MINUTES OF THE EIGHTH BOARD OF STUDIES MEETING

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

The Meeting of Board of Studies (BoS) was held as given below:

Name of the Body	**Board of Studies**
Department	**Computer Science with Data Analytics**
Meeting No.	**8th**
Date and Time	**09.06.2023@10.00 a.m**
Venue	**Hall No. A1 218**
Members Attended	**The details are given in the ANNEXURE –I**

	AGENDA
1	Discussion on curriculum and syllabi for Part III – Core Courses for III Semester UG - 2022-25 Batch
2	Discussion on syllabi for Part III Inter disciplinary Course (IDC) offered by Mathematics department for III Semester UG - 2022-25 Batch
3	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for III Semester UG 2022-25 Batch
4	Discussion on Part II (English) offered by English department for III Semester UG 2022-25 Batch
5	Discussion on curriculum and syllabi following R5 Regulations for Part III – Core Courses for I semester UG – 2023-26 Batch and onwards
6	Discussion on syllabi for Part III Inter disciplinary Course (IDC) offered by Mathematics department for I semester UG – 2023-26 Batch and onwards
7	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for I semester UG – 2023-26 Batch and onwards
8	Discussion on Part II (English) offered by English department for I semester UG – 2023-26 Batch and onwards
9	Discussion on Part IV (AECC) Environmental Studies for I semester UG – 2023-26 Batch and onwards
10	Discussion on Part-V Extension Activity for I semester UG – 2023-26 Batch and onwards
11	Discussion on curriculum and syllabi for Part III – Core Courses for III semester PG

	2022-24 Batch
12	Discussion on curriculum and syllabi following R5 Regulations for Part III – Core Courses for I semester PG 2023-25 Batch and onwards
13	Discussion on VACC for the AY 2023 – 24
14	Any other matters

MINUTES OF THE SEVENTH BOARD OF STUDIES MEETING

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

The Chairman of BoS welcomed all the Panel members for the meeting. The items listed in the agenda were taken for discussion. The following are the minutes of the meeting:

Item – 01	**Discussion on syllabi for Part III – Core Courses for III Semester UG 2022-25 Batch**
Discussion	**224DA1A3CA – Core : Database System Concepts** • The board members suggested to include advanced database system concepts along with NoSQL databases in Unit V to meet the requirements of the present day database applications **224CS1A3CA – Core : Operating Systems** • The unified syllabus approved by Board of Studies in Computer Science was placed for endorsement. **224AI1A3CP - Core : Programming in Java** • The unified syllabus approved by Board of Studies in Computer Science with Artificial Intelligence was placed for endorsement. **224DA1A3SP - Core Practical: Database Systems Lab** • Dr.B.Malar suggested to include programs incorporating concepts of data transfer using advanced databases like MongoDB as it is adopted in large industries.
Resolution	The Board unanimously approved the syllabi
Item-02	**Discussion on syllabi for Part III Inter Disciplinary Course (IDC) offered by Mathematics department for III Semester UG - 2022-25 Batch**
Discussion	**222MT1A3ID- Discrete Mathematics** • Syllabus approved by the Mathematics Board was placed for endorsement
Resolution	The Board approved the same
Item – 03	**Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for III Semester UG 2022-25 Batch**

Discussion	**221TL1A3TA - Tamil-III** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **221TL1A3HA - Hindi-III** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **221TL1A3FA – French III** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **221TL1A3MA - Malayalam - III** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement.
Resolution	The Board approved the same
Item -04	**Discussion on Part II (English) offered by English department for III Semester UG 2022-25 Batch**
Discussion	**221EL1A3EA : Part II: Professional English III** • The unified syllabus approved by the Board of Studies in English was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item -05	**Discussion on syllabi for Part I – Core Courses for I Semester UG 2023-26 Batch and onwards**
Discussion	**234AI1A1CA Core : Problem Solving and Programming in C** • The unified syllabus approved by Board of Studies in Computer Science with Artificial Intelligence was placed for endorsement. **234DA1A1CP Core Practical : C Programming** **234IT1A1CA Core: Digital Computer Fundamentals** • The unified syllabus approved by the Board of Studies Information Technology was placed for endorsement.
Resolution	The Board approved the same
Item-06	**Discussion on syllabi for Part III Inter Disciplinary Course (IDC) offered by Mathematics department for I Semester UG - 2023-26 Batch and onwards**

Discussion	**232MT1A1ID- Mathematics for Computing I** • Syllabus approved by the Mathematics Board was placed for endorsement
Resolution	The Board approved the same
Item – 07	**Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for I Semester UG 2023-26 Batch and onwards**
Discussion	**231TL1A1TA - Tamil-I** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **231TL1A1HA - Hindi-I** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **231TL1A1FA – French - I** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. **231TL1A1MA - Malayalam - I** • The unified syllabus approved by the Board of Studies in Languages was placed for endorsement.
Resolution	The Board approved the same
Item -08	**Discussion on Part II (English) offered by English department for I Semester UG 2023-26 Batch and onwards**
Discussion	**231EL1A1EA : Part II: Professional English I** • The unified syllabus approved by the Board of Studies in English was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item-09	**Discussion on Part IV (AECC) Environmental Studies for I semester UG – 2023-26 Batch and onwards**
Discussion	**233MB1A1AA : Environmental Studies** • The unified syllabus approved by the Board of Studies in Microbiology was placed for endorsement
Resolution	The Board unanimously approved the syllabus

Item-10	**Discussion on Part-V Extension Activity for I semester UG - 2023-26 Batch and onwards**
Discussion	• One credit to be awarded for participation in YRC/RCC//NSS/ RRC/Yoga/Sports/Clubs
Resolution	The Board approved the same
Item-11	**Discussion on curriculum and syllabi for Part III – Core Courses for III semester PG 2022-24 Batch**
Discussion	**224DA2A3CA - Core : Machine Learning** Dr.B.Malar suggested to include the concepts and applications of reinforcement learning in unit V as it is widely used in gaming and robotics. **224DA2A3CB - Core : Internet of Things and applications** The board members suggested that the course Internet of Things and applications can be given as core course due to its significance in the data analytics domain **224DA2A3CC - Core : Cloud Computing** **224DA2A3CD Core : Big Data Analytics** **224DA2A3CP Core Practical : Machine Learning Lab** Dr.J.Satheesh Kumar suggested to include programs incorporating Machine learning algorithms applied on datasets in healthcare, retail etc. **224DA2A3CQ Core Practical : Big Data Analytics Lab** Dr.J.Satheesh Kumar suggested to include programs incorporating advanced data types and data transfer using Cassandra for managing complex data in real time applications **224DA2A3DA DSE – II : Data Visualization** **224DA2A3DB DSE – II : Modern Databases** **224DA2A3DC DSE – II : Deep Learning** Dr.B.Malar suggested to include case studies related to deep learning in computer vision, speech processing, image recognition, fraud detection in unit V.
Resolution	The Board approved the same
Item -12	**Discussion on curriculum and syllabi for Part III – Core Courses for I semester PG 2023-25 Batch and onwards**

Discussion	**234DA2A1CA - Core :** Principles of Data Science and Python **234DA2A1CB - Core:** Probability and Statistics **234DA2A1CC- Core:** Design and Analysis of Algorithms **234CS2A1CB - Core:** Advanced Java **234DA2A1CP – Core Practical :** Python Programming **234CS2A1CQ – Core Practical :** Advanced Java **234DA2A1DA DSE-I :** Digital Image Processing **234DA2A1DB DSE-I :** Information Retrieval **234DA2A1DC DSE-I** : Web Intelligence
Resolution	The Board approved the same
Item -13	**Discussion on VACC for the AY 2023 - 24**
Discussion	The Syllabi of the VACC on Data Science with Python was discussed
Resolution	The Board approved the same
Item -14	**Any other matters**
Discussion	The board members discussed and recommended the Panel of Examiners
Resolution	The Board approved the same

The Chairman of Board of Studies (BoS) thanked all the members for their active participation and providing their valuable suggestions

Date: 09.06.2023

9/6/23
(Dr.V.Pream Sudha)

BoS Chairman/HoD
Department of Computer Science with Data Analytics
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Syllabus Revision

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

Semester: III

Course Code / Name: 224CA1A3CA / Database System Concepts

Unit	Course Content
I	Introduction to the Relational Model - Structure - Database Scheme - Keys - Schema Diagrams - Relational Query Languages - Relational Operations. Introduction to SQL: Overview of the SQL Query Language- SQL Data Definition - Basic Structure - Additional Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries
II	Intermediate SQL: Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas - Authorization. Advanced SQL: Accessing SQL From a Programming Language - Functions and Procedures - Triggers - Recursive Queries - Advanced Aggregation Features - Online Analytical Processing
III	Database Design and the E-R Model: Overview of the Design Process – Entity-Relationship Model - Constraints - Removing Redundant Attributes – Entity-Relationship Diagrams - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features. Relational Database Design: Features - Atomic Domains and First Normal Form - Second and Third Normal Forms - Decomposition using Functional Dependencies - Boyce Codd Normal Form (BCNF)
IV	Transactions: Transaction Concept - A Simple Transaction Model - Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability - Transaction Isolation and Atomicity - Transaction Isolation Levels - Implementation - Transactions as SQL Statements. Concurrency Control: Lock-Based Protocols - Deadlock Handling - Timestamp-Based Protocols - Validation-Based Protocols
V	Distributed Databases: Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Distributed Query Processing. NoSQL Databases: Introduction - Column Oriented Stores - Key/Value Stores - Document Databases - Graph Databases - CRUD Operations

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA1A3SP / Database Systems Lab

S.No	List of Programs
1	Create a database and apply the Data Definition Language
2	SQL Queries to perform the Data Manipulation Language
3	Create a database to set various constraints
4	SQL Queries to perform expression and Conditions.
5	Create and implement aggregate functions
6	Create and implement types of Joins.
7	Perform views, synonyms and sequence
8	Implement Cursors in PL/SQL.
9	Implement Triggers in PL/SQL
10	Handle exceptions in PL/SQL.
11	Perform CRUD operations in MongoDB
12	Import and Export files in MongoDB.

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 **Board : Computer Science with Data Analytics**

Semester: III

Course Code / Name: 224DA2A3CA / Machine Learning

Unit	Existing	Changes
1	Introduction to Machine Learning - Applications: Learning Associations - Classification- Regression - Unsupervised Learning - Reinforcement Learning - Supervised learning: Learning a Class - Probably Approximation Correct Learning - Noise – Learning Multiple Classes- Regression-Model selection and Generalization- Dimensions of supervised machine learning algorithm	Machine Learning Process – Weight Space – Testing Machine Learning Algorithms – A Brief Review of Probability Theory - Turning Data into Probabilities – The Bias-Variance Tradeoff
2	Introduction- Classification - Losses and Risks - Discriminant Functions - Utility theory - Association Rules - Parametric Methods: Maximum Likelihood estimation - Evaluating an Estimator - Bayesian Estimation - Parametric Classification - Regression - Model Selection Procedures	Linear Discriminants: The Perceptron - Linear Regression - Multi Layer Perceptron: Going Forwards – Backpropagation of Error - Multi Layer Perceptron in Practice – Support Vector Machines: Optimal Separation - Kernels - Decision trees: Constructing Decision trees - ID3 – Classification and Regression Tree (CART) – Classification Example
3	Multivariate Data-Parameter Estimation-Estimation of Missing values-Multivariate normal Distribution- Multivariate Classification - Tuning complexity - Discrete Features - Multivariate Regression - Dimensionality Reduction : Subset Selection - Principal Component Analysis - Factor Analysis - Multidimensional Scaling - Linear Discriminant Analysis – Isomap	Probabilistic Learning: Turning data into Probabilities— Gaussian Mixture Models – Expectation Maximization Algorithm – Nearest Neighbor Methods: Nearest Neighbor Smoothing – KD Tree - Independent Component Analysis – Locally Linear Embedding
4	Clustering: Mixture Densities - K-means-Expectation Maximization Algorithms - Mixtures of Latent Variable Models-Supervised Learning after Clustering-Hierarchical Clustering-Choosing the	Unsupervised learning: Dealing with Noise - Normalization – Weight Update Rule - Vector Quantization - Self - Organizing Feature Map - Genetic algorithms: Generating offspring - Using Genetic algorithms – Optimization: Going Downhill – Least –

	number of clusters-Nonparametric Methods: Non Parametric Density Estimation - Generalization to Multivariate Data - Nonparametric Classification-Condensed Nearest Neighbor- Nonparametric Regression	Squares optimization – Conjugate Gradients
5	Discrete Markov Processes - Hidden Markov Models - Basic Problems-Evaluation Problem-Finding the State Sequence-Learning Model Parameters - HMM with input - Model selection in HMM-Graphical Models: Naive Bayes Classifier-HMM - Linear Regression- d-Separation-Belief Propagation	Reinforcement Learning: Overview- State and Action Spaces- Reward function – discounting – Action Selection – Policy – Values – Sarsa and Q-learning – Uses of Reinforcement Learning - Case Study - Markov Chain Monte Carlo Methods: Sampling – Proposal Distribution - Markov Chain Monte Carlo – Hidden Markov Models: Viterbi Algorithm-Baum – Welch Algorithm

PERCENTAGE OF SYLLABUS REVISED : 65 %

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3CB / Internet of Things and Applications

Unit	Course Content
I	**Introduction to IoT :** Introduction Genesis of IoT - IoT and Digitization - IoT Impact - Convergence of IT and IoT - IoT Challenges. IoT Network Architecture and Design: Drivers Behind New Network Architectures - Comparing IoT Architectures - A Simplified IoT Architecture - The Core IoT Functional Stack - IoT Data Management and Compute Stack
II	**Engineering IoT Networks :** Smart Objects : The Things in IoT : Sensors, Actuators and Smart Objects - Sensor Networks - Connecting Smart Objects : Communication Criteria - IoT Access Technologies. IP as the IoT Network Layer : The Business Case for IP - The Need for Optimization - Optimizating IP for IoT - Profiles and Compliances - Application Protocols for IoT : The Transport Layer - IoT Application Transport Methods : SCADA - CoAP - MQTT.
III	**Design and Development :** Microcontroller Based Edge Devices: Microcontroller used in Ardunio - Microcontroller Peripherals - Microcontroller Programming Using Ardunio IDE - Physical Computing using Ardunio - Edge Device Signal Processing. Linux Based Edge Device Raspberry Pi: Raspberry Pi 3 Single Board Computer - Use Case of Smart Streetlight using Raspberry Pi Board - Interfacing and Programming Raspberry Pi Peripherals.
IV	**Data and Analytics for IoT :** An Introduction to Data Analytics for IoT - Machine Learning - Big Data Analytics Tools and Technology - Edge Streaming Analytics - Network Analytics. Securing IoT : History of OT Security - Common Challenges in OT Security - IT and OT Security Practices and System Vary - Formal Risk Analysis Structures : OCTAVE and FAIR - The Phased Application of Security in an Operational Environment.
V	**IoT in Industry Applications :** Manufacturing: Architecture for the Connected Factory - Connected Factory Security - Oil and Gas : Improving Opertional Efficiency - IoT Architectures for Oil and Gas - Smart and Connected Cities : Smart City IoT Architecture - Smart City Use - Case Examples - Transportation: IoT Use Cases for Transportation - Mining : - IoT Strategy for Mining - IoT Architecture for IoT in Mining - Public Safety: IoT Blueprint for Public Safety - IoT Public Safety Information Processing

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3CC / Cloud Computing

Unit	Existing	Changes
I	Introduction: Cloud Computing Basics: Cloud Computing Overview - Applications of cloud computing – Intranets and the cloud – First movers in the cloud - Benefits - limitations of cloud computing – Security Concerns – Cloud Computing Services	Business Drivers – Technology Innovations –Cloud Consumers and Cloud Providers – Scaling –Cloud Service – Cloud Service Consumer– Goals and Benefits –Risk and Challenges
II	Developing cloud services- -Advantages and Disadvantages - Types of cloud services development- Software as a Service - Platform as a service - On-Demand computing-Discovering cloud service development and tools.	Roles and Boundaries – Cloud Characteristics – Comparing Cloud Delivery models - Combining Cloud Delivery models
III	Introduction - Understanding Virtualization - History of Virtualization – Server Virtualization – Desktop Virtualization – Virtual Networks – Data Storage Virtualization. Data Storage in Cloud: Evolution of Network Storage – Cloud based data Storage – Advantages and disadvantages - Cloud based Backup systems	Data Center Technology: - Standardization and Modularity – Remote Operation and Management – High Availability – Secure Aware Design – Facilities – Computing Hardware – Storage Hardware – Network Hardware - Virtualization Management – Web Technology - Multitenant Technology – Service Technology
IV	Introduction – General security advantages – Introducing business continuity and disaster recovery: Data storage wiping- Distributed Denial of Service Attacks-Packet Sniffing- Man-in the Middle Attack-Monitoring Device Screens-Malicious Employees- Hypervisor Attack- Guest - Hopping Attack-SQL-Injection Attack -Physical Security	Application Services - Content Delivery Services - Amazon CloudFront - Windows Fundamental Cloud Architecture : Workload Distribution Architecture – Resource Pooling Architecture – Dynamic Scalability Architecture - Service Load Balancing Architecture – Cloud Bursting Architecture – Advanced Cloud Architecture: Load Balanced Virtual Server Instances Architecture – Zero Downtime Architecture – Dynamic Failure Detection and Recovery Architecture
V	Cloud services for individuals – Migration : Applications needed- sending the existing data to the cloud- Mobile Cloud Computing: Evolution of Mobile Computing – Mobile Cloud EcoSystem – Mobile Players	Cloud Platforms in Industry: Amazon Web Services – Google App Engine – Cloud Applications: Scientific Applications – Healthcare: ECG Analysis in Cloud – Biology: Protein Structure Prediction – Business & Consumer Applications: CRM & ERP – Social Networking

PERCENTAGE OF SYLLABUS REVISED: 70 %

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3CD / Big Data Analytics

Unit	Course Content
I	Introduction To Big Data : Big Data Introduction - Structuring big data- Elements of Big data - Big data Analytics - Future of Big data - Exploring the use of big data in business contexts: Preventive fraudulent activities - Retail industry - Understanding Big data technology foundation - Exploring the Big Data Stack - Ingestion layer - Virtualization and Big Data - Virtualization Approaches
II	Hadoop, MapReduce : Understanding Hadoop Ecosystem: Hadoop Ecosystem - Hadoop Distributed File System - HDFS architecture - Command Line interface - Using HDFS file - Hadoop Specific File System Types - HDFS Commands – MapReduce - HBASE Architecture- Regions -Storing big data with HBASE - MapReduce framework - Working of MapReduce - Exploring Map and Reduce function
III	Yarn, Pig, Hive : Limitations of MapReduce - YARN architecture - Resource Manager - Application Manager - Working of YARN - YARN schedulers - Commands - User commands - Registry - Log Management in Hadoop - Hive: Introduction - Hive Services - Variables - Properties – Built-in functions in Hive - Data manipulation in Hive - Join Operations - Pig : Pig Architecture- Benefits - Operators - Debugging
IV	Oozie, Cassandra, Zookeeper : Introduction of Oozie – Benefits - Oozie Workflow - Lifecycle Operations - Oozie parameterization : Workflow Functions - Coordinator Functions - Bundle Functions - Expression Language Functions - Job Execution Model – Apache Cassandra: Features - Structure of database system - Read/Write Operations in Cassandra - Contextual Query Language - Zookeeper : Data Model - Znodes - Time, Session and Watches in Zookeeper
V	Mobile Analytics, Applications : Mobile Analytics : Introduction - Types of results and Applications - Mobile Analytics Tools : Location Based Tracking Tools - Real Time Analytics Tools - User Behavior Tracking Tools - Performing Mobile Analytics - Challenges of Mobile Analytics – Applications : Online Social Media Analysis - Sentiment Analysis - Credit Risk Modelling - Churn Prediction - Recommender Systems - Fraud Detection - Business Process Analytics

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3DA / Data Visualization

Unit	Course Content
I	Introduction And Data Foundation : Basics - Relationship between Visualization and Other Fields -The Visualization Process - Pseudo code Conventions - The Scatter plot. Data Foundation - Types of Data - Structure within and between Records - Data Preprocessing - Data Sets
II	Foundations For Visualization: Visualization Process - Semiology of Graphical Symbols - The Eight Visual Variables - Historical Perspective - Taxonomies - Spatial Data: One-Dimensional Data - Two-Dimensional Data – Three Dimensional Data - Dynamic Data - Combining Techniques.
III	Visualization Techniques : Geospatial Data: Visualizing Spatial Data - Visualization of Point Data -Visualization of Line Data - Visualization of Area Data - Other Issues in Geospatial data.Time Oriented data: Introduction - Definitions -Visualizing Time Oriented data - TimeBench.
IV	Data Visualization Multivariate Data, Text and Document Visualization: Data Visualization Multivariate Data: Point-Based Techniques - Line Based Techniques - Region-Based Techniques - Combinations of Techniques – Visualization for Trees, Graphs and Networks: Displaying Hierarchical Structures –- Displaying Arbitrary Graphs/Networks,Text and Document Visualization: Introduction - Levels of Text Representations - The Vector Space Model - Single Document Visualizations -Document Collection Visualizations.
V	Interaction Concepts : Interaction Operators - Interaction Operands and Spaces - A Unified Framework. Interaction Techniques: Screen Space - Object Space -Data Space -Attribute Space- Data Structure Space - Visualization Structure - Animating Transformations -Interaction Control,Designing Effective Visualization : Steps in Designing Visualization - Problems in Designing Effective Visualization

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3DB / Modern Databases

Unit	Course Content
I	**Introduction to Data Models** : 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.
II	**Distribution Models, Consistency** : 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- Calculations.
III	**Key Value Databases, Document Databases :** 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
IV	**Column Family stores, Graph Databases :** Column Family stores- Introduction- Features-Use Cases- Graph Databases- Introduction- Features- Consistency -Transactions- Availability- Query Features- Scaling Use Cases-Case study: Building a Graph Database Application
V	**Schema Migration, Polygot Persistence** : 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

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 **Board: Computer Science with Data Analytics**
Semester: III
Course Code / Name: 224DA2A3DC / Deep Learning

Unit	Course Content
I	Introduction to Neural Network : Introduction to Neural Network- Model of Artificial Neuron - Learning rules and various activation functions Single layer Feed-forward networks -. Multi-layer Feed-forward networks - Recurrent Networks- Back Propagation networks- Architecture of Back-propagation Networks - Backpropagation Learning
II	Deep Neural Networks : Introduction to Deep Neural Networks -Training deep models- Training Deep Neural Networks using Back Propagation-Setup and initialization issues- Gradient- Descent Strategies - Vanishing and Exploding Gradient problems – Regularization - Dropouts.
III	Convolutional Neural Network : Basic structure of Convolutional Network - Convolutions for Images - Padding and Stride - Multiple Input and Multiple Output Channels – Pooling - Case study: Image classification, Object Detection, Image captioning using CNN
IV	Recurrent Neural Networks : Architectural Overview - Bidirectional RNNs – Encoder-decoder sequence to sequence architectures – Back-propagation Through Time for training RNN - Vanishing and Exploding Gradients - Long Short-Term Memory Networks- Gated recurrent Unit.
V	Natural Language Processing, Transfer learning : Introduction to NLP- Word Vector representation - word2vec model - Continuous SkipGram model - Continuous Bag-of-Words model. Case Study: Sentiment analysis. Popular CNN Architectures and Transfer learning Techniques: LeNet, ResNet, VGGNet, AlexNet, DenseNet.

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

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

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu & Accredited by NAAC with A++ Grade (3rd Cycle-3.64 CGPA)
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ATTENDANCEOF THE EIGHTH BOARD OF STUDIES MEETING

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

VENUE : A1 218
DATE : 09/6/2023
TIME : 10.00 AM

The following members were present for the Board of Studies meeting

S.NO.	NAME	DESIGNATION	SIGNATURE
1.	Dr. V. Pream Sudha HoD I/C Department of Data Analytics Dr. N.G.P. Arts and Science College Coimbatore	Chairman	9/6/23
2.	Dr. J. Satheeshkumar Associate Professor Department of Computer Applications Bharathiar University Coimbatore	Member (Subject Expert) (Nominated by Vice Chancellor)	9/6/23
3.	Dr. Malar B Professor Department of Applied Mathematics and Computational Sciences PSG College of Technology Coimbatore	Member (Subject Expert) (Nominated by Academic Council)	9/6/23
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)	Absent
6.	Mr. A. M. Sabarish Associate Data Engineer Cloud Destination Coimbatore	Alumni	

Cont...

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)	9/6/23
9.	Dr. R. Vithya Prabha M.A., M.Phil., Ph. D. Department of English Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (English)	9/6/23
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.	Mythili S (222DA011) I M.Sc CSDA	Student Representative	Absent
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	09/06/23
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	9/6/23
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