ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

MINOR

Subject: CLOUD COMPUTING

w.e.f. AY 2023-24

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	1. Computer Networks (for Non Computer Science Major) 2. Computer Networks Practical Course (for Non Computer Science Major)	3	3
				2	1
II	III	2	Cloud Computing	3	3
			Cloud Computing Practical Course	2	1
	IV	3	AWS for Cloud Computing	3	3
			AWS for Cloud Computing Practical Course	2	1
		4	Data Mining and Data warehousing	3	3
			Data Mining and Data warehousing Practical Course	2	1
III	V	5	Python Programming	3	3
			Python Programming Practical Course	2	1
		6	Data Analytics Methods	3	3
			Data Analytics Methods Practical Course	2	1

SEMESTER-II

COURSE 1: COMPUTER NETWORKS

Theory Credits: 3 3 hrs/week

I. Learning Outcomes: After this course, the student will be able to

1. Identify the different components in a Communication System and their respective roles.
2. Describe the fundamental concepts on data communication and the design of computer networks.
3. To get familiarized with the basic protocols of computer networks.
4. Describe the technical issues related to the local Area Networks
5. Identify the common technologies available in establishing LAN infrastructure.

II. Syllabus

UNIT- I

Introduction to Network:- Definition, Applications, line configuration, Network topologies, Transmission mode, Types of Networks (LAN, WAN, MAN), Protocols, Network models: The OSI model, TCP/IP Protocol Suite.

Physical Layer: Signals –Analog signals, Digital signals, Transmission media - Guided & Un- Guided.

UNIT- II

Network LAN Technologies: Ethernet, Fast Ethernet, Gigabit Ethernet, and Wireless LAN's.

Data Link Layer: Error Detection and correction - Types of Errors, Error Detection, Error correction. Data link Protocols – Stop-and-wait ARQ, Go-back-n ARQ, Automatic Repeat Request (ARQ).

UNIT- III

Network Devices: Modem, Hub, Switch, Router, Repeaters, bridges, Gateway.

Network Layer: Internetwork Protocol (IP), Addressing (Classes, Dotted-decimal notation, Sample Internet), Subnet mask, Network layer Protocols – ARP, IPv4, and IPv6.

UNIT- IV

Transport Layer: TCP protocol, UDP protocol, Process-to-Process delivery,
Congestion: Congestion control, congestion avoidance, congestion discarding, Quality of Service (QOS). **UNIT-V**

Application Layer: Domain Name System (DNS) - domain name space, distribution of name space, DNS in the Internet, SMTP, SNMP, FTP, POP3, HTTP, WWW.

III. REFERENCES

Text Books:

1. Data Communication and Computer Networks by Behrouz A. Forozoun, Published by Thomas MC GRAW HILL 2nd edition.
2. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, 2003
3. An introduction to computer network by PETER L DORODAL.

SEMESTER-II

COURSE 1: COMPUTER NETWORKS

Practical Credits: 1 2 hrs/week

PRACTICAL SYLLABUS: COMPUTER NETWORKS

III. Skill Outcomes: After this course, the student will be able to

1. Write HTML program to implement get( ) and post( ) methods
2. Describe the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
3. To get familiarized with the basic protocols of computer networks.
4. Describe the technical issues related to the local Area Networks

IV. Practical Syllabus:

1. Write a program for print the IP Address of a WWW.YAHOO.COM
2. Write a program for to print the IP Address of the local machine and hostname.
3. Write HTML program to implement get( ) and post( ) methods
4. Write a program for to identify the well known ports on a Remote system.
5. Write a program for to print the parts of URL.
6. Write a program for to send & receive data from datagram packet.
7. Write a program for a chat application.
8. Write a program for the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
9. Write a program for the HTTP server.

V. Co-Curricular Activities:

a) Suggested Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS: Some of the following suggested assessment methodologies could be adopted:

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

SEMESTER-III

COURSE 2: CLOUD COMPUTING

Theory Credits: 3 3 hrs/week

I. Learning Outcomes:

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability

II. Syllabus

UNIT- I

Introduction to Cloud Computing: Evolution and History of Cloud Computing, Introduction to Cloud Computing, Why Cloud Computing is Becoming Highly Important, Features of Cloud Computing, Cloud Computing for various users, Advantages of Cloud Computing, Limitations of Cloud Computing.

UNIT- II

Cloud Models and Types: The NIST Model, Cloud Cube Model, Deployment Models, Service Models. Layers and Types of Cloud, Components of Cloud Computing, Cloud Computing Service Providers

Software as a Service (SaaS): Software as a Service , Evolution of SaaS ,Brief Introductory part of Software as a Service , SaaS Unification Technologies , SaaS Integration Products and Technologies, SaaS Product Selection Criteria, SaaS Integration Services, Advantages of SaaS

UNIT- III

Platform as a Service (PaaS): Introduction to PaaS, Evolution of PaaS, PaaS Service Providers- Acquia Cloud, Amazon AWS, Amazon Elastic Beanstalk, Google App Engine, Force.com, PaaS Application Framework, PaaS Operator Verbs, PaaS Developer Verbs, Advantages and Challenges of PaaS

UNIT- IV

Infrastructure as a Service (IaaS): Evolution, IaaS Architecture- Advantages and Disadvantages of Infrastructure as a Service, SAN model, IaaS Providers, IaaS Architecture, Advantages and Disadvantages of Infrastructure as a Service

Data in Cloud : Evolution of Network Storage in Cloud, Data as a Service, Database as a Service, Cloud Based Data Storage, Advantages and Limitations of Cloud Based Storage Solution, Cloud Based Data Storage Service Providers

UNIT-V

Virtualization: Introduction to Virtualization and its Technical Evolution, History of Virtualization, Types of Virtual Machines, Advantages of Virtualization, Components of Virtualization, Types of Virtualization

Text Books:

1. Handbook of Cloud Computing By Dr.Anand Nayyar (Editor), First Edition 2019, BPB Publication, India
2. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi – 2010
3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
4. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
5. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press
6. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

SEMESTER-III

COURSE 2: CLOUD COMPUTING

Practical Credits: 1 2 hrs/week

Practical Syllabus: Introduction to Cloud Computing

III. Skill Outcomes:

1. Installing and using identity management feature of OpenStack.
2. Installing and using security feature of own Cloud.
3. Installing and using Administrative features of own Cloud.
4. Design Cloud Services and Set a private cloud
5. Installing and using JOSSO.

IV. Practical Syllabus:

1. Create a word document of your class time table and store locally and on cloud with doc and pdf format.
2. Prepare a PowerPoint on cloud on topic of your choice.
3. Create your resume in a neat format using Google and Zoho cloud
4. Install OpenStack and use it as Infrastructure as a Service and use technology ownCloud.
5. Installing and using identity management feature of OpenStack.
6. Write a program for web feed using PHP, HTML.
7. Installing and using JOSSO.
8. Installing and using security feature of own Cloud.
9. Installing and using Administrative features of own Cloud.
10. Case study on Amazon EC2.
11. Case study on Microsoft azure.

V. References:

1. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press
4. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

VI. Co-Curricular Activities:

a) Suggested Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS: Some of the following suggested assessment methodologies could be adopted:

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

SEMESTER-IV

COURSE 3: AWS FOR CLOUD COMPUTING

Theory Credits: 3 3 hrs/week

I. Learning Outcomes:

After completing this course, the student will be able to

1. Configure various virtualization tools such as Virtual Box, VMware workstation. Design and deploy a web application in a PaaS environment.
2. Learn how to simulate a cloud environment to implement new schedulers.
3. Install and use a generic cloud environment that can be used as a private cloud.
4. Manipulate large data sets in a parallel environment.

II. Syllabus

UNIT- I

Introduction: Definition of Cloud – Evolution of Cloud Computing – Benefits of Cloud Computing - Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning.

UNIT- II

Cloud Enabling Technologies: Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures-Tools and mechanisms.

UNIT- III

Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery. Cloud Architecture & Services: Layered Cloud Architecture Design –Public, Private and Hybrid Clouds -Cloud computing models: laaS – PaaS – SaaS, cloud delivery models, cloud deployment models.

UNIT- IV

AWS & Networking: Introduction to AWS, AWS Global infrastructure, Google cloud platform, network switches & virtual private cloud (VPC) , VPC and Subnets , IP addressing in AWS, AWS security groups, EC2 instance types. EC2 pricing models

UNIT-V

Cloud storage: Cloud Storage –Advantages of Cloud Storage – Cloud Storage Providers – S3 (Simple Storage Service) - S3 Features.

Security in cloud: Software-as-a-Service Security – Security Governance – Virtual Machine Security-Security types: network level, host level, application level.

Text Books:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. Overview of AWS : AWS whitepaper , copyright@aws,inc, and/or its affiliates. BY AWS.
3. Rittinghouse, John W., and James F. Ransome, ―Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.
4. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.
5. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009.
6. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)‖, O'Reilly, 2009.

SEMESTER-IV

COURSE 3: AWS FOR CLOUD COMPUTING

Practical Credits: 1 2 hrs/week

Practical Syllabus: AWS FOR CLOUD COMPUTING

III. Skill Outcomes:

After completing this course, the student will be able to

1. Configure various virtualization tools such as Virtual Box, VMware workstation. Design and deploy a web application in a PaaS environment.
2. 2.Able to Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or Windows 8.
3. Able to Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
4. Able to Install Google App Engine. Create hello world app and other simple web applications using python/java.
5. Able to Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim

IV. Practical Syllabus:

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or Windows 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count

V. References:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009.
3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)‖, O'Reilly, 2009.

VI. Co-Curricular Activities:

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B. General

1. Group Discussion
2. Others

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4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

SEMESTER-IV

COURSE 4: DATA MINING AND DATA WAREHOUSING

Theory Credits: 3 3 hrs/week

I. Learning Outcomes:

1. To understand data mining concepts.
2. To learn Data mining techniques and algorithms.
3. Comprehend the data mining environments
4. Characterize the various kinds of patterns that can be discovered by association rule mining.
5. Evaluate mathematical methods underlying the effective application of datamining.

II. Syllabus:

UNIT- I

Data Warehousing: Introduction, What is Data Warehouse? Definition, Multidimensional Data Model, **OLAP** Operations, Warehouse Schema, Data Warehouse Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Other Features

Data Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation

UNIT- II

Data Mining: What is Data Mining? Data Mining: Definitions, KDD vs Data Mining, DBMS vs DM, Other Related Areas, DM Techniques, Other Mining Techniques, Issues and Challenges in DM, DM Applications- Case Studies

Association Rules: What is an Association Rule?, Methods to Discover Association Rules, A Priori Algorithm, Partition Algorithm, Pincer-Search Algorithm, Dynamic Itemset Counting Algorithms, FP-Tree Growth Algorithm, Discussion on Different Algorithms, Incremental Algorithms, Border Algorithms, Generalized Association Rule, Association Rules with Item Constraints

UNIT- III

Clustering Techniques: Clustering Paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, CLARANS, Hierarchical Clustering, DBSCAN, BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS,

UNIT- IV

Decision Trees: What is a Decision Tree?, Tree Construction Principle, Best Split, Splitting

Indices, Splitting Criteria, Decision Tree Construction Algorithms, CART, ID3, C4.5, Decision Tree Construction with Presorting, RainForest, Approximate Methods, CLOUDS, BOAT, Pruning Techniques, Integration of Pruning and Construction, Ideal Algorithm

UNIT-V

Other Techniques: What is a Neural Network?, Learning in NN, Unsupervised Learning, Data Mining Using NN: A Case Study, Genetic Algorithms, Rough Sets, Support Vector Machines **Web Mining:** Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining, Unstructured Text, Episode Rule Discovery for Texts, Hierarchy of Categories, Text Clustering

Text Books:

1. Data Mining Techniques, Arun K Pujari, University Press
2. Data Mining: Concepts and Techniques, 3rd Edition, Jiawei Han, Micheline Kamber, Jian Pei

SEMESTER-IV

COURSE 4: DATA MINING AND DATA WAREHOUSING

Practical Credits: 1 2 hrs/week

Practical Syllabus: Data Mining and Data warehousing

III. Skill Outcomes:

Upon successful completion of the course, the student will be able to:

1. Apply preprocessing techniques on real world datasets
2. Apply apriori algorithm to generate frequent item sets.
3. Apply Classification and clustering algorithms on different

datasets. Note: Use python library scikit-learn wherever necessary

IV. Practical Syllabus:

15. Demonstrate the following data preprocessing tasks using python libraries. a) Loading the dataset b) Identifying the dependent and independent variables c) Dealing with missing data
16. Demonstrate the following data preprocessing tasks using python libraries. a) Dealing with categorical data b) Scaling the features c) Splitting dataset into Training and Testing Sets
17. Demonstrate the following Similarity and Dissimilarity Measures using python a) Pearson's Correlation b) Cosine Similarity c) Jaccard Similarity d) Euclidean Distance e) Manhattan Distance
18. Build a model using linear regression algorithm on any dataset.
19. Build a classification model using Decision Tree algorithm on iris dataset
20. Apply Naïve Bayes Classification algorithm on any dataset
21. Generate frequent item sets using Apriori Algorithm in python and also generate association rules for any market basket data.
22. Apply K- Means clustering algorithm on any dataset.
23. Apply Hierarchical Clustering algorithm on any dataset.
24. Apply DBSCAN clustering algorithm on any dataset.

V. References:

1. Introduction to Privacy-Preserving Data Publishing: Concepts and Techniques , Benjamin C.M. Fung, Ke Wang, Ada Wai-Chee Fu, Philip S. Yu

2. Data Mining: Concepts, Models and Techniques , Florin Gorunescu (auth.)

VI. Co-Curricular Activities:

Suggested Co-Curricular Activities:

25. Training of students by related industrial experts.
26. Assignments
27. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
28. Preparation of videos on tools and techniques.
29. Visits to technology facilities, firms, research organizations etc.

Invited lectures and presentations on related topics by field/industrial experts.

SEMESTER-V

COURSE 5: PYTHON PROGRAMMING

Theory Credits: 3 3 hrs/week

I. Learning Outcomes:

1. Develop and execute simple Python programs.
2. Structure a Python program into functions.
3. Using Python lists, tuples to represent compound data
4. Develop Python Programs for file processing
5. Understand the inheritance concepts

II. Syllabus

UNIT- I

Introduction to Python, Python, Features of Python, Execution of a Python, Program, Writing Our First Python Program, Data types in Python. Python Interpreter and Interactive Mode; Values and Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple Assignment, Precedence of Operators, Comments; Modules and Functions, Function Definition and use, Flow of Execution, Parameters and Arguments

UNIT- II

Operators in Python, Input and Output, Control Statements. Boolean Values and operators, Conditional (if), Alternative (if-else), Chained Conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful Functions: Return Values, Parameters, Local and Global Scope, Function Composition, Recursion

UNIT- III

Arrays in Python, Strings and Characters. Strings: String Slices, Immutability, String Functions and Methods, String Module; Lists as Arrays. Illustrative Programs: Square Root, gcd, Exponentiation, Sum an Array of Numbers, Linear Search, Binary Search.

UNIT- IV

Functions, Lists and Tuples. List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters; Tuples: Tuple Assignment, Tuple as Return Value; Dictionaries: Operations and Methods; Advanced List Processing - List Comprehension; Illustrative Programs: Selection Sort, Insertion Sort, Merge sort, Histogram.

UNIT-V

Files and Exception: Text Files, Reading and Writing Files, Format Operator; Command Line Arguments, Errors and Exceptions, Handling Exceptions, Modules, Packages; Illustrative Programs: Word Count, Copy File.

Text Books:

1. Mark Lutz, Learning Python
2. Tony Gaddis, Starting Out with Python

SEMESTER-V

COURSE 5: PYTHON PROGRAMMING

Practical Credits: 1 2 hrs/week

Practical Syllabus: PYTHON PROGRAMMING

III. Skill Outcomes:

1. Foundation to write and understand Python code
2. Learners will understand how to break down complex problems into smaller, manageable tasks
3. Understand how to design and implement classes, objects
4. Inheritance hierarchies, enabling them to build more complex and scalable programs.
5. Acquire skills to work with data structures like lists, dictionaries, and tuples

IV. Practical Syllabus:

1. Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
2. Write a Python program that accepts a word from the user and reverse it
3. Write a Python program to get the Fibonacci series between 0 to 50.
4. Write a Python program to find the square root of a number.
5. Write a Python program that accepts a string and calculate the number of digits and letters
6. Write a Python program to check whether an alphabet is a vowel or consonant
7. Write a Python program to calculate the sum and average of n integer numbers
8. Write a Python program to create the multiplication table (from 1 to 10) of a number
9. Write a Python function to find the Max of three numbers.
10. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.
11. Write a Python function that takes a number as a parameter and check the number is prime or not.
12. Write a Python function to check whether a number is perfect or not.
13. Write a Python function that checks whether a passed string is palindrome or not.
14. Write a Python program for sequential search.

V. References:

15. Kenneth A. Lambert, Fundamentals of Python
16. James Payne, Beginning Python using Python 2.6 and Python

VI. Co-Curricular Activities:

Suggested Co-Curricular

Activities:

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques.
5. Visits to technology facilities, firms, research organizations etc.
6. Invited lectures and presentations on related topics by field/industrial experts.

SEMESTER-V

COURSE 6: DATA ANALYTICS METHODS

Theory Credits: 3 3 hrs/week

I. COURSE OUTCOMES: After successful completion of this course, the student will be able to;

1. Ability to distinguish between discrete and continuous distributions.
2. Knowledge related to concept of curve fitting.
3. Knowledge of important discrete and continuous distributions such as Binomial, Poisson, rectangular , normal, distributions.
4. Acumen to apply standard discrete and continuous probability distributions to different situations.
5. Knowledge related to concept of correlations.
6. Knowledge related to concept of regressions.
7. Knowledge of correlation, regression analysis, regression diagnostics.

UNIT – I

Correlation: Introduction, Meaning of Correlation, Types of correlation ,probable error, Karl- pear sons coefficient of correlation for individual series only, Spearman's Rank correlation for individualseries only.

UNIT –II

Regression: Introduction, definition, difference between correlation and regression, Simple linear regression, properties of regression coefficients, Regression equation x on y, Regression equation yon x , Simple Problems.

UNIT – III

Estimation Techniques: Forward Differences - Backward differences. Newton's forward interpolation formula - Newton's backward interpolation formula

UNIT – IV

Curve Fitting : method of least squares, fitting of a straight line only. Linear trend and find trendvalues by the method of straight line trend.

UNIT –V

Applications of Numerical Integration: Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule.

Note: Concentration on numerical problems only. Proofs of theorems and Derivations of expressions are omitted.

Text Books:

1. Mathematical Methods by Dr. T.K.V.Iyengar. - S.Chand Publications.
2. Statistical methods - S.P Gupta.

Reference Books:

Fundamentals of Mathematical statistics - S.C. Gupta & V.K.Kapoor.

SEMESTER-V

COURSE 6: DATA ANALYTICS METHODS

Practical Credits: 1 2 hrs/week

DATA ANALYTICS METHODS LAB

1. Trapezoidal rule
2. Simpson's rule
3. Fitting of a Straight Line.
4. Fitting of a Straight Line Trend.
5. Estimation Techniques
6. Interpolation.
7. Rank Correlation.
8. Correlation coefficient.
9. Regression lines X on Y.
10. Regression lines Y on X.