



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)
Dr. N.G.P. - Kalapatti Road, Coimbatore - 641 048, Tamil Nadu, India
Web : www.drngpasc.ac.in | Email : info@drngpasc.ac.in | Phone : +91-422-2369100

BoS

7th

MINUTES OF THE SEVENTH 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.	7 th
Date and Time	02.12.2022@10.00 a.m
Venue	Hall No. A1 101
Members Attended	The details are given in the ANNEXURE -I

AGENDA

1	Discussion on syllabi for Part III – Core Courses for II semester UG - 2022-23 Batch and onwards
2	Discussion on syllabus for Part III Inter disciplinary Course (IDC) offered by Mathematics department
3	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for II Semester UG 2022-23 Batch and onwards
4	Discussion on Part II (English) offered by English department for II Semester UG 2022-23 Batch and onwards
5	Discussion on Part IV (AECC) Basic Tamil/Advanced Tamil/Human Rights and Women's Rights for II Semester UG 2022-23 Batch and onwards
6	Discussion on credits for Part-V Extension Activity for II Semester UG 2022-23 Batch and onwards
7	Discussion on syllabi for Part III – Core Courses for II semester PG 2022-23 Batch and onwards
8	Discussion on syllabus for Part III Extra Departmental Course (EDC) offered by Commerce IB department
9	Discussion on syllabi for Part III Extra Departmental Course (EDC) offered by Computer Science with Data Analytics department
10	Discussion on Value Added Certificate Courses (VACC) for UG 2021-24 batch and onwards
11	Any other matters





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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 II Semester UG 2022-23 Batch and onwards
Discussion	<p>224CA1A2CA – Core : Data Structures (New Course)</p> <ul style="list-style-type: none">The unified syllabus approved by Board of Studies in Computer Applications was placed for endorsement <p>224CS1A2CA - Core : Object Oriented Programming with C++ (New Course)</p> <ul style="list-style-type: none">The unified syllabus approved by Board of Studies in Computer Science was placed for endorsement. <p>224DA1A2CP - Core Practical: Data Structures and C++ (New Course)</p> <ul style="list-style-type: none">The board members suggested to include programs incorporating concepts of polymorphism, inheritance in order to reinforce the object oriented programming concepts along with programs for data structures
Resolution	The Board unanimously approved the syllabi
Item-02	Discussion on syllabi for Part III Inter Disciplinary Course (IDC) offered by Mathematics department
Discussion	<p>222MT1A2ID- Mathematics for Computing II</p> <ul style="list-style-type: none">Syllabus approved by the Mathematics Board was placed for endorsement
Resolution	The Board approved the syllabus
Item – 03	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for II Semester UG 2022-23 Batch and onwards
Discussion	<p>221TL1A2TA - Tamil-II: Ara Ilakkiyam</p> <p>221TL1A2HA - Hindi-II - Modern Literature</p> <p>221TL1A2FA-French-II-Grammar, Translation And Civilization</p> <p>221TL1A2MA - Malayalam - II - Modern Literature</p> <ul style="list-style-type: none">The unified syllabus approved by the Board of Studies in Languages were placed for endorsement.

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Resolution	The Board approved the syllabi
Item -04	Discussion on Part II (English) offered by English department for II Semester UG 2022-23 Batch and onwards
Discussion	221EL1A2EA : Part II: Professional English II <ul style="list-style-type: none">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 Part IV (AECC -II) Basic Tamil / Advanced Tamil / Human Rights and Women’s Rights for II Semester UG 2022-23 Batch and onwards
Discussion	221TLIA2AA :Basic Tamil <ul style="list-style-type: none">The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. 221TLIA2AB: Advanced Tamil <ul style="list-style-type: none">The unified syllabus approved by the Board of Studies in Languages was placed for endorsement. 225CR1A2AA: Human Rights and Women’s Rights <ul style="list-style-type: none">The unified syllabus was approved by the Board of Studies in Commerce with Corporate Secretaryship was placed for endorsement.
Resolution	The Board unanimously approved the syllabi
Item – 06	Discussion on credits for Part-V Extension Activity for II Semester UG 2022-23 Batch and onwards
Discussion	<ul style="list-style-type: none">One credit to be awarded for each extension activities like YRC/RCC//NSS/ RRC/Yoga/Sports/Clubs
Resolution	The Board members approved.
Item – 07	Discussion on syllabi for Part III – Core Courses for II semester PG 2022-23 Batch and onwards

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Discussion	<p>224DA2A2CA - Core : Artificial Intelligence</p> <ul style="list-style-type: none">Dr.J.Satheesh Kumar suggested to include case study along with applications of AI and Analytics related to Internet of Things, Chatbots for reinforcing the applications of AI in industry. <p>224DA2A2CB - Core : Advanced Database Management Systems (New Course)</p> <ul style="list-style-type: none">Mrs. Jennifer suggested to include NoSQL concepts in Unit IV, multimedia and spatial databases in Unit V as it is the current trend in DBMS. <p>224DA2A2CC - Core : Information and Network Security</p> <ul style="list-style-type: none">Dr.Bharathidason suggested to include case studies related to theft of confidential information, source code theft, web security and phishing for providing knowledge about real life security. <p>224DA2A2CP – Core Practical : R for Data Analytics (New Course)</p> <ul style="list-style-type: none">Dr.Bharathidason suggested to include programs related to regression, time series to implement exploratory and predictive data analytics. <p>224DA2A2CQ - Core Practical: Advanced Database Management Systems (New Course)</p> <ul style="list-style-type: none">Mrs. Jennifer suggested to include programs in MongoDB as it is widely used in industry <p>224DA2A2DA: DSE – II : Customer Analytics (New Course)</p> <ul style="list-style-type: none">Dr.J.Satheesh Kumar suggested to include recommendation systems in Unit V as it is required for business cases. <p>224DA2A2DB : DSE – II : Natural Language Processing (New Course)</p> <ul style="list-style-type: none">Mrs. Jennifer suggested to include the concepts of evaluation and error analysis in Unit III and Machine Translation approaches in Unit V as it is widely used in Machine learning. <p>224DA2A2DC: DSE – II : Advanced Statistics (New Course)</p> <ul style="list-style-type: none">Dr.Bharathidason suggested to include Estimation techniques in Unit I, Hypothesis Testing in Unit II and Hypothesis testing involving Means, Variances and Proportions in Unit III to implement the concepts in data analytics applications
Resolution	The board unanimously approved the syllabi
Item-08	Discussion on syllabus for Part III Extra Departmental Course (EDC) offered by Commerce with International Business department
Discussion	225IB2A2EA–EDC: Supply Chain Management (New Course)

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	<ul style="list-style-type: none">Syllabus approved by the Board of Studies in Commerce with International Business was placed for endorsement
Resolution	The Board approved the syllabus
Item-09	Discussion on syllabi for Part III Extra Departmental Course (EDC) offered by Computer Science with Data Analytics department
Discussion	224DA2A2EA-EDC :Business Analytics (M.Com.IB) (New Course) <ul style="list-style-type: none">The board members suggested to include case studies relevant to Predictive Trendline Models and Social Media Analytics. 224DA2A2EB-EDC : Foundations of Data Analytics (M.Sc. Mathematics) <ul style="list-style-type: none">Mrs.Jennifer suggested to include topics on Big Data Architecture in Unit I, types of regression and case study in Unit V.
Resolution	The Board approved the syllabi
Item-10	Discussion on Value Added Course (VACC) for 2021-22 batch and onwards
Discussion	The course titled Data Visualisation to be offered for 2021-22 batch was discussed
Resolution	The Board approved the same
Item -11	Any other matters
Discussion	<ul style="list-style-type: none">The board members discussed and recommended the Panel of Examiners
Resolution	The Board approved the panel

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

Date: 02.12.2022


(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





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Syllabus (New Course)

Faculty: Computer Science

Board: Computer Science with Data Analytics

Semester: II

Course Code / Name: 224CA1A2CA / Data Structures

Unit	Content
I	Introduction: Basic Terminology -Classification of Data Structures -Operations on Data Structures-Abstract Data Type-Algorithms-Time and Space Complexity -Big O Notation-Omega Notation (Ω) -Theta Notation (Θ). Arrays: Declaration of Arrays-Accessing the elements of an array-Storing values in Arrays-Operations on Arrays. Applications of Arrays: Sparse Matrices
II	Stacks: Array Representation of Stacks- Operations on a Stack-Linked Representation of Stacks - Applications of Stacks; Evaluation of Arithmetic Expression -Recursion. Queues: Array Representation of Queues - Operations on Queues -Linked Representation of Queues - Circular Queues -Applications of Queues: JOB Scheduling
III	Singly Linked Lists: Inserting a node in a Linked List- Deleting a node from a Linked List. Circular Linked Lists: Inserting a node in a Circular Linked List - Deleting a node from a Circular Linked List. Doubly Linked Lists: Inserting a node in a Doubly Linked List - Deleting a node from a Doubly Linked List. Applications of Linked Lists: Polynomial Addition
IV	Trees: Binary Trees - Representation of Binary Trees -Creating a Binary Tree - Traversing a Binary Tree-Binary Search Tree and its Operations - Threaded Binary Trees. Applications of Tree: Expression Trees. Graphs: Graph Terminology - Representation of Graphs - Graph Traversal Algorithms -Applications of Graphs: Shortest Path Algorithm - Dijkstra's Algorithm -Minimum Spanning Trees - Prim's Algorithm
V	Searching: Linear search -Binary Search. Sorting: Bubble Sort - Insertion Sort - Selection Sort - Quick Sort-Merge Sort -Heap Sort. Hashing and Collision: Hash Tables - Hash Functions - Collision. Applications of Hashing: Keyword Table in a Compiler

PERCENTAGE OF SYLLABUS REVISED: 100 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics





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Syllabus (New Course)

Faculty: Computer Science

Board: Computer Science with Data Analytics

Semester: II

Course Code / Name: 224CS1A2CA / Object Oriented Programming with C++

Unit	Content
I	Introduction - Programming Paradigms - Key concepts of Object-Oriented Programming – Applications of Object-Oriented Programming - Variable, Value and Constant - Components of a C++ Program - Data Types - Expressions - Type Conversion - Order of Evaluation - Formatting Data: Manipulators in Input/Output- Branching and Looping
II	User-Defined Types: Classes-Class Definition-Member function- Access Modifiers- Inline function- Constructors and Destructors- Instance Members: Instance Data Members-Instance Member Functions - Static Members - Arrays: One-Dimensional Arrays - Multidimensional Arrays. Case Study: Wave Array
III	References - Pointers - Pointer Types and Pointer variables - Constant Modifiers – Pointer to Pointer- Arrays and Pointers - Strings: C ++ String Class -C++ String Library – Inheritance: Private, Public and Protected Inheritance - Association – Dependency
IV	Polymorphism- Binding- Abstract Class : Pure Virtual Functions - Multiple Inheritance - Overloading Principles - Overloading as Member- Nonmember: Friend function-Exception Handling : Approach- Exceptions in Classes - Standard Exception Classes – Templates: Function Template - Class Template
V	Input and Output stream – Stream Classes - Console Streams - Console Objects - Stream State - File Streams - File I/O - Opening Modes - Sequential Vs Random Access - String Streams - Formatting Data: Direct use of Flags, Fields and Variables - Predefined Manipulators-Standard Template Library: Iterators, Sequence Containers, Container Adapters.

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus (New Course)

Faculty: Computer Science
Semester: II

Board: Computer Science with Data Analytics

Course Code / Name: 224DA1A2CP/ Core Practical: Data Structures and C++

S. No	List of Programs
1	Program for implementing classes and objects
2	Program for implementing constructor and destructor
3	Program for implementing inheritance
4	Program to perform exception handling
5	Program to implement overloading
6	Program to implement virtual function
7	Program to perform Push, Pop, Display operations for Stack using array implementation.
8	Program to convert infix expression to postfix expression using Stack
9	Program to perform the following Queue operations i.)Insert ii.)Delete iii.)Display.
10	Program to perform Linked list operations
11	Program to perform Searching
12	Program to implement Sorting

Out of 12 programs 10 are mandatory

PERCENTAGE OF SYLLABUS REVISED: 100%



Syllabus (New Course)

Faculty : Basic and Applied Sciences

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 222MT1A2ID / IDC : Mathematics for Computing II

Unit	Content
I	Random experiment - De-Morgan's laws - conditional probability - generalization of multiplicative law - Bayes' probabilities - random variable - discrete and continuous random variable - distribution function - discrete probability distribution and function - mathematical expectation - moments - moment generating function - characteristic function - cumulants..
II	Binomial distribution - Bernoulli's theorem - Poisson distribution and Poisson variate X - relationship between the probabilities, $P(X=x)$ and $P(X=x+1)$ - Hypergeometric distribution - Normal and Lognormal distribution - Beta, Gamma and Exponential distribution - Weibull distribution
III	Characteristics of a good measure of central tendency - mean - arithmetic Mean - pooled mean - geometric Mean - harmonic mean - median - mode. Measures of dispersion - purposes - properties - range - interquartile range - mean deviation - variance - standard deviation - coefficient of variation
IV	Scatter diagram - least square method - properties - regression line of X on Y - regression coefficient from coded data - correlation methods - graphical method - correlation coefficient - correlation in grouped bivariate data - relationship between correlation coefficients and regression coefficients - rank correlation.
V	Types of hypothesis - two types of errors - level of significance - critical region - one and two tailed test - size and power of a test - randomized test - non randomized test - degrees of freedom - student's t- test - test of equality of two population means - paired t- test - interval estimation - large sample tests - tests of hypothesis for proportions

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	<input type="checkbox"/>
Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Employability	Innovations
<input type="checkbox"/>	<input type="checkbox"/>
Intellectual Property Rights	Gender Sensitization
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Syllabus Revision

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 224DA2A2CA/ Artificial Intelligence

Unit	Existing	Changes
I	Foundations of Artificial Intelligence - Intelligent Agents: Agents and Environments- Structure of Agents – Problem Solving: Problem Solving Agents- Problem Formulation - Uninformed Search Strategies: Breadth-First Search – Depth-First Search – Depth-Limited Search – Iterative Deepening Depth-First Search – Bidirectional Search - Comparing Uninformed Search Strategies	Case Study: Intelligent Agents
II	Greedy Best-First Search – A * Search – Memory-Bounded Heuristic Search – Heuristic Functions – Local Search Algorithms – Hill Climbing Search – Simulated Annealing –Local Beam Search – Genetic Algorithms – Online Search Agents and Unknown Environments: Online Search Problems - Online Search Agents - Online Local Search –Learning in Online Search	Case Study : Online Search Agents
III	Introduction : Constraint Satisfaction Problems(CSP): Backtracking search for CSP-Local Search for CSP - Structure of Problems - Adversarial Search: Introduction – Games – Optimal Decision in Games - The Min Max Algorithm – Alpha–Beta Pruning – Games that Include an Element of Chance: Card Games	Case Study : Optimal Decision in Games
IV	Knowledge Based Agents – Logic – Propositional Logic: Syntax – Semantics – A simple knowledge base – Inference – Equivalence, Validity and Satisfiability – Reasoning Patterns in Propositional Logic: Resolution – Forward and Backward Chaining - First Order Logic : Syntax and Semantics of First Order Logic – Using First Order Logic	Case Study : Knowledge Based Agents
V	Language of Planning Problems – Planning with State-Space Search: Forward and Backward State-Space Search – Heuristics – Partial Order Planning: Partial order planning with unbound variables – Heuristics for partial-order planning – Uncertainty: Basic Probability Notation – Bayes' Rule and its Use	Exponential Technologies Underpinned by Analytics and AI : Beating Cyberattacks with Analytics-Connected Car Technology Reshaping Automotive Industry-IoT Analytics: Extracting Value and Transforming Business- Chatbots: The Protege of AI and Analytics- Case Study : Artificial Intelligence in Tesla





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PERCENTAGE OF SYLLABUS REVISED: 25 %

COURSE FOCUSES ON:

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<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus (New Course)

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 224DA2A2CB / Advanced Database Management Systems

Unit	Content
I	Data models - schemas and instances - DBMS architecture and data independence - Database languages and interfaces - database system environment - Classification of DBMS - Using High-Level Conceptual Data Models for Database Design - Weak Entity Types - ER Diagrams - Relationship Types of Degree Higher than Two - Subclasses - Super classes - Inheritance - Enhanced Entity Relationship Model - Relational Database Design by ER- and EER-to-Relational Mapping
II	SQL Data Definition and Data Types - Specifying Constraints in SQL - Additional features of SQL - Complex Queries - Triggers - Views - Schema Modification - More Complex SQL Retrieval Queries - Specifying Constraints as Assertions and Actions as Triggers - Views in SQL - Schema Change Statements in SQL - More normal forms and Domain Key Normal Form(DKNF) - Application design development - Application design user interface
III	Parallel systems-Distributed systems-Parallel databases: I/O Parallelism- Interquery & Intra query parallelism- Design of Parallel systems-Distributed Databases: Distributed data storage-Distributed Transactions-Concurrency control in distributed databases-Distributed Query processing-Heterogeneous distributed databases-Cloud based databases
IV	NoSQL Databases - Introduction to NoSQL Systems - The CAP Theorem - Document - Based NoSQL Systems and MongoDB - NoSQL Key - Value Stores - Column - Based or Wide Column NoSQL Systems - NoSQL Graph Databases, Big Data Technologies Based on MapReduce and Hadoop: Introduction to MapReduce and Hadoop- Hadoop Distributed File System (HDFS) - MapReduce: Additional Details - Case Study
V	Specialty Databases: Object based Databases - Complex Data Types-Object Relational Mapping-XML: Structure of XML Data-Querying and Transformation-Application Programming Interface-Storage XML data-XML applications-Spatial and Temporal Data Mobility: Time in databases-Spatial and Geographic Data-Multimedia Databases-Case study : User interfaces

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus Revision

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 224DA2A2CC / Information and Network Security

Unit	Existing	Changes
1	Information Security: Introduction - Concepts - Components of Information Systems - Approaches to Information Security Implementation - System Development Life Cycle - Security Systems Development Life Cycle - Security Professionals and Organization - Needs of Security: Business Needs - Threats - Attacks - Secure Software Development	Case Study : Theft of confidential Information
2	Information Security Planning and Governance - Information Security Policy, Standards and Practices - Information Security Blueprint - Security Technology : Access Control - Firewalls - Protecting Remote Connections - Intrusion, Detection and Prevention Systems - Honeypots, Honeynets and Padded Cell System	
3	Introduction: OSI Security Architecture - Security Services - Classical Encryption Techniques: Symmetric Cipher Model - Substitution Techniques - Transposition Techniques - Steganography - Block Cipher and Data Encryption Standards - Advanced Encryption Standard: AES Structure - AES Transformation Functions - RSA - Case Study : Source Code Theft	Case Study : Source Code Theft
4	Network Access control - Extensible Authentication Protocol - Cloud Computing - Cloud Security risks and counter measures - Data protection in the cloud - Cloud security as a service - Addressing cloud computing security concerns - Transport Level Security: Web security Considerations - HTTPS	Case Study: Credit card Fraud
5	Introduction: Internet Mail Architecture - Email Threats and comprehensive email security - Pretty Good Privacy - DNS Based Authentication of Named Entities - Sender Policy Framework - IP Security: Overview - Policy - Encapsulating security payload - Combining Security Associations - Internet key Exchange	Case Study : Phishing.





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PERCENTAGE OF SYLLABUS REVISED : 10 %

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics





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Syllabus (New Course)

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester : II

Course Code / Name: 224DA2A2CP / Core Practical : R for Data Analytics

S.No	List of Programs
1	Program to perform Manipulation of Vectors in R
2	Program for Matrix Manipulation
3	Program to perform operations on Factors
4	Program to perform operations on Data Frame in R
5	Program for Operations on String and List in R
6	Program to Implement Regression using R
7	Program for Exploratory Data Analysis in R
8	Program to Import data sets and Perform read and write in R
9	Program to Implement Graphics in R
10	Program to Implement Cluster analysis in R
11	Program to Implement Classification in R
12	Program to Implement Time Series in R

Any 10 are Mandatory.

PERCENTAGE OF SYLLABUS REVISED : 100 %





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Syllabus (New Course)

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester : II

Course Code / Name: 224DA2A2CQ / Core Practical : Advanced Database Management Systems

S.No.	List of Programs
1	Programs to implement Advanced SQL functions using Oracle.
2	Programs to implement Triggers in Oracle.
3	Programs to implement Views in Oracle
4	Programs to build Web Applications with Oracle as Back end.
5	Programs to implement Concurrency control in Oracle.
6	Programs to perform nested join operation in Oracle.
7	Programs to make Cursor operations in Oracle.
8	Programs to perform CRUD operations in MongoDB.
9	Programs to implement Aggregations in MongoDB
10	Programs to perform Indexing and searching in MongoDB
11	Programs to perform Validation in MongoDB
12	Programs to implement chart in MongoDB

Any Ten Programs are mandatory

PERCENTAGE OF SYLLABUS REVISED : 100 %





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Syllabus (New Course)

Faculty : Computer Science Board : Computer Science with Data Analytics

Semester : II

Course Code / Name: 224DA2A2DA / DSE - II : Customer Analytics

Unit	Content
1	Introduction to Retail Analytics – Sources of retail data - Regression – Assumptions – Need – Factor Analysis – Exploratory Vs confirmatory factor analysis – Using Factor Analysis - Understanding and estimating demand: Introduction - Regression to estimate demand - Properties of estimators - Time series data – Autocorrelation – Dummy variables – Business case
2	Price elasticity and discounts – Introduction to elasticity – Modelling elasticity – Business case - Forecasting future demand: Autocorrelation – Dummy variables and seasonality – Business case - Product bundling: Market Basket - Logistic Regression - Predicting the market basket - Business case - Estimating time of Purchase: Conceptual overview of survival analysis – Business case - Model output and interpretation
3	Increasing customer lifetime value: Descriptive analysis – Predictive analysis- Introduction to Tobit analysis - Business case – Modeling transactions - Quantifying complexity of customer behavior: Simultaneous equations – Need for Simultaneous equations - Missing value imputation - Identifying Loyal customers: Structural equation modeling – Business case
4	Introduction to Segmentation: Segment – Strategic uses of segmentation – Apriori – Conceptual process – Tools for segmentation – Metrics- Chi Squared Automatic Interaction Detection (CHAID) – Drawing insights from segmentation – Business case - analytics - Introduction to Recency, frequency, monetary value (RFM) – Behavioral segmentation – RFM Vs Behavioral segmentation - Customer Profiling: Types of data to collect – Preparing data for analysis – Cleaning and validation – Linking and deduplication – Data integration
5	Optimizing market spending using customer data - Predicting Customer Personas - Predicting the Customer Journey – Predicting the Customer Value and Value based marketing – Predicting Likelihood to buy - Choosing right level of discount using Likelihood to buy - Predictive lead scoring – Predicting Individual recommendations

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics





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Syllabus (New Course)

Faculty : Computer Science Board : Computer Science with Data Analytics
Semester : II
Course Code / Name: 224DA2A2DB/ DSE - II : Natural Language Processing

Unit	Content
1	Knowledge in Speech and Language Processing – Models and Algorithms – Language, Thought and Understanding - History – Natural Language Processing (NLP) Applications – Challenges of NLP – Regular Expressions and Automata: Regular Expressions – Finite-State Automata (FSA) – Regular Languages and FSAs
2	Finite - State Morphological Parsing – Construction of a Finite - State Lexicon - Finite - State Transducers - Sequential Transducers and Determinism - FSTs for Morphological Parsing - Transducers and Orthographic Rules - Combining FST Lexicon and Rules - Lexicon-Free FSTs - Word and Sentence Tokenization - Detecting and Correcting Spelling Errors - Minimum Edit Distance
3	N-Grams – Word Counting – Training and Test sets – Evaluating N-Grams – Smoothing – Parts of Speech (PoS) Tagging: English word classes – Tagsets – PoS Tagging – Rule based POS tagging – HMM (Hidden Markov Model) PoS tagging – Transformation based tagging – Evaluation and error analysis
4	Semantic Analysis: Meaning Representation-Lexical Semantics - Ambiguity – Word Sense Disambiguation - Discourse Processing: cohesion - Reference Resolution - Discourse Coherence and Structure
5	Architecture of NLG Systems – Generation Tasks and Representations – Applications of NLG – Machine Translation (MT): Problems in Machine Translation – Machine Translation Approaches – Direct – Rule-based – Corpus Based – Semantic or Knowledge-based MT systems

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus (New Course)

Faculty : Computer Science Board : Computer Science with Data Analytics

Semester : II

Course Code / Name: 224DA2A2DC / DSE - II : Advanced Statistics

Unit	Content
1	Estimation : Point Estimation: Introduction - unbiased Estimators - efficiency - consistency - sufficiency - robustness - the method of moments - the method of maximum likelihood - Bayesian estimation. Interval Estimation: Introduction - The estimation of means - the estimation of difference between means - the estimation of proportions - the estimation of difference between proportions - the estimation of variance - the estimation of the ratio of two variances - the theory in practice.
2	Hypothesis Testing :Introduction - testing a statistical hypothesis - losses and risks - The Neyman-Pearson lemma - the power function of a test - likelihood ratio test - the theory in practice
3	Tests of Hypothesis Involving Means, Variances and Proportions :Introduction - tests concerning means - tests concerning difference between means - tests concerning variances - tests concerning proportions - tests concerning differences among k-proportions - the analysis of an $r \times c$ table - goodness of fit - the theory in practice.
4	Design and Analysis of Experiments :Introduction - one-way designs - randomized-block design - factorial experiments - multiple comparisons - other experimental designs - the theory in practice
5	Non Parametric Tests :Introduction - the Sign test - the signed-rank test - Rank-sum tests: The U Test - Rank-sum tests: the H test - tests based on runs - the rank correlation coefficient - the theory in practice

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus (New Course)

Faculty : Computer Science Board : Computer Science with Data Analytics
Semester: II
Course Code / Name: 225IB2A2EA / EDC : Supply Chain Management

Unit	Content
1	Supply Chain Concepts: Objectives of a Supply Chain - Process view of Supply Chain - logistics & SCM - Supply Chain Drivers and obstacles - Supply chain strategies - strategic fit - Best practices in SCM. Case Study on supply chain strategies
2	Objectives of Procurement System - Principles of Procurement - History of procurement function: from administrative to strategic - value added role, Procurement Cycle - Procurement Planning - Purchasing Mix: Six Rights. Case Study on procurement strategies
3	Supply Chain Performance: Bullwhip effect and reduction - Performance measurement: Dimension - Tools of performance measurement - SCOR Model. Key issues in SCM. Case Study on bullwhip effect
4	Supply Chain and Customer Relationship Management (CRM) integration - Functional components for CRM - IT infrastructure used for Supply Chain and CRM. Case Study on CRM and SCM integration
5	Introduction eSCM - eSCM framework - Benefits of eSCM Positioning information in Logistics - Key success factors for eSCM - Strategic information linkage - Supply chain communication networks - Overview of telecommunication networks - EDI - Data security in supply chain networks - Overview of internet able models. Case Study on technology implementation in Supply chain.

PERCENTAGE OF SYLLABUS REVISED : 100 %

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus (New Course)

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 224DA2A2EA / EDC : Business Analytics

Unit	Content
I	Key Purpose of Using IT in Business - Enterprise Applications - Types of Digital Data - Structured Data - Unstructured Data - Semi Structured Data - Online Transaction Processing - Online Analytical Processing (OLAP) - OLAP Architectures - OLAP Operations - BI Component Framework - BI Users - BI Applications - BI Roles and Responsibilities - Case Study : Predictive Trendline Models
II	Need for Data Warehouse - Definition - Data Mart - Operational Data Store - Goals - Components of Data Warehouse - Extract, Transform, Load (ETL)- Data Integration - Data Integration Technologies - Data Quality - Data Profiling - Case Study : ETL in McDonalds
III	Data Modeling Basics - Types of Data Model - Data Modeling Techniques - Fact Table - Dimension Table - Dimension Models - Dimension Modeling Life Cycle - Enterprise Reporting - Balanced Scorecard - Dashboards - Case Study : Data Modeling in Advertising
IV	Statistics in Analysis - Data, Data Description and Summarization - Statistical Tests - Hypothesis and t-Test - Correlation Analysis - Regression - ANOVA - F-Test - Time Series Analysis - Case Study : Applying Statistics to detect financial problems
V	Applications of Analytics : Analytics in Business Support Functions - Analytics in Industries : Analytics in Telecom, Retail, Healthcare, Analytical Application development- Widely used Applications: Social Media Analytics, Recommendation Systems - Data Mining Algorithms : Association Rule Mining - k-Means Clustering - Decision Tree - Case study : Social Media Analytics

PERCENTAGE OF SYLLABUS REVISED: 100 %

COURSE FOCUSES ON:

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<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
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Syllabus Revision

Faculty : Computer Science

Board : Computer Science with Data Analytics

Semester: II

Course Code / Name: 224DA2A2EB/ EDC : Foundations of Data Analytics

Unit	Existing	Changes
I	Understanding Data : Introduction – Types of Data : Numeric-Categorical-Graphical-High dimensional data – sources : Time series- Transactional data- Biological data- Spatial data – Social Network data –Data science components : Statistics-Mathematics- Programming Languages- Database- Machine Learning – Big data technology	Big Data and Data science – Big Data Architecture – Data Analytics – Examples of Data Use – Methodologies for Data Analytics – Knowledge Discovery in Database (KDD) Process
II	Data Preprocessing : Data Quality- Data cleaning : Missing values- Redundant data – Inconsistency – Noisy data Outliers- Data conversion : Nominal to Relative- Ordinal to relative- Data transformation –Dimensionality Reduction – Attribute Aggregation – Principal Component Analysis- Independent Component Analysis – Multidimensional Scaling- Attribute Selection	Filters – Wrappers – Embedded
III	Clustering : Distance Measures – Distance Measures for objects with Quantitative attributes- Distance Measures for Non-Conventional Attributes-Clustering- Validation – Clustering Techniques : K –means-DBSCAN – Hierarchical clustering	Agglomerative Hierarchical Clustering Techniques - Dendrograms
IV	Frequent Itemset Mining Frequent Itemset: Introduction – Setting the threshold- Apriori-FP Growth- Maximal Frequent itemsets - Closed Frequent itemsets – Association rule mining – Lift- Sequential patterns- Frequent sequence mining- closed and maximal sequences	
V	Regression and Classification: Regression – Predictive Performance Estimation – Finding the parameters of the model : Linear regression – Bias- variance trade off-Shrinkage methods- Classification : Binary classification – Predictive performance measures for classification-Distance based algorithms- Probability based algorithms	Ridge Regression – Lasso Regression – Case Study: Using Linear Regression to Predict Performance with Excel





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PERCENTAGE OF SYLLABUS REVISED: 25 %

COURSE FOCUSES ON:

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<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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ATTENDANCE OF THE SEVENTH BOARD OF STUDIES MEETING

Faculty: Computer Science

Board: Data Analytics

VENUE : IQAC Board Room

DATE : 02/12/2022

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	
2.	Dr. J. Satheeshkumar Associate Professor Department of Computer Applications Bharathiar University, Coimbatore	Member (Subject Expert) (Nominated by Vice Chancellor)	 2/12/22
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)	
5.	Ms. Jennifer Xavier Project Manager Accenture AI, Bengaluru	Member (Industrial expert)	
6.	Mr. A. M. Sabarish Associate Data Engineer Cloud Destination Coimbatore	Alumni	ABSENT

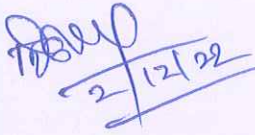
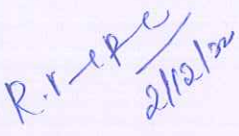



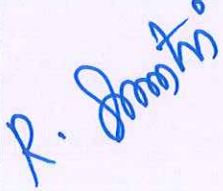
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S.NO.	NAME	DESIGNATION	SIGNATURE
8.	Dr. N. Kuppuchamy MA., M. Phil., Ph. D. Department of Tamil Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (Tamil)	 2/12/22
9.	Dr. R. Vithya Prabha M.A., M.Phil., Ph. D. Department of English Dr.N.G.P. Arts and Science College, Coimbatore	Co-opted Member (English)	 2/12/22
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)	ABSENT
11.	Mythili S (222DA011) I M.Sc CSDA	Student Representative	
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	 02/12/22
13.	Dr.S.Gomathi M.Sc., M.Phil., Ph.D. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
14.	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	



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15.	Ms.Bharathi Anbarasan M.C. A., M. Phil., NET. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
16.	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	
17.	Mrs.S.Shenbaha M.Sc., M.Tech. Department of Computer Science with Data Analytics Dr.N.G.P. Arts and Science College, Coimbatore	Member	
18.	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	
19.	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	

Date : 02/12/2022

(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



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