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KRISHNA UNIVERSITY

BOARD OF STUDIES (BoS) – DEPARTMENT OF COMPUTER SCIENCE

MINUTES OF THE BOARD OF STUDIES MEETING

Agenda:

Framing and Approval of Curriculum and Syllabus for I, II, III and IV Semesters of Diploma Programmes

- Diploma in Computer Applications
- Diploma in Artificial Intelligence and Robotics
- Diploma in Artificial Intelligence and Machine Learning
- Diploma in Cybercrime and Cyber Security
- Diploma in Data Analytics

Members Present:

S. No.	Name	Designation	Role
1	Prof. R. Kiran Kumar	Dept. of Computer Science, Krishna University	Chairman
2	Smt. P. Durga Bhavani	HOD, Dept. of Computer Science, Nalanda Degree College, Vijayawada	Member
3	Kondapalli Ramkumar	HOD, Dept. of Electronics and Internet of Things, Nalanda Degree College, Vijayawada	Member
4	Bommareddy Sudheer Reddy	Lecturer, Dept. of Computer Science, Nalanda Degree College & PG Centre, Vijayawada	Member
5	Prof. P. Suresh Varma	Dept. of CSE, Adikavi Nannaya University, Rajahmundry	Member
6	Dr. M.H.M. Krishna Prasad	Dept. of CSE, JNTUK, Kakinada	Member
7	Prof. D. Lalitha Bhaskari	Dept. of CS & Systems Engineering, Andhra University	Member
8	Assoc. Prof. M. Babu Reddy	HOD, Dept. of Computer Science, Krishna University	Member

Proceedings

The meeting commenced with the Chairman welcoming all the members. The proposal for introducing the above **Diploma programmes** was placed before the Board for detailed discussion.

The members discussed the proposed **curriculum, syllabus course structure, credits, teaching scheme, practical components, Course Outcomes, and assessment pattern** of the five Diploma programmes.

The Board members emphasized the importance of providing students with **practical, skill-oriented, and industry-relevant knowledge** in emerging areas of Computer Applications, Artificial Intelligence, Robotics, Machine Learning, Cyber Security, Cybercrime, and Data Analytics.

The members also suggested incorporating adequate **laboratory work, hands-on training, project-based learning, and application-oriented components** to enhance the employability and technical skills of students.

Resolution

After detailed discussion, the **Board of Studies approved/recommended the introduction of the following Diploma programmes**:

1. **Diploma in Computer Applications**
2. **Diploma in Artificial Intelligence and Robotics**
3. **Diploma in Artificial Intelligence and Machine Learning**
4. **Diploma in Cybercrime and Cyber Security**
5. **Diploma in Data Analytics**

The Board recommended that the proposed **curriculum and syllabus , course structure, credits, Course Outcomes, teaching scheme, practical components, and assessment pattern** be finalized by incorporating the suggestions given by the members.

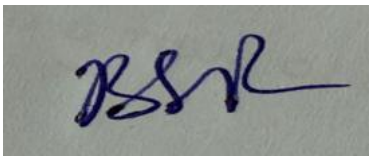
The Board further recommended that the finalized curriculum and syllabi be submitted to the **competent academic authority of Krishna University** for approval and implementation.

Conclusion

The Chairman thanked all the members for their valuable suggestions and active participation in the discussion. The meeting concluded with a vote of thanks.

Chairman, Board of Studies
Prof. R. Kiran Kumar
Signature: _____











Model Syllabus for Diploma in Data Analytics

COURSE STRUCTURE (for Semester I to IV)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Descriptive Statistics	3	3
			Descriptive Statistics Lab	2	1
	II	2	Foundation of Data Analytics	3	3
			Foundation of Data Analytics Practical	2	1
II	III	3	R Programming	3	1
			R Programming Practical	2	1
	IV	4	Data Mining	3	3
			Data Mining Practical	2	1

Semester-1

Course-1: Descriptive Statistics

Theory	Credits- 3	3 Hrs / Week

Unit-1

Introduction to Statistics: Concepts of Primary and secondary data. Diagramatic and graphical representation data. Histogram, frequency polygon, Ogives.

Measures of central tendency: Mean, Median, Mode, G.M and H.M, Properties, merits and demerits. Relation between AM, Gm and HM.

Unit-2

Measures of Dispersion: Range, QD, MD and SD, Variance.

Moments: Central and Non central moments and their interrelationship. Sheppards Correction.

Unit-3

Skewness and Kurtosis: Pearson's coefficient of skewness, Bowley's coefficent of skewness-kurtosis.

Curve fitting: Principles of least squares, fitting of a degree polynomial, fitting of stright line, fitting of parabola, fitting of power and exponential curves.

Unit-4

Correlation: Meaning, types, Measures – Scatter diagram, Karl Pearson's coefficient of correlation, Rank correaltion coefficient (with and without ties). Correlation coefficient for bi-variate data and simple problems.

Unit-5

Regression: Concepts , Linear regression- Lines, regression coefficients and its properties, regression lines for bi-variate data and simple problems. Correlation Vs Regression.

TEXT BOOKS:

[1] V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.

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[2] BA/BSc I year statistics descriptive statistics, probability distribution - Telugu Academy-Dr M.Jaganmohan Rao, DrN.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.

[3] K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

REFERENCE BOOKS:

[1] Willam Feller: Introdvuction to Probability theory and its applications. Volume -I, Wiley

[2] Goon AM, Gupta MK, Das Gupta B: Fundamentals of Statistics, Vol-1, the World Press Pvt.Ltd., Kolakota.

[3] Hoel P.G: Introduction to mathematical statistics, Asia Publishing house. [4] M. Jagan Mohan Rao and Papa Rao: A Text book of Statistics Paper-I. [5]Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Pra

SEMESTER-I

COURSE 1: Descriptive Statistics

Practical **Credits: 1** **2 hrs/week**

1. Graphical presentation of data (Histogram, frequency polygon, Ogives).
2. Diagrammatic presentation of data (Bar and Pie).
3. Computation of measures of central tendency (Mean, Median and Mode).
4. Computation of measures of dispersion (Q.D, M.D and S.D).
5. Computation of non-central, central moments.
6. Computation of non-central, central moments, Sheppard's corrections for grouped data.
7. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.
8. Fitting of straight line by the method of least squares.
9. Fitting of parabola by the method of least squares.
10. Fitting of power curve of the type by the method of least squares.
11. Fitting of exponential curve of the type and by the method of least squares.
12. Computation of correlation coefficient and regression lines for ungrouped data.

SEMESTER-II

Course 2 : Foundation of Data Analytics

Theory **Credits-3** **3hrs/week**

UNIT-I

Overview of Data Analytics-Definition and importance-Applications in various industries-Data Types and Sources.

Structured and unstructured data -Primary and secondary data sources-DataAnalytics Life Cycle

UNIT-II

Data Collection and Cleaning -Data Collection Techniques-Surveys and questionnaires-Web scraping-Sensor data-APIs-Data Cleaning and Preprocessing Handling missing data-Outlier detection and treatment-Data normalization and scaling

UNIT.III

Data Visualization-Introduction to data visualization — Data visualization options — Filters - Dashboard development tools — Creating an interactive dashboard with excel.

UNIT-IV

Exploratory Data Analysis (EDA)- Descriptive Statistics-Mean, median, mode-Measures of variability.

Data Modelling- Machine Learning:Machine learning — Modelling Process — Training model — Validating model — Predicting new observations —Supervised learning algorithms — Unsupervised learning algorithms.

UNIT-V

Big Data: Big Data and Cloud technologies - Introduction to HADOOP: Big Data, Apache Hadoop, MapReduce - Data Serialization - Data Extraction - Stacking Data - Dealing with data.

Ethics and recent Trends: Data Science Ethics — Doing good data science — Owners of the data - Valuing different aspects of privacy - Getting informed consent - The Five Cs — Diversity

TEXT BOOKS:

1. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, Introducing Data Science, ManningPublications Co., 1st edition.
2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, An Introduction to Statistical Learning: with Applications in R, Springer, 1st edition, 2013.
3. Bart Baesens, Analytics in a Big Data World: The Essential Guide to Data Science and its Applications, Wiley.
4. D J Patil, Hilary Mason, Mike Loukides, Ethics and Data Science, O' Reilly, 1st edition, 2018.

REFERENCE BOOKS:

1. Dr Anil Maheshwari, Data Analytics Made Accessible, Publisher: Amazon.com Services LLC.

2. Joel Grus, Data Science from Scratch: First Principles with Python, O'Reilly, 1st edition, 2015.

SEMESTER- II

Course -2 : Foundation of Data Analytics Lab

Practical Credits-I 2hrs/week

1. Import an external dataset into Excel and explore its structure
2. Clean and format messy data, addressing issues like missing values and inconsistencies.
3. Splitting data in a column using Text-to-Columns to handle structured data.
4. Use Excel functions to calculate mean, median, mode, standard deviation, and quartiles.
5. Generate a frequency distribution table and histogram for a dataset.
6. Create a bar chart to visualize categorical data and perform Pareto analysis.
7. Generate line charts to represent trends over time and analyse patterns.
8. Create pie charts to illustrate the distribution of categorical variables and analyse percentages.
9. Utilize pivot tables to summarize and analyse data, exploring various functionalities.
10. Explore advanced chart types, such as waterfall charts or box-and-whisker plots, for specific visualizations.
11. Use Excel to perform correlation and regression analysis to identify relationships between variables.
12. Conduct a basic hypothesis test (e.g., t-test) using Excel functions.
13. Perform ANOVA to analyse differences among group means in a dataset.

SEMESTER-III

COURSE 3 : R Programming

Theory **Credits: 3** **3 hrs/week**

UNIT-I :

Introduction to R -What is R? - Why R? -Installing R -R environment -How to get help in R - R console and Editor

Understanding R data structure -Variables in R - Scalars - Vectors - Matrices - List -Data frames - Using c, Cbind, Rbind, attach and detach functions in R - Factors- While loop - If loop -For loop - Arithmetic operations

UNIT-II

Importing data-Reading Tabular Data files - Reading CSV files -Importing data from excel-Importing data from SAS -Accessing database -Saving in R data - Loading R data objects -Writing to files

UNIT-III

Manipulating Data- Selecting rows/observations -Selecting columns/fields - Merging data -Relabelling the column names -Converting variable types - Data sorting -Data aggregation

UNIT-IV

Using functions in R-Commonly used Mathematical Functions -Commonly used Summary Functions -Commonly used String Functions -User-defined functions - local and global variable

UNIT-V

Charts and Plots -Box plot -Histogram-Pareto charts -Pie graph -Line chart - Scatterplot-Developing graphs

TEXT BOOKS:

[1] Grolemund G., Hands-on programming with R: write your own functions and simulations, O' Reilly Media Inc., 2014.

[2] James G., Witten D., Hastie T., & Tibshirani R., An introduction to statistical learning: with Applications in R, Springer, 2013.

REFERENCE BOOKS:

[1] Gupta S. C., & Kapoor V. K., Fundamental of Mathematical Statistics, Sultan Chand & Sons, 2018.

[2] Peng R. D, Exploratory data analysis with R, Lulu.Com, 2012.

[3] Peng R. D, R programming for data science, Leanpub, 2016.

[4] Teetor P, R cookbook: Proven recipes for data analysis, statistics, and graphics, O' Reilly Media Inc., 2011.

[5] Crawley M. J., The R book, John Wiley & Sons, 2012.

SEMESTER-III

COURSE 3: R Programming

Practical **Credits: 1** **2 hrs/week**

1. Installing R and packages in R.
2. Programs on data types in R.
3. Built-in Functions in R
4. Creating and manipulating a vector in R.
5. Creating matrix and manipulating matrix in R.
6. Creating and operations on Factors in R.
7. Operations on Data Frames in R.
8. Operations on Lists in R.
9. Programs on Operators in R.
10. Comparison of Matrices and Vectors in R.
11. Programs on If–else statements in R.
12. Programs on For Loops in R.
13. Programs on While Loops in R.
14. Customizing and Saving to Graphs in R.

Semester-IV

Course -4: Data Mining

Theory **Credits-3** **3hrs/week**

UNIT-I

Introduction and Data Preprocessing- Data Mining — Kinds of data to be mined— Kinds of patterns to be mined — Technologies — Targeted Applications - Major Issues in Data Mining— Data Objects and Attribute Types — Measuring Data similarity and dissimilarity - Data Cleaning —Data Integration - Data Reduction — Data Transformation — Data Discretization

UNIT-II

Mining Frequent Patterns And Advanced Pattern Mining- Basic Concepts — Frequent Itemset Mining Methods — Pattern Evaluation Methods — Pattern Mining in Multilevel, Multidimensional space — Constraint-Based Frequent Pattern Mining — Mining Compressed or Approximate Patterns — Pattern Exploration and Application.

UNIT-111

Classification Techniques - Basic Concepts — Decision Tree Induction — Bayes Classification Methods — Rule-Based Classification — Model Evaluation and Selection — Techniques to Improve Classification Accuracy — Bayesian Belief Networks — Classification by Backpropagation — Support Vector Machines.

UNIT-IV

Clustering Techniques- Cluster Analysis — Partitioning Methods - Hierarchical Methods — Density-Based Methods (Includes all clustering techniques under the given categories in the Text Book)

UNIT-V

Outlier Detection And Applications- Outliers and Outlier Analysis — Clustering Based Approach — Classification-Based Approach — Mining Complex Data Types— Data Mining Applications

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pie, Data Mining Concept and Techniques, Morgan and Kaufmann Publisher, Third Edition, 2012.
2. Arun K Pujari, Data Mining Techniques, Second Edition, Universities Press India Pvt. Ltd. 2010.

REFERENCE BOOKS:

1. Daniel T. Larose and Chantal D. Larose, Data Mining and Predictive Analytics, Wiley Series on Methods and Applications in Data Mining, Wiley Publications.

2. (2] Ian H. Witten, Eibe Frank and Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques, Morgan and Kaufmann Publisher, Third Edition,2014

Course -4 : Data Mining Lab

Practical Credits-I 2hrs/week

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 Algorithm
6. Demonstration of classification rule process on dataset employee. arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee. arff using id3 algorithm
8. Demonstration of classification rule process on dataset employee.arff using naive bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k- means

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Diploma (Data Analytics) Model Paper for Core Subjects

Semester: I

Paper Title: Descriptive Statistics

Time: 3hrs **Max.Marks:70**

Section–A(20Marks)

Answer any *Five* questions. All questions carry equal marks. 5X4=20M

1. Define data.
2. What is an Ogive?
3. Explain Range and its coefficient.
4. Explain the method of fitting a straight line.
5. Define Kurtosis.
6. What is a Scatter Diagram?
7. Explain Bivariate Data.
8. Explain the properties of regression coefficients.

Section–B(50Marks)

Answer ALL Questions. All questions carry equal marks. 5X10 =50M

9. a) Explain the different methods of diagrammatic and graphical representation of data.

OR

b) Calculate Mean, Median and Mode for a given frequency distribution.

10. a) Explain Variance and Standard Deviation with suitable examples.

OR

b) Explain Sheppard's Correction and its applications

11. a) Explain Pearson's coefficient of skewness formulaes

OR

b) Explain the methods of fitting Power and Exponential Curves.

12. a) Explain the meaning, types and measurement of correlation.

OR

b) Explain Spearman's Rank Correlation Coefficient with and without ties.

13. a) Explain Linear Regression with example.

OR

b) Explain the Correlation Vs Regression.

KRISHNAUNIVERSITY

Diploma (Data Analytics) Examinations Model Paper for Core Subjects

Semester: II

Paper Title: Foundation of Data Analytics

Time: 3hrs **Max.Marks:70**

Section–A(20Marks)

Answer any *Five* questions. All questions carry equal marks. 5X4=20M

1. Define Data Analytics and its importance.
2. Explain about Structured and unstructured data.
3. Describe about Web scraping.
4. Explain about Data normalization?
5. Explain about Filters?
6. Describe Exploratory Data Analysis (EDA).
7. Explain about Machine learning?
8. Explain about Data Extraction.

Section–B(50Marks)

Answer ALL Questions. All questions carry equal marks. 5X10 =50M

9. a) Define Data Analytics. Applications of data analytics in various industries.

OR

b) Discuss about Data Analytics Life Cycle.

10. a) Explain about the Data Collection Techniques.

OR

b) Explain about Data Cleaning and Preprocessing Handling missing data.

11. a) Explain about Data Visualization.

OR

b) How to Creating an interactive dashboard with excel.

12. a) Explain about Descriptive Statistics.

OR

b) Write about Supervised learning algorithms.

13. a) Write about Big data. Explain the Structure of Apache Hadoop.

OR

b) Explain about Ethics and recent Trends in Data Analytics.

KRISHNAUNIVERSITY

Diploma (Data Analytics) Examinations Model Paper for Core Subjects

Semester: III

Paper Title: R Programming

Time: 3hrs **Max.Marks:70**

Section–A(20Marks)

Answer any *Five* questions. All questions carry equal marks. 5X4=20M

1. Arithmetic operations in R.
2. Explain about R environment.
3. Describe about Accessing database.
4. Explain about Data sorting in R?
5. Explain about string functions?
6. Describe about local and global variables in R.
7. Explain about plots?
8. Explain about Pie graphs.

Section–B(50Marks)

Answer ALL Questions. All questions carry equal marks. 5X10 =50M

9. a) Briefly explain about R data structures.

OR

b) Discuss about loops in R.

10. a) How to importing data from Tabular Data files, CSV files, excel and SAS.

OR

b) Explain about saving and loading R objects.

11. a) Explain about Manipulating Data in R.

OR

b) Data aggregation in R.

12. a) Explain about Commonly used Mathematical functions in R.

OR

b) Write about User Defined functions in R.

13. a) Write about chats and plots inn R.

OR

b) How to developing graphs in R.

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UG Diploma (Data Analytics) Examinations Model Paper for Core Subjects

Semester: IV

Paper Title: Data Mining

Time: 3hrs **Max.Marks:70**

Section–A(20Marks)

Answer any *Five* questions. All questions carry equal marks. **5X4=20M**

1. Define Data Mining.
2. What is data Reduction?
3. Describe about pattern Mining.
4. Explain about Pattern Evaluation Methods?
5. Explain about Bayesian Belief Networks?
6. Describe about Partitioning Methods.
7. Explain about Mining Complex Data Types?
8. Write about Mining Applications.

Section–B(50Marks)

Answer ALL Questions. All questions carry equal marks. **5X10 =50M**

9. a) Major issues in Data Mining.

OR

b) Discuss about Data Cleaning and Data Integration.

10. a) Define Constraint-Based Frequent Pattern Mining.

OR

b) Explain about pattern Evaluation Methods.

11. a) Explain about Classification Techniques.

OR

b) Techniques to Improve Classification Accuracy.

12. a) Explain about Cluster Analysis.

OR

b) Write about different clustering techniques.

13. a) Write about Outliers and Outlier Analysis.

OR

b) Explain about classification based approach?