
4. To get them understand SPSS modeler working environment, creation of streams and collecting data.
5. To acquaint students about modeling in SPSS.

**Outline:**

1. Basic fundamentals, installation and use of software (Python/SPSS Modeler)
2. Python/SPSS Fundamentals and working environment
3. Introduction to Python Libraries: Numpy, Pandas, Matplotlib, Scipy, Seaborn and SKLearn
4. Data Wrangling - Numpy and Pandas
5. Data Cleaning using Pandas
6. Data Visualization using matplotlib and Seaborn
7. Learn Applied Statistics - Descriptive Statistics in Python
8. Learn Statistics - Statistical Inference in Python
9. Implementation of Supervised ML - Linear Regression in Python
10. Implementation of Supervised ML - Logistic regression in Python
11. Implementation of Supervised ML - Decision Tree Model in Python
12. Implementation of Ensemble Techniques - Random Forest in Python
13. Implementation of Ensemble Techniques - Boosting Techniques in Python
14. Implementation of Unsupervised ML - Clustering and Principal Component Analysis in Python
15. Implementation of NLP - Text Processing and Sentimental Analysis techniques in Python
16. Creation of data streams in SPSS Modeler
17. Data visualization techniques in IBM SPSS Modeler
18. Implementation of clustering techniques in SPSS Modeler on sample datasets
19. Implementation of a-priori algorithm in SPSS Modeler on sample datasets
20. Implementation of classification techniques: Decision tree (CART) and Regression Techniques: Linear regression in SPSS Modeler



## Course Outcomes:



After completion of course, students would be able to:

1. Understand the basic concepts and roadmap of Python and IBM SPSS Modeler.

2. Understand and implement various data mining techniques like clustering, association rule discovery, classification and regression
3. Categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, associations, classification and regression using learned software
4. Build models for trending real world data analytical problems like sentiment analysis, text analysis etc.

## REFERENCES

1. Jiawei Han and M Kamber, Data Mining Concepts and Techniques,, Second Edition, Elsevier Publication, 2011.
2. McKinney, W. (2012). Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. " O'Reilly Media, Inc."
3. Swaroop, C. H. (2003). A Byte of Python. Python Tutorial



**CODE: PCC-DS-404**  
**SUBJECT NAME: OBJECT ORIENTED PROGRAMMING USING**  
**JAVA LAB**

**CREDITS: 2**

**SESSIONAL: 15**  
**END SEMESTER: 35**  
**TOTAL: 50**

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**List of Programs**

1. Write a program to take a string and copy some of the characters of the string in to character array.
2. Write a program for splitting a string into pieces wherever a space is found.
3. Write a program to initialize the instance variables of a class, using parameters constructor.
4. Write a program to test whether a static variable can access the instance variable or not.
5. Write a program to test whether a static variable can access the static variable or not.
6. Write a program to create a package with the name pack and store the addition class in it.
7. Write a program to shows how a package is import a package and use the class of the imported package
8. Write a program which tell us the use of try, catch and finally block.
9. Write a program which shows how to write and read a data from the file.
10. Write a program to improve the efficiency to write and read a data from the file.
11. Write a program to show the serialization and de- serialization of object
12. Write a program to synchronize the threads acting on a single object. The synchronized block on the program can be executed by only thread at a time
13. Write a program depicting a situation in which deadlock can occur.
  14. Write a program to implement the producer – consumer problem using thread communication.