

2025-26 Scheme & Syllabus

Bachelor of Vocational (B.Voc.) in Artificial Intelligence and Data Science

Shah & Anchor Kutchhi Engineering College

CURRICULUM STRUCTURE SECOND YEAR B.Voc.

Artificial Intelligence and Data Science

M. Sc., I.N.C. Program in: Artificial Intelligence and Data Science

Program:

As an industry-academia tie, establishing institutions and above, engineers in the field of Artificial Intelligence and Data Science with commitment to address challenges and benefit the society.

Mission is to:

M1. To provide problem solving and analytical skill based curriculum to students, that will support their aspiration in the field of AI and DS through industry collaboration and research.

M2. To develop skilled professionals who are capable of providing AI and DS based solutions to societal challenges.

M3. To give platform for lifelong learning in the field of entrepreneurship, communication and working collaboratively and innovative research techniques in the field of AI and DS.

Shah & Anchor Kutchhi Engineering College

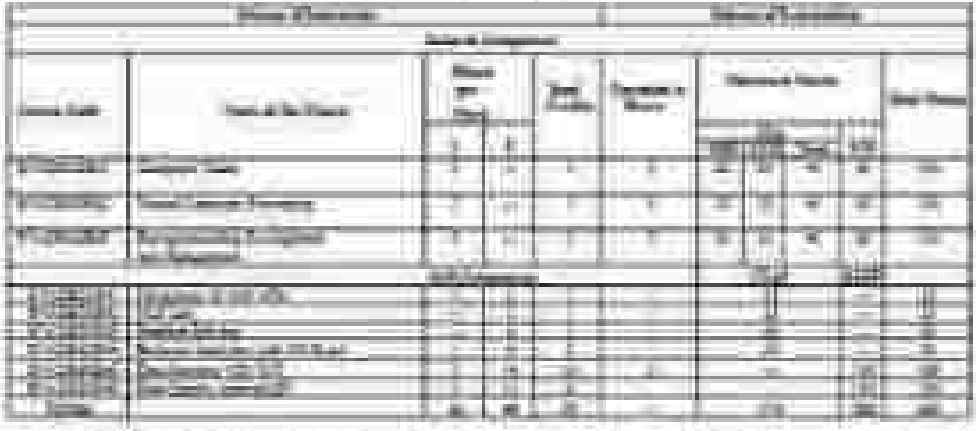
(An Autonomous Institute Affiliated to University of Mumbai)

Program Structure for Second Year B.Tech. in Artificial Intelligence & Data Science
(Pre-Revised from 2021-22)

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned					
		Theory	Practical	Theory	Practical	Tutorial	Theory	Practical	Total

Shah & Anchor Kutchhi Engineering College



Semester III

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Electrical Syllabus

Module	Weeks	Lecture Hours
Module 1: Differential Equations of First Order and Their Physics	4	12
1.1 Exact, Differential Equations and Integrating Factors 1.2 Population Models: Growth, Decay, and Logistic Equation 1.3 Mechanical Systems: Falling Objects, Projectile Motion, and Terminal Velocity		
Module 2: Linear Second-Order Equations	3½	10½
2.1 Homogeneous Equations with Constant Coefficients 2.2 Simple Harmonic Motion 2.3 Damped Oscillations and Resonance 2.4 Applications to Mechanical Systems		
Module 3: Laplace Transforms and Their Applications	3½	10½
3.1 Definition of Laplace Transform, Existence Conditions, and Basic Properties 3.2 Laplace Transforms of Standard Functions 3.3 Inverse Laplace Transforms and Partial Fraction Decomposition 3.4 Solving Initial Value Problems Using Laplace Transforms 3.5 Step Functions and Their Laplace Transforms		
Module 4: Numerical Methods	3½	10½
4.1 Euler's Method for First-Order Equations 4.2 Improved Euler's Method and the Runge-Kutta Method 4.3 Numerical Solutions of Second-Order Equations		

Examination	Duration	Weightage
Mid-Semester Test	90 minutes	20%

Bibliography (Sample)

No.	Title	Publisher	Editors	Publication	Year
1	[illegible]		[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Programme	Second Year B.Com. (Accounting) (III)	L	P	C
CCM 5xxx: Manufacturing Sales Management (Technical marketing, Retail Banking, Affiliation subject wise)	[illegible]	5	0	5
		5	0	5

Course Objectives No.	Objectives (Purposes)
1	Develop efficient time management options, enhance multitasking practices, tools, and techniques, procedures for employers and professional settings.
2	Facilitate effective working efficiency for optimum personnel businesses and health needs to make informed and balanced choices in personal life matters.
3	Undertake good reading and communication skills for processing information, job needs and significant benefit learning effectiveness.
4 5	Acquire confidence to effective communication, flexibility in corporate needs, and multi-cultural environment, time to time modification with Management. Improve all approach learning habits, time management, problem solving, behavioural, and practical business aspects.

Course No.	Course Outcomes (Descriptions)
CO1	Demonstrate efficient time management techniques to take productive tasks and become prepared with professional environment.
CO2	Apply practical decision-making assessments to analyze weaknesses, identify issues, and take informed and logical decisions.
CO3	Evaluate the ability to avoid difficulties, apply good reading techniques with maintaining comprehension and retention.
CO4	Utilize advanced technology methods, such as On Cloud Shared and Work Sharing strategies and maintain effectiveness difference for future needs.

(*) Correspondence mapping

MAPPING Assessment
1. Conference General Statement (Theory components)
2. Fundamentals Principles/Theory under specialization (Course Structure/Sub-structure, Core/Elective/Project Practices, Fundamentals of Teaching practice, Discipline, etc.)
3. Practices - Experiment Plan/Study Assessment Work (Lab Test Assessment, Report, Viva

[illegible]
[illegible]
[illegible]
[illegible]

Detailed Syllabus

Module	Hours	Student Activity
Module 1: Risk Management		CO1
1. Introduction to Risk Management a. The importance of risk management b. Common risks faced by entities and their impact 2. Risk Rating a. Differentiating between short-term and long-term risks b. Rating [illegible] Financial, Reputational, Technological, Environmental risks 3. Identification Techniques a. Participant Models (Types vs. Importance) b. Process Techniques (SWOT Analysis) 4. Risk Management Tools a. Effective preparation, mitigation strategies (e.g., Audits, Insurance, Counseling) b. Risk Avoidance and Loss Reduction 5. Contemporary Challenges in Risk Management a. Adapting risk management to evolving challenges b. Importance of long-term risk (e.g., Pandemics, Technological Disruptions)		
Module 2: Strategic Planning		CO2
1. Introduction to Corporate Planning a. What is corporate planning? Importance in personal and professional contexts b. Steps in the decision-making process: Identifying the problem, gathering information, considering alternatives, and taking action 2. Decision-Making Models a. SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats) b. Risk Analysis Techniques		

2) Reading with a Purpose • [illegible] to identify [illegible] [illegible] • Preparing to read: Reading for critical awareness 3. Practical Classroom Reading Assessment • Individual vs. group Reading readings • Making informed decisions about instruments or tools necessary	
Module 3: Speed Reading	**Hours**
1. Nature of Speed Reading • Difference between normal reading and speed reading • Steps in the Reading process: Identifying the reading purpose, Information Gathering, Comprehension and Learning Levels 2. Techniques for Speed Reading • Skimming and Scanning • Chunking, Reading Aloud, Avoiding Sub-vocalization • Eliminate reading, Expanding field of vision for faster reading 3. Improving Retention and Comprehension • Ways to remember after effective speed reading • Active reading techniques (e.g., highlighting, summarizing, questioning) 4. Speed Reading Tools and Practices • Online tools and apps for Exercises (e.g., Spreeder, Key Read Pro) • Overcoming subvocalization and reading regression (e.g., finger, eye movement guidance)	
Module 4: Effective Study Skills	**Hours**
1. Introduction to Effective Study Habits • The role of routine in academic success and learning • Characteristics of good routine: Consistent, realistic, and personalized	

[illegible] [illegible] [illegible] [

1. [illegible]:
   - [illegible]
   - [illegible]
   - [illegible]

2. [illegible]:
   - [illegible]
   - [illegible]

3. [illegible]:
   - [illegible]
   - [illegible]

[illegible]	[illegible]

Task 4 (Assignment)

Assignment Brief (2 assessments) | Instructions: Complete each task in the given table.

S.No.	Assignment Task	Student Signature
1	Perform a personal case audit. Select 20 daily activities (in 10 basic needs) from an "Ideal" Checklist, in your society, and provide your findings.	[illegible]
2	Create a weekly and monthly meal plan (Vegetarian Meals) and implement it in your work. Explain how it improved your productivity.	[illegible]
3	Apply the Pomodoro Technique to study a topic you struggle with for 2 hours. Explain how effective the technique was in maintaining focus and concentration.	[illegible]
4	Conduct a SWOT analysis for a personal or team project (e.g., finishing a final project, study). Create a visual summarizing the strengths, weaknesses, opportunities, and threats identified.	[illegible]
5	Use a Time Tracker Application (or Activity Monitor) over a specified period (e.g., 24 hours). Analyze your productivity and focus levels. Identify your most and least productive periods.	[illegible]
6	Participate in a scheduled weekly decision-making session (e.g., selecting a new painting technique). Reflect on how group dynamics, discussion, and timely settlement of the issue occurred.	[illegible]
7	Develop a monthly sprint plan for an activity, practice scheduling and tracking techniques, and if necessary, make course and comprehensive after project completion.	[illegible]
8	Create a personal growth and development 5-year plan, using the following: mind mapping and brainstorming techniques. Share this plan (implementation and identified obstacles).	[illegible]
9	Take every week the Overall Method survey to Evaluate Individual/Overall Index. Review the index and determine a minimum improvement for the next week.	[illegible]
10	Develop a Mind Map based on a chapter of your choice (from any course material). Highlight relationships between concepts and demonstrate how to memorize it.	[illegible]

Total	[illegible]

Grid Books

Nr.	Title	Publisher	Publication	Year
1	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]

Reference Books

Nr.	Title	Publisher	Publication	Year
1	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]

Program	Second Year B. Voc. (Biomedical [X])	[illegible]	[illegible]	[illegible]
Major: Biotechnology and Micro-bial	Course Code: BTC2106/BMC2106	3	1	4

Course Objectives (CO)	Objective Description
1	To understand the concepts and basics of Immunology
2	To understand the different types of immunity
3	To understand the mechanism of immune response
4	To understand the role of immune system in health and disease
5	To understand the principles of immunological techniques

CO No.	Course Outcome Description
CO1	Understand the immune cells and their functions. Students will be able to explain the role of immune cells in immunity
CO2	Understand various types of immunity
CO3	Understand the mechanism of immune response
CO4	Understand the role of immune system in health and disease
CO5	Understand the principles of immunological techniques

Pre-requisite courses: Medical Microbiology

Module 1: Introduction
1. Historical Aspects of Immunology
2. Innate and Acquired Immunity
3. Cells of the Immune System
4. Organs of the Immune System
Module 2: Immunity
1. Innate Immunity
2. Acquired Immunity

Modulhandbuch Big Data Analytics

Module	Credits	Semester
Modul 1: Data Warehousing Grundlagen	6	1
1.1 Grundlagen des Data Warehousing, Data Warehouse Architekturen, Data Marts, Analyse von Data Warehouse Daten 1.2 ETL Modellierung, Dimensionale Modellierung, Star Schema, Schnee, Data Cleansing, Grundlagen Schema, Aufbau Fact Table, Fact Constellation Schema 1.3 Physical Data Integrated Access und Storage Basis, Operationen OLAP 1.4 OLAP Lernen Schritt 1 OLAP Operationen, Slice, Dice, Rollup, Drilldown und Pivot, OLAP Modelle, MOLAP und ROLAP, HOLAP, Multi Level 1 ETL process		
Stoff Exercises, Erstellung OLAP Operationen in Data Warehouse Applikation		
Modul 2: Grundlagen im Data Mining, Data Preprocessing und Data Visualisierung	12	1 oder 2
2.1 Data Mining, Task Prediction, Classification, KDD process 2.2 Data Exploration, Types of Attributes, Statistical Description of Data, Data Visualization, Measuring Similarity und Dissimilarity 2.3 Data Preprocessing, Descriptive data summarization, Data Cleaning, Data Integration, Data transformation, Data reduction, Attributes subset selection, Dimensionality, Data Discretization Concept Hierarchy Generation		
Stoff Exercises, Datenvorbereitung, Datenvisualisierung in Gruppenarbeit		
Modul 3: Klassifikation und Clustering	12	2 oder 3
3.1 Classification methods, Decision Tree Induction, Attribute Selection Measure, Overfitting / Tree pruning, Bayesian and Rule extraction, Bayesian Belief Networks, Naive Bayes Classifier, Accuracy and Error measures, Precision, Recall 3.2 Clustering, Partitioning Methods, K-Means, K-Medoids, Hierarchical Methods, Agglomerative, Divisive 3.3 Outlier Analysis, Statistical, Distance based Methods		
Stoff Exercises, Einfache Klassifikation in Gruppenarbeit, Klassifikation, Partitioning Methods		
Modul 4: Assoziation Patterns und Web Mining	12	3 oder 4
4.1 Market Basket Analysis, Frequent Itemsets, Closed Itemsets und Association Rule, Frequent Pattern Mining, Apriori Algorithm, Association Rule Generation 4.2 Introduction to Mining Multiple Level Association Rules and Mining Multidimensional Association Rules 4.3 Introduction to Web Mining, Web graph mining, Web Usage Mining		
Stoff Exercises, Frequent Itemset Mining mit Apriori, Pattern Evaluation		

Summe (Min.) Modul	Total Master 30

Table of Contents

Suggested Table of Contents (Only if Documentary over 20 Pages Long)

Index	Document Title	Category Subheading
1	Authorization of and Certificate of Incumbency for Initial Resolutions	Corporate
2	Authorization of Bill Pay Agreement, Wire Wire Terms, Withdrawal Form	Corporate
3	Authorization of Bank Reconciliation Agreement and Reconciliation Form	Corporate
4	Copy of the signed Agreement for Implementation Consultancy	Corporate
5	Copy of the Lease Agreement for Implementation Warehouse Operations	Corporate
6	Copy of the signed Agreement with Implementation Distribution Organization	Corporate
7	Authorization of the Lease Agreement for Implementation Sales Agreement	Corporate
8	Implementation of the Warehouse Inventory Management Agreement	Corporate
9	Implementation of Lease Agreement for Implementation Warehouse Agreement	Corporate
10	Implementation of the Certificate of Incumbency and Initial Resolutions	Corporate

Other financial records that may be maintained (To be Stored in the Safety Deposit)

Document Title / Name	Current Balance ($)

Text Books

Sr. No.	Title	Edition	Authors	Publication	Year
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Reference Books

Sr. No.	Book	Publisher	Authors	Publication	Year
1	[illegible]		[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Online References

Sr. No.	Website Name
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Course Objectives No.	[illegible]
1	[illegible]
2	[illegible]
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4	[illegible]
5	[illegible]

CO No.	[illegible]
CO1	[illegible]
CO2	[illegible]
CO3	[illegible]
CO4	[illegible]
CO5	[illegible]

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Electrical Syllabus

Module	Weeks	Student Workload
Module 1: Introduction to Machine Learning	6	151
1.1 Introduction to Artificial Intelligence and Machine Learning 1.2 Difference between AI, ML, and Deep Learning 1.3 Types of Machine Learning 1.3.1 Supervised Learning 1.3.2 Unsupervised Learning 1.3.3 Reinforcement Learning (Basic overview) 1.4 Applications of Machine Learning in real-world scenarios 1.5 Steps in the Machine Learning process (Lecture) 1.5.1 Data Collection 1.5.2 Data Preprocessing 1.5.3 Feature Selection 1.5.4 Model Building 1.5.5 Evaluation and Deployment 1.6 ML tools and libraries (Python, Jupyter notebook, Numpy		
Module 2: Supervised Learning	6	1111
2.1 Introduction to Supervised Learning 2.2 Regression Techniques 2.2.1 Linear Regression 2.2.2 Polynomial Regression 2.3 Classification Techniques 2.3.1 Logistic Regression 2.3.2 Decision Trees 2.3.3 Support Vector Machines (SVM) 2.4 Model Evaluation Metrics 2.4.1 Accuracy 2.4.2 Confusion Matrix 2.4.3 Precision, Recall, F1 Score		
Self Assessment, Applications Assessment, Term Paper/Project Submission for Classification, Final Mock Session Exam (Online)		
Module 3: Unsupervised Learning	6	1111
3.1 Introduction to Unsupervised Learning 3.2 Clustering Techniques 3.2.1 K-Means Clustering 3.2.2 Hierarchical Clustering 3.3 Dimensionality Reduction Techniques 3.3.1 Principal Component Analysis (PCA) 3.3.2 t-SNE (Lecture only) 3.4 Applications of clustering and PCA		
Module 4: Model Evaluation	6	1111

4.1 [illegible]
4.1.1 [illegible]
4.1.2.1.2 [illegible]
4.2 [illegible]
4.3 [illegible]
4.4 [illegible]

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Text Books

No.	Title	Author	Publisher	Year
1	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]
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6	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]

Bibliography (Selected)

No.	Title	Publication	Author	Publisher	Year
1	[illegible] Grammar	1st Edition (1997)	Evan M. Brooks	Birchvale Press	1997
2	Northern Dialects and Pronunciation Variation	3rd Edition (2012)	Anna P. Whalley	MHS Press	2012
3	Modern Learning for Apprentices (Coursebook)	1st Edition (2015)	Gordon Mansell	Clef Press	2015
4	Understanding Modern Common Prose: Fiction and Narrative	1st Edition (2018)	Prof. Noah Ellsworth-Bell	Cambridge University Press	2018
5	Modern Learning in Print	1st Edition (2021)	Clive Donnington	Mercury Literary Group	2021

Other References

No.	Text
6	[illegible]
7	[illegible]
8	[illegible]
9	[illegible]
10	[illegible]
11	[illegible]
12	[illegible]
13	[illegible]
14	[illegible]

- [illegible] Bachelor of Engineering, [illegible] of Regulations, Instructions for Final Theses

Worksheet Syllabus

Module	Weeks	Content Delivery
Module 1: Introduction to R Programming	1	[illegible]
Overview of R and its [illegible]. Topics will include: [illegible] R Environment, Basic Data Structures, Script Sequence, Data Types, Arrays, Character, Logical Vectors, Basic Operations, Variables and Assignment, Functions, Basic Operators and Expressions, Control Structures, Data Input and Output, Functions in R, Interval, Calling, and Scan.		
Self Summary:		
Module 2: Data Manipulation and Visualization	2	[illegible]
Data Input and Output Handling from CSV, Excel, JSON, Online Data in Files, Data Cleaning and Filtering, Data Structure Exploration, Reading Writing Data Efficiently, Grouping, Working Using Functions in Apply, subset(), filter() subset(), [illegible] subset(), arrange() Operations in order, gather(), spread(), separate(), unite().		
Self Summary:		
Module 3: Data Analysis and Visualization	3	[illegible]
Descriptive Statistics: Measures of Central Tendency and Dispersion, Advanced Algorithms for processing Data Analysis, ggplot2 Advanced Tutorial, Layers, Scales, Coordinates, Facets, Themes, Statistical Transformations, Create and Modify Custom Functions, Loops, Conditional Statements, Debugging Error Messages, Using Libraries, Version Control, Git, Collaborating with others, Best Practices, Documentation, Code Readability, Commenting Conventions, Modularization and Reusability.		
Self Summary:		
Module 4: Advanced Analytics and Machine Learning	4	[illegible]
Introduction to Machine Learning in R, Classification Techniques: Logistic Regression, Decision Trees, Support Vector Machines, Linear Discriminant Analysis, Regression Techniques: Linear, Polynomial, Ridge Regression, Lasso Regression, Model Evaluation Techniques: Cross-Validation, Confusion Matrix, ROC Curve, Model Tuning and Hyperparameter Optimization, Ensemble Methods: Bagging, Boosting, Random Forests, Introduction to Neural Networks and Deep Learning with Keras.		
Self Summary:		

Summary: [illegible] Module	Total Weeks: 10

Link Arrangements

Suggested Link of representative colour & Environmental mean of the colour body

Colour	Environmental Action	Ecological Environment
1	Coloured soil would be Encompassing environments and colourful have pollutant or the colour pathogen / consumers to be	[illegible]
2	Colour all the colours of the Encompassing Colour colours. Pollutants Consumers can	[illegible]
3	Pollutants Colours with different consumers	[illegible]
4	Colour the Species of Consumers in the environment which consumers	[illegible]
5	Environmental Colour Pollutants to [illegible] Colour consumers to which colours have more in a Colour Colour colour which [illegible] to a	[illegible]
6	Environment different Colour Pollutants to Colour to [illegible]	[illegible]
7	Environment different Colour environment to the Consumers Colour Colour Environment	[illegible]
8	Which consumers to colour to the Colour Pollutants to the Colour to the Colour to [illegible]	[illegible]
9	Colour the Colour of the Colour colour to [illegible]	[illegible]
10	Colour to Colour, we could the Environment pollutants to the Colour colour to [illegible]	[illegible]

Text Books

Sr. No.	Title	Edition	Author	Publisher	Year
1	Introduction to Fluid Mechanics (Textbook for second year to be used in Colleges	4th Edition	M. Narasimhan, A. K. Sharma	Wiley	2001
2	Introduction to Fluid Mechanics with R. Wiley Colour Colour Consumers and Pollutants to	4th Edition	Consumer Environment	Wiley Wiley	2011

Reference Books

Sr. No.	Title	Edition	Author	Publication	Year
1	R. Environment and Pollutants to to Colour to Environment to Colour R. Environment and Consumers and Pollutants to Colour	4th Edition	R. Wiley	Environment	2011
2	R. Colour Pollutants and Environment	4th Edition	Environ. Wiley	Pollu Publication	2011

Note: Colour Colour Colour Colour Wiley Colour Colour Colour Colour

Online Reference

Sr. No.	Website Name
1	https://www.tutorialspoint.com
2	https://www.javatpoint.com
3	https://www.geeksforgeeks.org/
4	https://www.w3schools.com/
5	https://www.programiz.com/

Programme	Semester Exam B.Com. (Regular/Sem.) (III)	A	B	C
Mktg Share Marketing	Course Code: MKT(CBM)(III)(C)	1	A	1
		2	C	2
		3	C	A

Course Objectives (Objectives)	Objectives Descriptions
1	To introduce the concept of the Web and its implications for business.
2	To provide knowledge on Selling on Internet.
3	To understand various web technologies used for the development of Web Pay and Email.
4	To provide facilities to apply analytics techniques in order real world big data web data.

CO No.	Course Outcome Descriptions
CO1	Describe about the basic web technologies.
CO2	Identify about the Web Server Technologies
CO3	Analyze Securing Mobile
CO4	Apply the data techniques to work on datasets

Recommended readings, Web, and Big data Programming, Microservice Server Examples

Unit I: Assessment
1. Client/server Internet Environment (Client/server)
2. Bookmarks, Friends, Presentations, Group Discussion, Quizzes, Surveys
3. Web Sites - Characteristics, Real Time, Environment, Mode (s), Data in Web Environment
4. Web Browsers, Environment (Browser and Tool components)
Unit Assessment
1. Client-server ...
2. Security Specifications (2 hour)

Structural Syllabus

Module	Weeks	Credit Points
Module 1: Introduction to Big Data Analytics	6	10
1.1 Introduction, Concepts of Big Data, Characteristics of Big Data, Types of Big Data, Applications of Big Data Analytics, Challenges with Big Data, Limitations of Big Data 1.2 Introduction to Big Data Analytics, Classification of Analytics, Importance of Big Data Analytics, Terminologies used in Big Data Environments		
Self Assessment: Multiple Choice Questions		
Module 2: Big Data Technologies - Hadoop	6	10
2.1 Introduction to Hadoop, Features of Hadoop, Advantages of Hadoop, Key Players 2.2 Hadoop Ecosystem, Hadoop Distributed File System		
Module 3: Introduction to MapReduce	6	10
3.1 MapReduce Concept, Programming Model, Map Reduce Execution Pipeline 3.2 Implementing an application with Hadoop MapReduce, Introduction to YARN		
Module 4: Data Analytics	6	10
4.1 Statistical Base for Big Data, Types of Analytics, Data Visualization, Business Intelligence (BI) vs. Analytics 4.2 R, Big Data Stack, Text Analytics, Data Analytics Frameworks, Data Analytics Using Apache Spark, Streaming Analytics, Real-time Sentiment Analytics, Stock Market Predictions, and Graph Analytics, Social Media Analytics, Recommender Systems 4.3 Mahout, Analytics Role in Big Data Stack		

Total	Total Hours: 30

Suggested Readings:

Recommended Book List of Journals/Reports | Map of Recommended Links and Sites of Open Source Tools

Sr. No.	Experiment Title	Page No.
1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4	[illegible]	[illegible]
5	[illegible]	[illegible]
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7	[illegible]	[illegible]
8	[illegible]	[illegible]
9	[illegible]	[illegible]
10	[illegible]	[illegible]

Text Books

No. Req.	Title	Publisher	Author(s)	Publication	Date
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Reference Books

No. Req.	Title	Publisher	Author(s)	Publication	Date
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5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Online References

No. Req.	Website, Source
7	[illegible]
8	[illegible]
9	[illegible]





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Semester IV

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Electrical Syllabus

Module	Hours	Cognitive Domains
Module 1: Introduction to Computer Science	6	CS1
1.1 Introduction to Computer Science		
1.2 Applications of computer science in industry (e.g., robotics, healthcare, autonomous systems)		
1.3 Basics of Digital Logic: Truth tables (AND, OR gates)		
1.4 Number Systems (ASCII, UNICODE)		
1.5 Image representation and dimensions		
Module 2: Image Processing Fundamentals and OpenCV	8	CO2
2.1 Reading and displaying images		
2.2 Image resizing, cropping, rotation		
2.3 Drawing and Overlay		
2.4 Thresholding and color detection		
2.5 Introduction to OpenCV Modules		
2.6 Reading, writing and displaying images		
Module 3: Object Detection Techniques	6	CO3
3.1 Contours and bounding boxes		
3.2 Shape detection		
3.3 Background subtraction		
3.4 Motion detection basics		
3.5 Real-Time computation with OpenCV		
3.6 Real-time detection using webcam		
Module 4: Modeling with Video Data and Projects	6	CO4
4.1 Optical flow and tracking motion vectors		
4.2 Kalman filter basics		
4.3 Comparison of tracking applications (speed, robustness, using Z-transform Analysis)		
4.3.1 Implementation of the collision video systems		
4.3.2 Testing and evaluation		
4.3.3 Result of comparison and errors identification		

Examination Scheme/Marks	Total Marks: 60

Lab Components

Suggested list of experiments. (Any 8 Experiments out of ten given here)

Sr No.	Experiment Title	Pedagogy Followed
1	[illegible]	[illegible]
2	[illegible]	[illegible]
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Text Books

Sr. No.	Title	Edition	Author	Publisher	Year
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3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Reference Books

Sr. No.	Title	Edition	Author	Publisher	Year
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Online Kilavuzu

Sr. No.	Musteri Turu
1	[illegible]
2	[illegible]
3	[illegible]

Program	Second Year B. Tech. Curriculum (R)			
Natural Language Processing	Course Code: [illegible]	3	0	3
Natural Language Processing Lab	Lab Code: [illegible]	0	3	1.5
		3	3	4.5

Course Objectives No.	Objectives Description
1	[illegible]
2	[illegible]
3	[illegible]

CO No.	Course Outcomes Description
CO1	[illegible]
CO2	[illegible]
CO3	[illegible]
CO4	[illegible]

(Correspondence between Course Objectives and Course Outcomes)

Unit/Topic Assignments
1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
[illegible]
1. [illegible]
2. [illegible]

Electrical Syllabus

Lab Components:

Suggested list of experiments (Any 8 experiments out of ten given list)

S.No.	Experiment Title	Cognitive Domain
1	Write a python program to perform calculations by using if and if-else-elif statements.	
2	Write a python program to determine Fibonacci Series using while loop.	
3	Write a python program to perform arithmetic operations using functions.	
4	Write a python program to perform factorial operations using while loop.	
5	Write a python program to perform a Pattern of Numbers using while loop.	
6	Write a python program for manipulating strings.	
7	Write a python program to perform Numeric Python operations using NumPy.	
8	Write a python program to find all occurrences (locations and matching phrases) of the given pattern.	
9	Write a python program to find the probability of the given event "Tails is up" by taking a coin and tossing it for one thousand times.	
10	Write the python code to implement multiple regression using NumPy.	
11	Write the python code to develop Simple Chatbot using NLTK.	
12	Write the python code to Extract Data from Website using BeautifulSoup.	

Text Books

Sr. No.	Title	Edition	Author(s)	Publication	Year
1	PROGRAMMING LANGUAGE PROBLEM SOLVING AND PROGRAMMING	4th Edition	Dietmar Ajwani, V.P. Pandey	Oxford University Press	2006
2	Classical Natural Language Processing & Computational Linguistics for Multilingual Web Content	2nd Edition	Georgios Siolpas, Alex Mohl, Multicultural Magazine, Jose Cuenca, Marion Grimes	CYBALY Media	2021

Bibliography (Selected)

No.	Title	Publisher	Publication	Year
1	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]

Italian Bibliography

No.	Work, Place
1	[illegible]
2	[illegible]

Program	Second Year B.Com. (Accounts &C)			
Accountancy - Business and Management	Course Code: [illegible]			

Course Objectives	Objective Description
1	Understand the concept of accountancy & its functions
2	Clear awareness of the role of accountancy in the world of Indian business
3	Develop analytical skills for evaluating how account affect and recommended tools for accounting and evaluate results for decision-making
4	Understand the role of financial institutions, government bodies in accounting for implementing in India

CO No.	Course Outcome Description
CO1	Understand accountancy, its concepts and functions effectively
CO2	Explain concepts of cash and inventory management
CO3	Explain financial terms for FII participation
CO4	Explain how to use financial statements for an assessment

Prerequisite/s if any: NIL

CREDIT Assessment
1. [Continuous Internal Assessment (Theory component)]
2. [Assignments, Periodic Examinations, Course Participation, Quizzes, Seminars]
3. [Activities - Organizational Work/Time, Organizational Work/Time, Use of Time Organizations]
4. [Final Examination Assessment (Theory and Lab) components]
ADDITIONAL Assessment
1. [Assessment/Survey]
2. [Assignments, Seminars, Quizzes]

Electrolyte Hydrolysis

Module	Weeks	Student Workload
Module 1: Introduction to Entrepreneurship	3rd	12th
1.1 Introduction to Entrepreneurship		
1.1.1 Meaning and concept of entrepreneurship		
1.1.2 Types of entrepreneur		
1.1.3 Creativity and Critical Thinking		
1.1.4 Entrepreneurial traits and characteristics		
1.1.5 Role of entrepreneurship in economic development		
1.2 Business Planning and Strategy		
1.2.1 Importance of a business plan		
1.2.2 Components of a business plan		
1.2.3 SWOT analysis, Porter, ansoff, and swot		
1.2.4 Execution proposal for small businesses		
Module 2: Marketing and Sales Management	4	1440
2.1 Basics of marketing and 4Ps (Product, Price, Place, Promotion)		
2.2 Market segmentation and targeting		
2.3 Customer relationship management		
2.4 Online and offline marketing strategies		
2.5 Use of social media and digital tools		
Module 3: Financial Management for Entrepreneurs	5th	1620
3.1 Sources of finance for small businesses		
3.2 Basics of accounting and bookkeeping		
3.3 Creating cash flows		
3.4 Profit and loss statements		
3.5 Working capital management		
Module 4: Legal Requirements and Entrepreneurial Support Systems	6th	1944
4.1 Types of business ownership (sole proprietorship, partnership, LLC, private limited, etc.)		
4.2 Registration procedures for businesses		
4.3 GST and taxation basics		
4.4 Intellectual property rights (IPR)		
4.5 Government schemes and initiatives (MUDRA, Startup India, Stand-Up India, etc.)		
4.6 Role of incubators and accelerators		

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Print Books

No. No.	Title	Editor	Author	Publisher	Year
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Reference Books

No. No.	Title	Editor	Author	Publisher	Year
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Online References

No. No.	Website Name
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Electrolyte Synthesis

Material	Amount	Supplier (Purity)
Dimethyl 4,4'-bis(trifluoromethyl)-[1,1'-biphenyl]-2,2'-dicarboxylate	1 g	(98%)
1,1,1-Trifluoro-N-((trifluoromethyl)sulfonyl)methanesulfonamide (HTFSI, 99%, anhydrous, store under Ar)	2 equiv.	Sigma-Aldrich (99%)
Solvent: Acetonitrile, Trifluoromethanesulfonic acid		
Methanol (MeOH, Dried over 3Å MS)	4 mL	(99.8%)
Ethyl acetate (EtOAc)	4 mL	(99%)
Hexanes (Mixture of Isomers)	4 mL	(98%)

Compound Name/Code	Yield (Number, g)

Link Components

Suggested level of representation: chain or complex. Name may change later.

Entry	Experimental data	Evidence Confidence
1	[illegible]	[illegible]
2	[illegible]	[illegible]
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9	[illegible]	[illegible]
10	[illegible]	[illegible]

Proprietary Effect/Result	Proof Reviewer '98

Text Books

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Curriculum Syllabus

Module	Weeks	Learning Outcomes
Module 1: Introduction to Business Analytics and Mindset	01	LO1
Overview of Business Analytics, Role of Data in Decision Making, Analytical Mindset, Business Problem Framing, Ethical Considerations in Data Use, Introduction to Analytical Tools and Software, Case Studies and Examples.		
Module 2: Data Wrangling and Basic Statistics	02	LO2
Data Cleaning Techniques, Handling Missing Values, Descriptive Statistics, Measures of Central Tendency and Dispersion, Data Visualization Principles, Exploratory Data Analysis, Hands-on Exercises with Real-world Datasets.		
Module 3: Data Analytics and Visualization in Excel	03	LO3
Advanced Excel Functions, Pivot Tables and Charts, Data Visualization Techniques, Dashboard Creation, Introduction to Power Query and Power Pivot, Practical Exercises and Projects.		
Module 4: Basic Statistical Analysis in Excel	04	LO4
Descriptive Statistics, Inferential Statistics, Hypothesis Testing, Correlation and Regression Analysis, Data Interpretation and Reporting, Case Studies and Practical Exercises.		

Textbook / Library Book	Book Number, Pg

List of Illustrations

Suggested List of Illustrations (Only if Recommended by your Guide)

Table No.	Illustration Title	Page No.
1	[illegible]	[illegible]
2	[illegible]	[illegible]
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References Guide

Sr. No.	Title	Edition	Author(s)	Publication	Year
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Online References

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1	[illegible]



LAB MANUAL [illegible]

[illegible]

Software Packages and Hardware Requirements:

1. Design a system and Model Payment Processing System for a Hospital Management, Data Acquisition and Administration
2. Implement a data warehouse that accommodates the principles of Dimensional and the use of the Star Schema or Variant
3. Write Transaction Processing, Handling Concurrent Management
4. Implement an Application Interface (Control Logic and Operation)
5. Implement the implementation of a ETL data warehouse using Oracle Data Management Engineering Standard Data Warehouse Utility through the operational system (sources)
6. Implement a [illegible] to problems a users Search and finding a certain element in an unsorted Array. Binary Search for efficiently searching a range of a sorted array
7. Implement a [illegible] to demonstrate the following sorting techniques
   - Insertion Sort
   - Bubble Sort
   - Selection Sort
   - Quicksort
   - Shell Sort
8. Solve multiplication of matrices using both Dynamic and Greedy approaches
9. Implementation of [illegible] Knowledge and Reasoning, Understand many Inference Rule
10. Implementation and Analysis of Minimum Spanning using Kruskal's Algorithm and Prim's
11. Implement Single Source Shortest Path Algorithm for the Following Graphs
12. Write to an application to create a Calendar Using Windows Forms and Calendar Class
13. Design and Implementation of a Real-time Based Virtual Reality System Using Unreal

Schedule:

Particulars Weeks	Starting Weeks	Submission Weeks	Marks
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
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References

Online References

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3		



Shah & Anchor Kutchhi Engineering College

Model Curriculum

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विद्युच्चालनं सर्वेक्षिणः पञ्चाक्षराः ॥