Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC A++ Grade (3rd Cycle- 3.64 CGPA)
Dr. N.G.P.-Kalapatti Road, Coimbatore-641048, Tamil Nadu, India
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BoS

10th

Department of Computer Science with Data Analytics
Board of Studies Meeting

The minutes of the 10th meeting of Board of Studies held on 02.04.2024 at 10.00 am at the AV Hall (A1 218).

Members Present:

S.No.	Name	Category
1	Dr. V. Pream Sudha	Chairman
2	Dr. J. Satheeshkumar, Professor Department of Computer Applications Bharathiar University, Coimbatore	Subject Expert
3	Ms.Jennifer Xavier, Project Manager Accenture AI, Bengaluru	Industrial Expert (online)
4	Mr. A. M. Sabarish, Associate Data Engineer Cloud Destination, Coimbatore	Alumni
5	Dr. A C Sountharraj	Member
6	Dr.R. Suganthi	Member
7	Ms. Bharathi Anbarasan	Member
8	Ms. C. Karpagam	Member
9	Mrs. S. Shenbaha	Member
10	Mrs.R.Ranjani	Member
11	Ms.S.Govardhini	Member
12	Mr.C.Anbarasan	Member
13	Ms. A. Roselin	Member
14	Dr. R. Sowrirajan	Co-opted Member
15	Dr. HazelVerbina.A	Co-opted Member
16	Dr. N. Kuppuchamy D.	Co-opted Member
17	Indra ((232DA009)	Student Representative

The HoD and Chairman of the department of CS with Data Analytics welcomed and introduced all the members and appreciated them for their continuous support and contribution for the development of academic standard and enrichment of the syllabus.

Further, Chairman informed the inability of the following members to attend the meeting and requested to grant leave of absence.

1. Dr. Malar B - Subject Expert

2. Dr. S. Bharathidason - Subject Expert
The items of the agenda were taken one by one for discussion and the following resolutions were passed.

Item 10.1 : *To review and approve the minutes of the previous meeting held on 16.10.2023.*

The chairman of the Board presented the minutes of the previous meeting held on

16.10.2023 and requested the members to approve. After brief discussion the following resolution was passed.

Resolution:

Resolved to approve the minutes of the previous meeting held on 16.10.2023.

Item 10.2 : *To consider and approve the scheme, regulation and syllabi for I semester for the students admitted during the academic year 2024-25.*

The chairman presented the detailed scheme and Regulation for the students admitted from the academic year 2024-25 onwards and syllabus for the I semester. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

Changes Made:

B.Sc Computer Science with Data Analytics :

B.Sc Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
24MTU1ID	IDC: Mathematics for Computing - I	Matrix transformations has been included in Unit II as many data science applications require this concept as suggested by Dr. Satheesh Kumar. J

New Courses Introduced:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
24CYU1CA	Core: Digital Logic Design	To include design principles for better understanding of computer architecture.

M.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
24MTP1EA	EDC: Mathematical Foundations of Data Science	To provide the mathematical principles necessary for analyzing data and building models

Courses Removed:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

M.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the above modification and adopt the revised scheme and syllabus for students admitted for the academic year 2024-2025.

Item 10.3 : *To consider and approve the changes, if any, in the syllabi for III semester for the students admitted during the academic year 2023-24.*

The Chairman presented the detailed syllabi for the III semester for the students admitted from the academic year 2023-24 onwards. The details of changes made also presented as follows:

Changes Made:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

M.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
234DA2A3DB	DSE : Modern Databases	MongoDB and Neo4j has been introduced in Unit IV and Unit V as suggested by Mr. Sabarish. A.M
234DA2A3CQ	Practical : Big Data Analytics and Visualization	To provide the skills needed for data visualization and reporting new exercises were added as suggested by Dr. Satheesh Kumar.J

New Courses Introduced:

M.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

Courses Removed:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

M.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

IDC Offered

Course Code	Course	Department
Nil	Nil	Nil

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the syllabi for the III semester for the students admitted from the academic year 2023-24 onwards.

Item 10.4 : *To consider and approve the changes in the syllabi for V semester for the students admitted during the academic year 2022-23.*

The Chairman presented the detailed syllabus for the V semester for the students admitted from the academic year 2022-23 onwards. The details of changes made also presented as follows:

Changes Made:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
224DA1A5CA	Core: Computer Networks and Communication	Case studies have been included in all units to provide the latest networking applications in various fields as suggested by Dr. Satheesh Kumar. J

New Courses Introduced:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

Courses Removed:

B.Sc. Computer Science with Data Analytics		
Course Code	**Course**	**Changes and Reason**
Nil	Nil	Nil

IDC Offered

Course Code	Course	Department
Nil	Nil	Nil

Generic Elective Offered

Course Code	Course	Department
224DA1A5GA	Data Visualization	All UG courses

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the modified syllabus for the V semester for the students admitted from the academic year 2022-23 onwards.

Item 10.5: *To approve the panel of examiners for question paper setting, question paper scrutiny, conduct of practical and theory examinations, evaluation of answer scripts for the odd semester of the academic year 2024-25.*

The Chairman presented the panel of examiners for question paper setting and evaluation of answer scripts for the odd semester of the academic year 2024-25.

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2024-2025

Item 10.5: To consider and approve any other item brought forward by the Chairman and the members of the board.

- Value Added Certificate Course: Python Libraries for Data Analytics and Information Visualization
- Diploma in Data Science
- Foundation course for first year students
- MoU with HashInd, Handle Course

Resolved to approve the Value Added Certificate Courses and syllabus for Diploma in Data Science

Finally the Chairman thanked all the members for their cooperation and contribution in enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was closed with formal vote of thanks proposed by Dr. V. Pream Sudha, Head and Chairman- Computer Science with Data Analytics BoS.

Signature

Date : 02.04.24

Syllabus Revision

Faculty: Computer Science with Data Analytics　　　**Board: CSDA**
Programme: UG　　　**Semester: I**
Course Code/ Name: 24MTU1ID - Mathematics for Computing I

Unit	Existing	Changes
I	**Systems of Linear Equations:** Introduction to system of linear equations- - linear systems in two and three unknown - augmented matrices and elementary row operations - Gaussian elimination- Matrices and Matrix operations - inverses - algebraic properties of matrices - elementary matrices - method for finding A^{-1} - invertible matrices - ~~diagonal matrices - triangular matrices - symmetric matrices~~	
II	**Determinants:** Introduction - determinants by cofactor expansion- minors and cofactors - technique for evaluating 2×2 and 3×3 determinants - evaluating determinants by row reduction - elementary row operations - Matrices with proportional rows or columns - properties of determinants - Cramer's rule.	**Matrix Transformations and Applications:** Diagonal matrices - triangular matrices - symmetric matrices - Matrix Transformations - Network Analysis - Electrical Circuits - Balancing Chemical Equations - Polynomial Interpolation - Leontief Input-Output Models
III	**Eigenvalues and Eigenvectors:** Definition of eigenvalues and eigenvectors - computing eigenvalues and eigenvectors - Diagonalization - Geometric and Algebraic multiplicity - complex vector spaces - vectors in C^n - differential equations - first order linear systems - solution by diagonalization	
IV	**Solution of Algebraic , Transcendental Equations and Linear Systems:** Introduction - Newton-Raphson method-Direct methods -Matrix inversion method - Gaussian elimination method - Gauss Jordan method - Iterative methods - Gauss Seidel Method - Gauss Jacobi method	
V	~~Interpolation, Numerical Differentiation and Integration:~~ ~~Introduction - Finite differences - Newton's formulae for interpolation - Interpolation with unevenly spaced points: Lagrange's interpolation formula - Numerical differentiation - maximum and minimum values of a tabulated function - Numerical integration - Trapezoidal rule - Simpson's 1/3 rule - Simpson's 3/8 rule .~~	

PERCENTAGE OF SYLLABUS REVISED: 30%
COURSE FOCUSES ON:

✓	Skill Development	☐	Entrepreneurial Development
☐	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
☐	Social Awareness/ Environment	☐	Constitutional Rights/ Human Values/ Ethics

Syllabus (New Course)

Faculty: Computer Science with Data Analytics **Board: CSDA**
Programme: PG **Semester: I**
Course Code/ Name: 24MTP1EA – Mathematical Foundations of Data Science

Unit	Course Contents
I	**Probability Concepts** : Introduction -Probability Defined -Importance of the Concept of Probability - Calculation of Probability -Theorems of Probability -Addition Theorem - Multiplication Theorem - Conditional Probability -Bayes' Theorem –Mathematical Expectation
II	**Probability Distributions** : Introduction - Binomial Distribution-Fitting a Binomial Distribution- Poisson Distribution - Fitting a Poisson Distribution- Normal Distributions - Fitting a Normal Curve
III	**Correlation and Regression Analysis** : Correlation- Scatter Diagram Method -Graphic Method- Karl Pearson's Coefficient of Correlation-Spearmans coefficient of Correlation - Regression Analysis - Regression Lines -Regression Equations -Regression Equation of Y on X - Regression Equation of X on Y
IV	**Statistical Inference -Testing of Hypothesis** : Introduction - Hypothesis Testing - Standard Error and Sampling Distribution - Estimation -Tests of Significance for Large Samples -Difference between small and large samples -Two tailed test for difference between the means of two samples - Standard Error of the difference between two standard deviations -Tests of significance for small samples - Assumption of Normality -Student's t distribution - Application of the t Distribution
V	**Chi square test, F-test and Analysis of Variance** : Introduction- Chi-Square test- F-Test -Applications of F-Test -Analysis of Variance - Assumptions -Technique of Analysis of Variance - One-Way Classification - Analysis of Variance in Two-Way Classification Model

PERCENTAGE OF SYLLABUS REVISED: 100%
COURSE FOCUSES ON:

✓	Skill Development	☐	Entrepreneurial Development
☐	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
☐	Social Awareness/ Environment	☐	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision

Faculty: Computer Science with Data Analytics　　　　　**Board: CSDA**
Programme: PG　　　　　　　　　　　　　　　　　　　**Semester: III**
Course Code / Name: 234DA2A3DB / Modern Databases

Unit	Existing	Changes
1	Introduction - Value of Relational Databases-Emergence of NoSQL- Aggregate Data models- Aggregates- Key value and Document models -Column Family Stores Relationships- Graph Databases- Schema less Databases- Materialized Views Modeling for Data Access	Case Study on Column Family Stores
2	Distribution Models - Single Server- Sharding - Master-Slave Replication - Peer to peer Replication- Consistency - Update, Read Consistency- Relaxing Consistency CAP Theorem-Relaxing Durability- Basic MapReduce - Partitioning and combining Calculation	Case Study on Key value stores
3	Key Value Databases - Introduction- Features-Consistency -Transactions - Availability- Query Features- Scaling - Use Cases- Document databases: Introduction- Basic operation of document databases- XML and XML Databases: XML Tools and Standards-XML Databases - XML Support in Relational Systems - JSON Document Databases : Introduction - Data Models in Document Databases MemBase and CouchBase	Case Study on XML Databases
4	~~Column Family stores- Introduction- Features-Use Cases- Graph DatabasesIntroduction- Features-Consistency Transactions Availability Query FeaturesScaling Use Cases-Case study: Building a Graph Database Application~~	Introduction to MongoDB: MongoDB Vs Relational Database Management Systems – Data Types – MongoDB Query Language - Getting Data into MongoDB – Database Operations: Create – Update – Read – Delete - Querying-Indexing - Aggregation - Comparison of Relational databases to new No-SQL stores- Case Study on MongoDB
5	~~Schema Changes- Schema Changes in NoSQL Data store- Polygot Persistence Disparate data storage needs- Polygot data store usage -Service usage-Choosing the right technology-Deployment complexity-XML Databases- Object databases~~	Graph databases: Need for graph databases - Neo4j : Key concept and characteristics -Modeling data for Neo4j : Four fundamental data constructs-Modeling for graph databases- Graph modelling - best practices - Importing data into Neo4j - Visualizations for Neo4j - Cypher Query Language- Case Study on Graph Databases

PERCENTAGE OF SYLLABUS REVISED　　　: 40 %
COURSE FOCUSES ON

✓	Skill Development	☐	Entrepreneurial Development
✓	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
☐	Social Awareness/ Environment	☐	Constitutional Rights/ Human Values/ Ethics

Faculty: Computer Science with Data Analytics　　　**Board: CSDA**
Programme: PG　　　**Semester: III**
Course Code/ Name: 234DA2A3CQ - Core Practical : Big Data Analytics & Visualization

Unit	List of Programs	
1	~~Programs to execute the Hadoop commands~~	Perform Extraction, Transformation, and Loading (ETL) process to construct the database using a data analytics tool
2	~~Programs to mine time series data using MapReduce~~	Perform Imputation Methods for Data Preprocessing, grouping and filtering using a data analytics tool
3	~~Programs to implement suitable Pig Scripts for sorting and filtering~~	Implement DAX (Data Analysis Expressions) queries using a data analytics tool
4	~~Programs to create, alter and drop databases in Hive~~	Perform Geographical mapping on a massive dataset using a data analytics tool.
5	~~Programs to work with Cassandra collections~~	Create a Dashboard and perform Data Analysis on given data set.
6	Program to perform Grouping and Joins Operations using Pig package.	
7	Develop an application to find the maximum temperature using Spark.	
8	Program for word count using MapReduce technique.	
9	Program to create CRUD operations in Cassandra	
10	Program to import and export Cassandra data in HiveQL.	
11	Program to create Views and indexes in HiveQL.	
12	Program to sort and aggregate data in tables using HiveQL	

PERCENTAGE OF SYLLABUS REVISED: 40%

COURSE FOCUSES ON:

✓	Skill Development	☐	Entrepreneurial Development
✓	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
☐	Social Awareness/ Environment	☐	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision

Faculty: Computer Science with Data Analytics **Board: CSDA**
Programme: UG **Semester: V**
Course Code/ Name: 224DA1A5CA - Core: Computer Networks and Communication

Unit	Existing	Changes
I	**Introduction to Computer Networks** Components of Computer Networks – Data Representation – Distributed processing - Network criteria – Physical Structure – Categories of Networks – Interconnection of Networks – Protocols and standards – Standard organization – Network models – OSI Reference: The TCP/IP Reference model	Case study on Network Layer Protocol
II	**Physical and Data Link Layer** Introduction – Network Topologies – Switching – Multiplexing – Transmission Medium: Guided medium: Twisted Pair – Coaxial – fiber optics – Wireless Transmission: Electromagnetic spectrum – Radio – Transmission – Microwave Transmission - Data Link Layer: Goals – Design Issues - Error Detection and Correction – Data Link Protocols – Sliding Window protocol	Case study on Network topologies
III	**Network Layer** Introduction: Design Issues of Network Layer – Routing – Types of routing Algorithms: Optimality Principle – Shortest path – Flooding – Distance Vector –Hierarchical Routing – Link State routing – Congestion Control – The IP Protocol –IP Address: Subnets – CIDR – Internet control Protocols: IPV4 – IPV6	Case study on shortest path in a transport network
IV	**Transport Layer** Introduction: TCP Basics – Service of Transport Layer – Service Primitives: Connection Establishment – Connection Release – Transmission Policy –Congestion control – UDP: Introduction - Inter Process Communication - Remote Procedure Call – Real time transport protocol	Case study on TCP-Targeted Denial of Service Attacks
V	**Application Layer** Domain Name System : DNS Name Space – Resource Records – Name Servers –Electronic Mail: Architecture and Service – User Agents – Message Formats –Message Transfer – World Wide Web: Architecture – Static Web page – Dynamic Web page –The Hyper Text Transfer Protocol	Case study on DNS Cache Poisoning Attacks

PERCENTAGE OF SYLLABUS REVISED: 10 %

COURSE FOCUSES ON:

✓	Skill Development	☐	Entrepreneurial Development
✓	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
☐	Social Awareness/ Environment	☐	Constitutional Rights/ Human Values/ Ethics

Faculty: Computer Science with Data Analytics   **Board: CSDA**
Programme: UG   **Semester: V**
Course Code/ Name: 224DA1A5GA - Core:Generic Elective – Data Visualization

Unit	Course Contents
I	Communicating Data : Introduction- A Step in the process - A Model of Communication - Three Types of Communication Problems - Six Principles of Communicating Data - Handling Data
II	Ratios and Proportions : Finding sources- Data scraping- Formatting Data: Data formats- Formatting tools - Formatting with code. Case Study: Web Scraping for Sentiment Analysis.
III	Ratios – Rates: Blending Data Source - Visualizing Rates - Proportions and Percentages: Introduction Filters and Quick Filters - Introducing Table Calculations
IV	Multiple Quantities : Scatterplots - Stacked Bars - Regression and Trend Lines - The Quadrant Charts Case Study : Stock Market Data Analytics
V	Dashboards : Dashboards - Types of Dashboards - Building and Exploratory Dashboards - Advanced Dashboards Features: Animating Dashboards

PERCENTAGE OF SYLLABUS REVISED: 100%

COURSE FOCUSES ON:

✓	Skill Development	☐	Entrepreneurial Development
✓	Employability	☐	Innovations
☐	Intellectual Property Rights	☐	Gender Sensitization
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ATTENDANCE OF THE TENTH BOARD OF STUDIES MEETING

Faculty: Computer Science   **Board: Data Analytics**

VENUE   :   AV HALL A Block
DATE   :   02/04/2024
TIME   :   9.30 AM

The following members were present for the Board of Studies meeting

S.NO.	NAME	DESIGNATION	SIGNATURE
1.	Dr. V. Pream Sudha HoD Department of Data Analytics Dr. N.G.P. Arts and Science College Coimbatore	Chairman	
2.	Dr. J. Satheeshkumar Associate Professor Department of Computer Applications Bharathiar University, Coimbatore	Member (Subject Expert) (Nominated by Vice Chancellor)	
3.	Dr. Malar B Professor Department of Data Science PSG College of Technology, Coimbatore	Member (Subject Expert) (Nominated by Academic Council)	— Absent —
4.	Dr. S. Bharathidason Professor & Head Department of Computer Science Loyola College, Chennai	Member (Subject Expert) (Nominated by Academic Council)	— Absent —
5.	Ms. Jennifer Xavier Project Manager Accenture AI, Bengaluru	Member (Industrial expert)	Present (online Mode)
6.	Mr. A. M. Sabarish Associate Data Engineer Cloud Destination Coimbatore	Alumni	

Cont...

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| S.NO.	NAME	DESIGNATION	SIGNATURE
8.	Dr. N. Kuppuchamy MA., M. Phil., Ph. D. Department of Tamil Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (Tamil)	02/04/24
9.	Dr.A.Hazel Verbina M.A., Mphil., Ph.D., D.C.A Department of English Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (English)	2/04/24
10.	Dr. R. Sowrirajan M. Sc., M. Phil., Ph. D. Department of Mathematics Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (Mathematics)	
11.	S. INDRA (232DA009) I M.Sc CSDA	Student Representative	02/04/24
12.	Dr. A C Sountharraj MCA., M.Phil., Ph.D. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	02/04/24
13.	Dr.R.Suganthi MCA., M.Phil., Ph.D. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	R.Suganthi 2/4/24
14.	Ms.Bharathi Anbarasan M.C. A., M. Phil., NET.	Member	2/4/2024
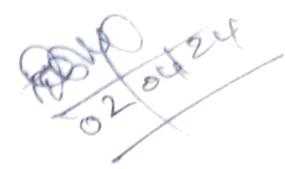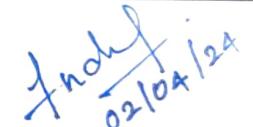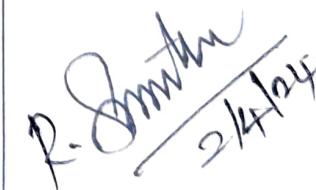
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	Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore		
15.	Ms. C. Karpagam M.C.A., M. Sc. (CP)., TN–SET., UGC-NET., (Ph.D.) Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
16.	Mrs.S.Shenbaha M.Sc., M.Tech. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
17.	Mrs.R.Ranjani M.C.A., M.Phil., UGC – NET Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
18.	Ms.S.Govardhini M.C.A., M.Phil.,SET, NET Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
19.	Mr. A Anbarasan M.Sc. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
20.	Ms. A. Roselin MCA., (Ph.D.) Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore		
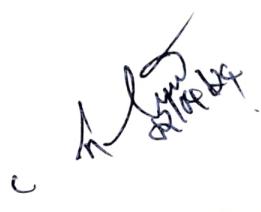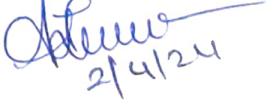
Date : 02/4/2024

(Dr. V Pream Sudha)

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