REGULATIONS FOR ONE YEAR POST GRADUATE DIPLOMA IN BUSINESS ANALYTICS (PGDBA)

1. TITLE

These regulations shall be called "RV INSTITUTE OF MANAGEMENT Regulations for POST GRADUATE DIPLOMA IN BUSINESS ANALYTICS (PGDBA) - 2026"

2. EXTENT OF APPLICATION

This set of Regulations, on approval by the Governing Body, shall supersede all the corresponding earlier sets of regulations of the Post Graduate Diploma in Business Analytics along with all the amendments thereto and shall be binding on all students undergoing the Post Graduate Diploma Programme/(s) (Credit System) at RVIM, Bangalore. This set of Regulations, may evolve and get refined updated or amended or modified or changed through appropriate approvals from the Academic Council and/or Governing Body from time to time, and shall be binding on all parties concerned, including the Students, Faculty and the Staff of Departments. The decision of the Governing Body shall be final and binding.

3. VISION, MISSION AND QUALITY POLICY

Vision

To Become World Class Management Institute of Eminence

Mission

To nurture Universal Thought Leaders by offering holistic management education fostering Creativity, Innovation and Entrepreneurship through Technology and Business Intelligence for Inclusive Growth and Sustainable Development

AND

To serve Business, Government and Society through Research, Collaborative Engagement and Stakeholder Empowerment.

Quality Policy

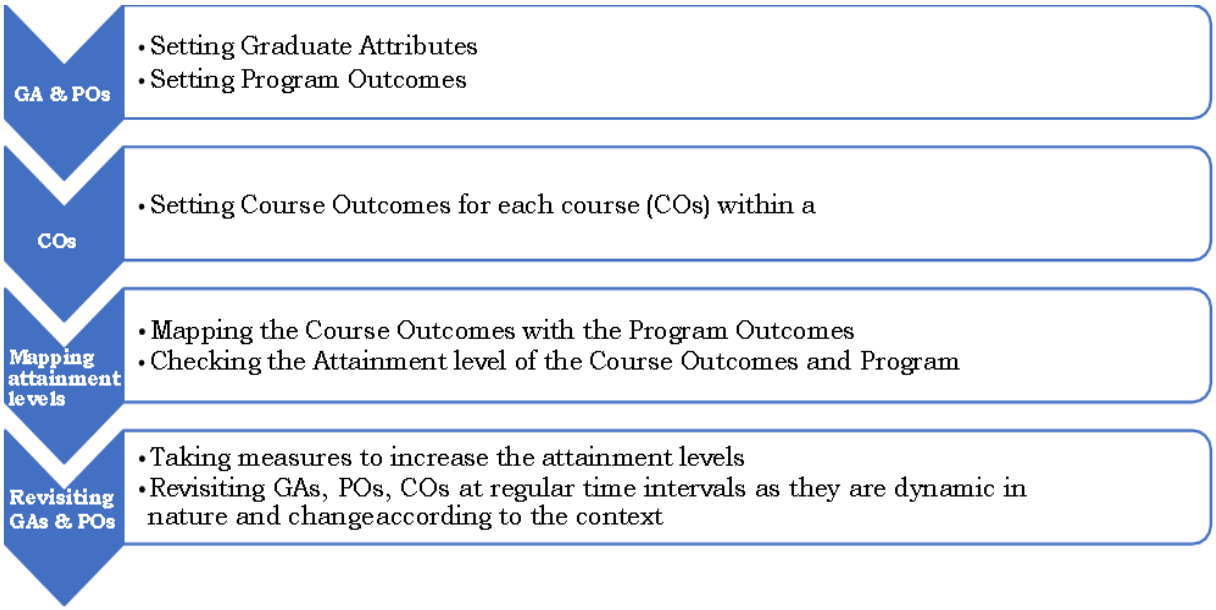
Consistent pursuit of excellence across all fronts to remain an industry relevant and socially responsible Institution by following the principles and philosophy of Outcome Based Education in the areas including;



Values

Trust
Respect
Integrity
Universal
Morale
Professional
Humane

4. OBE PROCESS FOLLOWED AT RVIM



4.1 ATTRIBUTES OF THE PROGRAM

ATTRIBUTES	DESCRIPTOR
IT Skills & Business Analytics	Graduates will be able to use contemporary information, technology, tools and techniques independently to enhance productivity and strengthen decision-making skills
Subject Knowledge Proficiency & Application	Able to demonstrate comprehensive Knowledge in their functional domains and apply it to professional practice

Data Analysis, Problem Solving and Decision Making	Graduates will apply logical, critical and creative thinking tosolve a range of problems for data-based decision making
Research Aptitude, Critical Thinking and Cognitive Flexibility	Graduates will be able to think critically with cognitive flexibilityand develop an aptitude skill towards research
Disciplinary Knowledge	To enhance the capability of comprehensive knowledge with a holistic approach towards recent advances in the field of business analytics & management to exhibit the skills essential for executing various business operations and resolving business problems.
Self-Awareness, Self-Reflection and Lifelong learning	Graduates will understand their own self and their reflections onothers and engage in lifelong learning
Experiential Learning	Enables the students to analyze the situation from diverse perspective and to widen the horizon of their thought processes.

4.2 PROGRAM OUTCOMES (POs)

PO1	Apply knowledge of management theories and practices to solve business problems with the required abilities to understand, analyze, and communicate global, economic, societal, cultural, legal and ethical aspects of business.
PO2	Foster analytical and critical thinking abilities for data-driven decision making.
PO3	Apply appropriate algorithms and methodologies to design, develop, test and deploy analytical models to solve business problems.
PO4	Deal with complex issues using a multidisciplinary approach, supported by advanced management, AI and IT tools and techniques.
PO5	Ability to apply domain-specific knowledge and skills to build competencies in their respective functional areas.
PO6	Develop value-based leadership to lead themselves and others in the achievement of organizational goals and contribute to a team environment through entrepreneurial mindset, innovation and starting a new Venture.
PO7	Engage in training, research and consultancy with cognitive flexibility and an analytical mindset to create new knowledge and be a lifelong learner.
PO8	Practice social responsibility and contribute to the community for inclusive growth and sustainable development of society through ethical behaviourusing the power of technology and analytics.

5. MINIMUM ELIGIBILITY FOR ADMISSION AND ADMISSION PROCEDURE FOR PGDBA PROGRAM

The Graduates from any discipline from Government recognized University with minimum 50% (45 percent for SC/ST/PWD category candidates) marks in aggregate along with regular SSLC/10th + PUC/12th/3 years Diploma + Minimum 3 years Bachelors program in any discipline are eligible or an equivalent qualification recognized by the Ministry of HRD, GOI along with regular SSLC/10th + PUC/12th /3 years Diploma are eligible.

5.1 SELECTION PROCEDURE

Interested candidates fulfilling the eligibility norms have to login to our website https://www.rvim.edu.in & find the Admissions link on our home page.
There is a dedicated link – Apply online through which the candidates have to first register & then proceed as per the instructions. Candidates first have to register as a new user & use the login information to apply online in our website and submit application online. After submitting the application online, candidates should send an email to admissions.rvim@gmail.com mentioning the Name, Parents name, DOB, application number, mobile number and attach the filled application form along with the soft copy of marks cards - 10th, 12th, Degree Marks cards & one passport photograph to the mail ID: admission.rvim@gmail.com. Once we receive the application, the candidate will get email with the application fee payment information. The candidates can also pay the application fee of Rs. 500/- through demand draft in the favour of The Director, RVIM payable at Bengaluru or through NEFT.

6. ADMISSION PROCESS

The candidates can confirm the dates to appear for the Personal Interview to the Email ID: admission.rvim@gmail.com. The interviews are currently being conducted Online and Off- line mode. The candidate can choose the mode of interview. The interviews will be conducted on all weekdays (Monday to Friday). Documents required are 10th, 12th, Degree Marks cards & one passport photograph (Original & One set photocopy of all the documents).
After completing the application form, paying the application fee & verifying all the documents, Institution will conduct the Personal Interview. The results of the interview will be announced on the same day. The interviews are currently being conducted online and off-line. The candidates can choose the mode of interview.

Students should confirm the dates at least one day in advance to the Institution. The admission team will present to the HoI, the list of selected candidates duly considering the permissible Intake along with its recommendation for each candidate and intimate the same to the candidates.

7.**DURATION OF THE COURSE**

The duration of the PGDBA program shall extend to over two semesters with real world capstone project spanning over a period of one year.

8. MEDIUM OF INSTRUCTION

The course being a professional course and having global connotation, the medium of instruction shall be in English medium only.

9. ATTENDANCE

a) Each semester is considered as a unit and the candidate has to put in a minimum attendance of 75% in each course with a provision for condonation of 10% of the attendance by the Director, RVIM for reasons such as (i) Serious medical condition or (ii) Representing the Institute / University /State /Nation in sports, cultural, technical or academic activity and any other meaningful engagements with the Permission of the Director. Leave of absence granted by the competent Authority is must to give the attendance under special cases. The students who do not satisfy this condition will be declared as NSAR (Not Satisfied Attendance Requirement).

b) The basis for the calculation of the attendance shall be the period prescribed by the Institution through its calendar of events. For late admission, the date of admission to first semester PGDBA would be considered for the calculation of attendance (this rule does not apply to second semester).

c) The students will be informed about the attendance position periodically by the college notifying the status on the notice board before each CIA. Student declared as NSAR is not eligible to take up SEE in that particular course.

10. CREDIT DISTRIBUTION

Sl.NO	TITLE	CREDITS
1	Experiential Learning Courses	03
2	Core Courses	18
4	Functional Electives	03
5	Open Electives	04
6	Skill Enhancement Courses	22
8	Real World Capstone Project	04
	Total Credits	**54**

11. SCHEME OF EXAMINATION

- Continuous Internal Assessment (CIA): 50 Marks
- Semester End Examination (SEE): 50 Marks
- Internal & External: 50% & 50%

Minimum requirement to get promoted:

Students should secure minimum of 40% marks in CIA to write the semester end exam and should secure minimum of 40% in SEE to pass the subject

12. GRADING SYSTEM

EIGHT POINT ALPHA - SIGN GRADING SCALE under CBCS System

Alpha Sign/ Letter Grade	O (Outstanding)	A+ (Excellent)	A (Very Good)	B+ (Good)	B (Above Average)	C (Average)	P (Pass)	F (Fail)	Ab (Absent)
SGPA/ CGPA	9.00 -10.00	8.00- < 9.00	7.00 - < 8.00	6.00 - < 7.00	5.50 - <6.00	5.00 - < 5.50	4.00 - <5.00	Below 4.00	00
Semester/Program percentage of marks	90.0-100	80.0- < 90.0	70.0- < 80.0	60.0- < 70.0	55.0- < 60.0	50.0 - < 55.0	40.0- < 50.0	Below 40	Absent
Result/ Class description	Outstanding	First class Exemplary	First class Distinction	First class	Higher second class	Second class	Pass class	Fail/ re-appear	Absent

12.1 Continuous Internal Assessment (CIA):

• Attendance & Class participation - 05 Marks

• Mid –term test – 15 Marks

• Other Assignments & Projects - 30 Marks

Minimum 75% attendance is required to write the Semester End Examination

12.2 CLASSIFICATION OF SUCCESSFUL CANDIDATES: SEMESTER WISE

The Grade Points (GP) in a course shall be assigned based on the basis of actual marks scored in that course. They shall be generally percentages divided by 10. The Grade Point Weights (GPW) shall then be calculated as the product of the grade points earned in the course and the credits for the course. The total GPW for a semester is obtained by adding the GPW of all the courses of the semester.

ILLUSTRATION 1 (24 CREDITS)

PAPERS	P1	P2	P3	P4	P5	P6	P7	TOTAL
MAX. MARKS	100	100	100	100	100	100	100	700
% MARKS OBTAINED	77	73	58	78	64	67	83	500
GRADE POINTS EARNED (G.P.)	8.0	7.5	6.0	8.0	6.5	7.0	8.5	-
CREDITS FOR THE COURSE ©	3	4	3	3	4	3	4	24
TOTAL GPW = GP X C	24	30	18	24	26	21	34	177

• Semester Aggregate Marks: 500 / 700 = 71.43%

• Classification of Result: First Class Distinction.

• The SGPA = Total CP/Total Credits = 177/24= 7.3

• Semester Alpha Sign Grade: A

12.3 CALCULATION OF CUMULATIVE GRADE POINT AVERAGE (CGPA)

The Cumulative Grade Point Average (CGPA) at the end of the final semester shall becalculated as the weighted average of the semester GPW. The CGPA is obtained by dividing the total of GPW of all the two semesters by the total credits for the program.

12.4 MINIMUM GRADE FOR A PASS

• A candidate shall be declared to have passed the MBA program if he/she secures at least a CGPA of 4.0 and qualify all the prescribed courses including Audit course(s).

• The candidate who pass in all the papers in first attempt in all four semesters is eligible for ranks provided they secure minimum CGPA of 7.0 (Alpha-Sign Grade A).

• The results of the candidates who have passed the fourth semester examination but not passed the lower semester examinations shall be declared as NCL (Not Completed Lower semester examinations). Such candidates shall be eligible to receive the degree only on completion of all the lower semester examinations.

• A candidate who passes the semester examinations in parts is eligible for only Class / CGPA and Alpha Sign Grade but not be eligible for rank.

12.5 FREQUENCY OF EXAMINATIONS

Exams are conducted every semester once in six months

13. COURSE MATRIX OF PGDBA PROGRAM

Sl.NO	TITLE	I SEM	II SEM	Credits
1	Experiential Learning Courses	1 1*1 Cr	1 1*2 Cr	3
2	Core Courses	3 3*3 Cr	3 [3*3 Cr]	18
3	Skill Enhancement courses	4 [2*3 Cr + 1*4 Cr + 1 * 2 Cr]	3 [1*4 Cr + 2 * 3 Cr]	22
4	Functional Electives	---	1 [1*3 Cr]	3
5	Open Electives	2 [2*1 Cr]	2 [2*1 Cr]	4
6	Real World Capstone Project (2 months)	---	Internship [4 credits]	4
Total Credits		**24**	**30**	**54**

First Semester Course Matrix

SUBJECT CODE		NAME OF THE COURSE	CREDITS	MAXIMUM MARKS		TOTAL
				CIA	SEE	
26PGB111	SE1	Advanced IT Skills	3	50	50	100
26PGB112	CC1	Quantitative Techniques for Decision Making	3	50	50	100
26PGB113	CC2	Introduction to Business Analytics, Data Warehousing and Data Mining	3	50	50	100
26PGB114	SE2	Database Management Using MySQL	3	50	50	100
26PGB115	SE3	Predictive Analytics Using R	4	50	50	100
26PGB116	CC3	Generative AI and Prompt Engineering	3	50	50	100
26PGB117	EC1	Creativity & Design Thinking for Business	1	50	50	100
26PGB118	SE4	Professional Communication and Employability Skills	2	50	50	100
26PGB311	OE1	Open Elective – I (MOOCs) (20-30 hrs.)	1	50	50	100
26PGB312	OE2	Open Elective – II (MOOCs) (20-30 hrs.)	1	50	50	100
	TOTAL		**24**	**500**	**500**	**1000**

Course Title	ADVANCED IT SKILLS
Term/Semester	I
Course ID	26PGB111
Credits	3

Introduction:
The Advanced IT Skills course is designed to build strong analytical, technical, and decision-support capabilities among postgraduate management students by equipping them with industry-relevant tools and techniques. With a curriculum integrating advanced Excel modelling, strategic analytics, Power BI reporting, data-driven dashboard development, and state-of-the-art artificial intelligence applications, the course emphasizes hands-on proficiency and real-world business utility. Students learn to work with structured and unstructured data, perform predictive and diagnostic analytics, automate workflows, and design interactive visualizations that support managerial reasoning and performance evaluation.

Through exposure to advanced data modelling approaches, Monte Carlo simulations, DAX-based analytical logic, and AI-enabled forecasting and insight generation, learners develop the ability to translate data into strategic business solutions. The course further enhances decision-making skills by incorporating cutting-edge AI tools for research, productivity, visualization, and business intelligence. By the end of the programme, students acquire the technical depth and analytical confidence required to operate effectively in data-driven environments and contribute meaningfully to digital transformation initiatives across functional domains.

COURSE OUTCOMES (COS):
After successful completion of the course students will be able to:
CO1: Demonstrate proficiency in applying advanced Excel functions, statistical techniques, financial models, and automation tools to analyze complex datasets and support business decision-making.
CO2: Develop the capability to design, transform, and model data using Power Query, Power Pivot, and DAX to construct meaningful dashboards, predictive insights, and executive-level analytical reports.
CO3: Utilize Power BI to connect diverse data sources, build interactive visualizations, optimize reports, collaborate within workspaces, and communicate data insights effectively across organizational settings.
CO4: Apply advanced analytical techniques—including forecasting models, regression analysis, outlier detection, Monte Carlo simulations, and time-series methods—to evaluate business scenarios and derive actionable insights.
CO5: Integrate artificial intelligence tools and platforms to enhance business research, automate tasks, generate insights, develop visual and textual outputs, and support ethical, data-driven managerial decision-making.

COURSE CONTENT AND STRUCTURE **36 Hours**

Module 1: Advanced Excel for Business Analytics & Data Modelling **8 Hours**

- Analyze datasets using PivotTables, Pivot Charts, Grouping, Ungrouping, Calculated Fields, Calculated Items, Slicers, Timelines, PivotTable

Relationships
- Create and manage What-If Scenarios, Scenario Manager Summaries, Goal Seek Models, Data Tables (One-Variable, Two-Variable)
- Define, Edit, and Audit Named Ranges, Named Formulas, Dynamic Named Ranges
- Build interactive dashboards using Form Controls, Spin Buttons, Combo Boxes, Scroll Bars
- Conditional Formatting rules including Icon Sets, Data Bars, Color Scales, Custom Formulas
- Lookup and reference functions: MATCH, INDEX, OFFSET, VLOOKUP, HLOOKUP, XLOOKUP, XMATCH, INDIRECT, CHOOSE, ROW, COLUMN
- Dynamic array functions: FILTER, SORT, SORTBY, UNIQUE, SEQUENCE, RANDARRAY, WRAPROWS, WRAPCOLS
- SUMIFS, COUNTIFS, AVERAGEIFS for multi-criteria modelling
- Date and time formulas: EOMONTH, EDATE, NETWORKDAYS, WORKDAY, YEARFRAC, TODAY, NOW—applied for warranty tracking and after-sales service analytics
- Applied Financial Statement Modelling: Ratio Analysis, Trend Analysis, Sensitivity Analysis
- Financial forecasting using FORECAST, FORECAST.LINEAR, FORECAST.ETS, GROWTH, LOGEST, LINEST
- Descriptive Statistics, Histogram, Correlation, Rank, Percentile, Regression, ANOVA, Standard Error, Confidence Intervals, Moving Averages
- Use Macros and VBA for automation, dynamic reporting, iterative calculations, and workflow optimization

Module 2: Advanced Excel for Strategic Decision-Making & Predictive Insights **8 Hours**

- Power Query features: Extract, Transform, Load (ETL), Merge Queries, Append Queries, Unpivot Columns, Custom Columns, Data Type Conversions
- Power Pivot: Data Models, Relationships, Diagram View, Hierarchies, KPIs (Key Performance Indicators)
- Advanced DAX formulas: CALCULATE, FILTER, SUMX, AVERAGEX, RELATED, RELATEDTABLE, ALL, ALLEXCEPT, VALUES, EARLIER, SWITCH
- Star Schema and Snowflake Schema creation within Data Models
- Build interactive dashboards using Slicers, Timelines, Pivot Charts, Maps, KPI Indicators
- Apply Monte Carlo Simulation concepts using RAND, RANDBETWEEN, Data Tables
- Develop rolling forecasts and projections using dynamic array formulas and advanced charting
- Create executive summary dashboards integrating finance, supply chain, HR, and sales metrics
- Build advanced visualizations: Waterfall Charts, Funnel Charts, Box-and-Whisker Plots, Sparklines, Histogram Chart, Combo Charts, Pareto Charts
- Use advanced formatting tools: Custom Number Formatting, Conditional Chart Formatting, Data Labels with Formulas
- Automate Report Refresh using Power Query, Macros, and Scheduled Workbook Connections
- Regression models: Linear, Multiple, Logistic (conceptual), using Data Analysis ToolPak and LINEST
- Outlier detection using Z-Scores, IQR Method, Conditional Formatting
- Time series techniques: Moving Average, Exponential Smoothing, Seasonality

Detection
- Diagnostic techniques: Sensitivity Analysis, Break-Even Modelling, Contribution Analysis, What-If impact models

Module 3: Power BI Fundamentals, Data Connectivity & Visualization Development **6 Hours**

- Get Started with Power BI, Power BI Concepts Overview,
- Power BI Account Setup, Data Source Connectivity, SaaS Data Connections, CSV Import, Excel Workbook Integration,
- Sample Dataset Usage, Report Creation, Visualization Development,
- Visualization Formatting, Chart Visualizations, Text Visualizations, Map Visualizations, Gauge Visualizations, Slicer Visuals, Filter Visuals, Sorting Visuals,
- Copy and Paste Features, Custom Visuals, Visualization Arrangement, Report Layout Design, Power BI Portal Exploration

Module 4: Report Enhancement, Dashboard Creation, Collaboration, Data Modeling & DAX **8 Hours**

- Report Modification, Report Page Management, Page Renaming, Page Deletion, Report-Level Filters, Page-Level Filters, Visual Interaction Controls,
- Export to PowerPoint, Dashboard Creation, Dashboard Management, Pinning Tiles, Pinning Live Pages, Pinning Excel Elements, Managing Pinned Items,
- Quick Insights, Featured Dashboard Setup, Q&A Query Feature, Dataset Optimization for Q&A, Power BI Mobile Usage, Workspace Management, Report Sharing,
- Dashboard Sharing, Data Acquisition, Data Transformation, Table Relationships, Service–Desktop Report Export,
- DAX Functions (Date & Time, Time Intelligence, Filter, Information, Logical, Math & Trig, Parent-Child, Text)

Module 5: Artificial Intelligence Tools, Techniques & Functions for Business Decision-Making **6 Hours**

- Generative AI Platforms (ChatGPT, Gemini, Claude), Prompt Engineering Techniques, AI-Driven Market Research Tools (Glasp, Perplexity, Genei), AI Presentation Tools (Beautiful.ai, Tome, Gamma), AI Productivity Tools (Notion AI, Otter.ai, Fireflies),
- AI Email Assistants (Superhuman AI, Flowrite), AI Image Generation Tools (Midjourney, DALL·E, Adobe Firefly), AI Video Creation Tools (Synthesia, Pictory, Veed), AI Social Media Tools (Lately AI, Predis.ai, Jasper AI), AI Content Optimization Tools (Surfer SEO, Clear scope),
- AI Data Analytics Tools (ChatGPT Data Analyst Mode, Power BI AI Insights, Tableau Ask Data), Natural Language Querying, Auto-Generated Visuals, AI-Powered Forecasting Models, Anomaly Detection Algorithms, Sentiment Analysis, Text Classification, Clustering Techniques, Predictive Modeling Functions, Recommendation Systems,
- AI-Based Decision Support Systems, Ethical Use of AI, AI Governance, Data Privacy Considerations.

Pedagogy:

- Lab based learning/teaching
- Software linked practice-based teaching
- Project based learning
- Interaction with experts
- Case based teaching
- Class room discussion
- Master Class

Teaching Learning Resources:
Essential readings

- John Walkenbach. Excel 2016 Bible, Wiley Publishers, 1st Edition, ISBN-13: 978-1119067511
- Dick Kusleika and Michael Alexander. Excel 2016 Power Programming with VBA", Wiley, ISBN: 9781119067726
- Jordan Goldmeier. Advanced Excel Essentials, Apress publications, ISBN-13: 9781484207352.
- Brett Powell. Mastering Microsoft Power BI: Expert techniques for effective data analytics and business intelligence, Packt publisher, ISBN 13: 9781788297233
- Devin Knight, Brian Knight, Mitchell Pearson, Manuel Quintana. Microsoft Power BI Quick Start Guide: Build dashboards and visualizations to make your data come to life. Packt, ISBN 13: 978178138221

References

- Linda Foulkes- Learn Microsoft Office 2019: A comprehensive guide to getting started with Word, PowerPoint, Excel, Access, and Outlook (Packt Publishing Limited)
- Wayne, Winston (2014). Microsoft Excel 2013: Data Analysis and Business Modelling, Micro soft Press, Washington
- Daniil Maslyuk, Analysing and Visualizing Data by Using Microsoft Power BI 1st Edition, Microsoft, ISBN-13: 9780134857794
- Marco Russo & Alberto Ferrari, The Definitive Guide to DAX: Business Intelligence for Microsoft Power BI, SQL Server Analysis Services, and Excel Second Edition (Business Skills) 2nd Edition, Microsoft Press, ISBN-13: 978-1509306978
- Greg Harvey (2018). Excel 2019 All-in-One for Dummies, Wiley-VCH GmbH (1st edition), ISBN: 978-1119517948
- William Fisher (2016). Excel Quick Start Guide from Beginners to Expert, CreateSpace Independent Pub, ISBN-13:9781533137951
- Bill Jelen & Michael Alexander. Excel 2019: Pivot Table Data Crunching, Microsoft Press, 1st edition, ISBN-13: 978-1509307241
- Devin Knight, Brian Knight, Mitchell Pearson, Manuel Quintana. Microsoft Power BI Quick Start Guide: Build Dashboards and Visualizations to make your data to come to life, Packt Publishing, 1st

edition, ASIN: B07G38522Z

- Dr. Shirshendu Roy (2021). Data Visualization: Using Power BI, Orange and Excel, Notion Press, 1st edition, ISBN-13: 978-1638324997

Supplementary Resources

- https://docs.microsoft.com/en-us/power-bi/guided-learning/
- https://microsoftlearning.github.io/DA-100-Analyzing-Data-with-Power-BI/
- https://www.kaggle.com
- https://www.github.com
- https://www.myonlinetraininghub.com/microsoft-excel-online-training-syllabus
- https://excelexposure.com/
- https://corporatefinanceinstitute.com/resources/excel/study/basic-excel- formulas-beginners/
- https://www.rstudio.com/online-learning/
- https://hackr.io/tutorials/learn-r
- https://www.statmethods.net/r-tutorial/index.html
  https://www.tutorialspoint.com/r/index.htm

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	1	1	1	2	2	1	–
CO2	2	2	2	2	2	1	1	–
CO3	2	2	1	2	2	2	1	–
CO4	1	2	2	2	2	1	2	–
CO5	1	2	1	2	3	1	1	–

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University	Hours	Rating	Link
Everyday Excel, Part 1	University of Colorado Boulder	23 hours	4.7	https://www.coursera.org/learn/everyday-excel-part-1
Everyday Excel, Part 2	University of Colorado Boulder	21 hours	4.8	https://www.coursera.org/learn/everyday-excel-part-2
Mastering Data Analysis in Excel	Duke University	23 hours	4.2	https://www.coursera.org/learn/analytics-excel
Data Visualization with Advanced Excel	PwC	21 hours	4.8	https://www.coursera.org/learn/advanced-excel

Suggested Coursera Guided Projects:

Project Name	University /Institution	Instructor(s)
Power BI for Beginners: Interactive Dashboard Fundamentals	Coursera	Hussein EI Ghoul
Excel for Beginners: Beginner Functions	Coursera	Edward Falzon
Introduction to Data Analysis Using Microsoft Excel	Coursera	Paula Del Rey
Data Modeling with Power BI: Advanced DAX calculations	Coursera	Hussein EI Ghoul
Power BI for Beginners: Sales Data Exploration	Coursera	Ahmad Varasteh

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Internal Test	Individual	10	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group , Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester
6	Lab Journal	Individual	5	Full Semester

Course Title	QUANTITATIVE TECHNIQUES FOR DECISION MAKING
Term / Semester	I
Course ID	26PGB112
Credits	3

Introduction

Business Statistics introduces students to the role of data in modern decision-making and builds essential skills in statistical reasoning. The course enables learners to identify business problems, collect and analyse data, and interpret results using appropriate statistical tools. Emphasizing scientific inquiry, it helps students understand not just what statistics is, but how and why it is applied in real business contexts. With the growing use of predictive and prescriptive analytics, students also gain insights into how organizations use data, machine learning models, and forecasting techniques to optimize resources, improve performance, and make informed decisions. By the end of the course, learners will be equipped to apply data-driven approaches across various areas of business.

COURSE OUTCOMES (COs):

At the end of the course, students will be able to

CO1: Apply descriptive statistical measures to summarize, interpret, and present business data effectively.

CO2: Analyse relationships between variables using correlation, regression, and probability distributions for informed business decision-making.

CO3: Conduct hypothesis testing using parametric and non-parametric tests to draw valid statistical inferences.

CO4: Develop and optimize decision models using linear, non-linear, integer programming, transportation, assignment, and network analysis techniques.

CO5: Design and evaluate simulation models and multi-criteria decision-making frameworks to solve complex managerial problems

COURSE CONTENT AND STRUCTURE **36 Hours**

Module 1: Descriptive Statistics **5 Hours**

- Basic measures of central tendency: Mean; Median; Mode
- Basic measures of Dispersion: Range; Quartile Deviation; Mean Deviation; Standard Deviation; Partition values
- Skewness and Kurtosis

Module 2: Inferential Statistics **8 Hours**

- Correlation: -Introduction and significance of correlation
- Methods of correlation Analysis; Scatter diagram; Karl Pearson's coefficient of Correlation; Spearman's Rank Correlation, Concurrent deviation method
- Regression: Types; Simple Regression; Linear Regression
- Probability Distribution: Binomial; Poisson; Normal Distribution

Module 3: Testing of Hypothesis **12 Hours**

- Hypothesis Testing: Concept; Formulation of Hypotheses; Errors: Type I and II error
- Parametric tests: z-test; t-test; f-test; Chi-Square test; Analysis of Variance (ANOVA)

- Non-parametric tests - Sign test; Wilcoxon test; Mann-Whitney U test; Median test: Runtest; Kolmogorov –Smirnov one sample test.

Module 4: Prescriptive Analytics & Optimization 12 Hours

- Introduction to Mathematical/Optimization Models for Decision Making**:** Linear Programming – Marketing Mix, Capital Budgeting, Duality & Sensitivity Analysis, Budget Allocation, Scheduling,
- Non-Linear Programming – Pricing, Facility Location, Portfolio Selection;
- Integer & Mixed Integer Programming – Logical Constraints, Project Selection, Set Coverage
- Transportation and Assignment Models
- Network Analysis: CPM; PERT

Module 5: Simulation and Multi criteria Decision making 11 Hours

- Types; Application; Simulation Development Process – Conceptual Design, Input Analysis, Model Development Verification and Validation,
- Output Analysis & Experimentation for Decision Making; Probability Distribution and Random Number Generation; Procedure of Monte Carlo Simulation;
- Other types of Simulation – Discrete Event Simulation, Look ahead Simulation, Visual Interactive Simulation, Agent- Based Simulation.
- Type of Decisions – Choice Problem, Sorting Problem, Ranking Problem, Description Problem;
- Decision Analysis – Artificial Intelligence & Expert System for Decision Making; Decision Tree.

Pedagogy:

- Practice based teaching using Tora , SPSS and Excel Solver
- Classroom discussion
- Case based teaching
- Project based teaching
- Master Class

Teaching Learning Resources:
Essential Reading:

- SP Gupta, “Statistical Methods”, Sultan Chand & Sons, 46th Edition
- N D Vohra, “Business Statistics”, Tata McGraw Hill, 2nd Edition
- Levin & Rubin, “Statistics for Management”, Prentice-Hall, 8th Edition
- Prescriptive Analytics, The Final Frontier for Evidence Based Management and Optimal Decision Making. Dursun Delen. Pearson Education ISBN:978013439004
- Prescriptive Analytics: A Short Introduction to Counterintuitive Intelligence
- Simulating Business Process for Descriptive, Predictive and Prescriptive Analytics. Andrew Greasley. De Gruyter Publications ISBN: 9781547400690, 2019
- J.K. Sharma, Quantitative methods and operation research, Excel publication, 4th Edition

Reference Books

- Hamdy A Taha , Operation Research. Pearson publication. 9th edition.
- K.K Chawla, Vijay Gupta and Bhushan K Sharma, "OPERATIONS RESEARCH and Quantitative Analysis for Management, Kalyani Publishers, First Edition
- Keller/Arora, "BSTAT: A South-Asian Perspective", Cengage Learning, First Edition
- Statistics for Managers Using Microsoft Excel, 9th Edition, David M. Levine, Baruch College, Zicklin School of Business, City University of New York, Pearson

Supplementary reading

- https://www.thoughtworks.com/en-in/insights/blog/data-science-and-analytics/operations-research
- https://www.decisionanalyst.com/analytics/operationsresearch/
- https://www.invensislearning.com/blog/impact-of-artificial-intelligence-on-project-management/
- https://statmodeling.stat.columbia.edu/
- https://statisticsbyjim.com/
- https://simplystatistics.org/
- Pearson e- library; https://elibrary.in.pearson.com/bookshelfDashboard

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	-	1	-	-	1	-
CO2	3	1	-	-	-	-	-	-
CO3	1	3	-	2	2	1	-	-
CO4	1	2	-	2	1	-	-	-
CO5	3	3	-	2	1	1	2	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	Offered by	Instructor
Statistics and Data Analysis with Excel, Part 1	University of Colorado	Charlie Nuttleman
Inferential Statistics	Duke University	Mine Rundell
Statistical Analysis Fundamentals using Excel	IBM	Murtaza Haider
Operations Research (1): Models and Applications	National Taiwan University	Ling Cheih Kung

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group , Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	INTRODUCTION TO BUSINESS ANALYTICS,DATA WAREHOUSING AND DATA MINING
Term/Semester	1
Course ID	26PGB113
Credits	3

Introduction:

Data warehousing and data mining form the backbone of modern business analytics and decision support systems. With organizations generating high-volume, high-velocity data, managers increasingly rely on data warehouses, OLAP tools and data mining techniques to derive actionable insights.

This course introduces conceptual and practical aspects of data warehousing (including dimensional modeling and modern cloud DW platforms) and core data mining techniques such as classification, prediction, clustering and association analysis. Students will design simple data warehouse schemas, work with ETL concepts, and implement data mining workflows using tools such as WEKA and Python-based libraries. The course also highlights ethical, legal and societal issues in data mining and familiarizes students with recent trends such as text, web and multimedia mining.

Course Outcomes (COs):

Upon completion of this course, the students will be able to:

CO1: Explain fundamental concepts related to organisational data, analytical thinking, and data-driven decision-making.

CO2: Design and construct analytical data models that enable managers to view and interpret business information consistently

CO3: Apply data preparation methods and discover meaningful business patterns using automated analytical techniques

CO4: Build, evaluate, and interpret predictive and segmentation models using modern analytical tools for actionable managerial insights.

CO5: Evaluate emerging data technologies and appraise their ethical, social, and organisational implications.

Course content and Structure: (36 hours)

Module 1: Business Analytics, Data Warehousing, Business Analysis and OLAP 10 hours

- Meaning, scope, and evolution of Business Analytics
- Types of analytics: Descriptive, Predictive, Prescriptive
- Business Analytics Framework & Lifecycle (Data → Insights → Decisions)
- Applications of Business Analytics: Marketing, HR, Finance and Supply chain
- Data warehousing concepts and components.
- Dimensional modeling: facts, dimensions, star and snowflake schemas, hierarchies.
- OLAP: cubes, measures, operations (roll-up, drill-down, slice, dice,

pivot).
- OLTP vs. OLAP.
- Data warehouse architecture: Inmon vs. Kimball, MOLAP, ROLAP, HOLAP.
- Data warehouse lifecycle; requirement gathering; team roles.
- ETL concepts: extraction, transformation, loading; data quality and cleansing.
- Metadata and reporting tools; business intelligence applications

Module 2: Introduction Datamining using Orange 8 Hours

- **Download & install Orange** – open-source visual data mining and ML toolkit.
- **Understand Orange features** – Canvas (workflow builder), Widgets, Add-ons (Text Mining, Time Series, Association Rules, etc.).
- **Navigate key widget groups** – Data, Visualize, Model, Evaluate, Transform.
- **Learn supported file formats** – CSV, Excel, Tab files, and Orange workflow files (.ows).
- **Explore sample datasets** – Iris, Titanic, Housing, Zoo, Heart Disease, etc., available in the File widget.

Module 3: Introduction to Data Mining and Applications 4 Hours

- Introduction to Data Mining, Importance of Data Mining, Challenges in Data Mining, Data Mining functionalities
- Classification of Data mining systems, Data Mining architecture, Knowledge Discovery in Databases(KDD), CRISP- DM.
- Ethical issues in Data Mining and their Analysis; Global issues in Data Mining
- Data Mining Applications: Risk management and targeted marketing; Health Care Sector; Retail Sector; Financial Services and other sectors

Module 4: Data Mining Techniques: an Overview 10 Hours

- Classification and Prediction: Issues Regarding Classification and Prediction; Classification by Decision Tree Introduction; Bayesian Classification – Rule Based Classification; Classification by Back propagation; Support Vector Machines; Associative Classification; Lazy Learners; Other Classification Methods; Prediction; Accuracy and Error Measures; Evaluating the Accuracy of a Classifier or Predictor; Model Section.
- Cluster Analysis: - Types of Data in Cluster Analysis; A Categorization of Major Clustering Methods; Partitioning Methods; Hierarchical methods; Density-Based Methods; Grid- Based Methods; Model-Based Clustering Methods; Clustering High-Dimensional Data; Constraint-Based Cluster Analysis; Outlier Analysis.

Module 5: Emerging Trends 4 Hours

- Cloud Data Warehouses: Amazon Redshift, Azure Synapse, Google Big Query, Snowflake.
- Big data warehousing and Lakehouse concepts.
- Unstructured data and its use cases: Social Media Analytics, Recommendation Systems
- Text mining, sentiment analysis basics; web mining.
- Process mining, AutoML, explainable AI.

Pedagogy:

- Classroom discussion
- Case based teaching (Text and Multimedia)
- Project based teaching
- Practice based learning
- Software linked Practice based Teaching
- Industry expert interaction
- Master class

Teaching Learning Resources:

Essential readings-

- M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education, ISBN : 978-8177587852
- Ralph Kimball and Margy Ross, "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling", (Third Edition). John Wiley and Sons, ISBN : 978-1118530801
- J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufman, 3/E, 2011, ISBN: 978-0-12-381479-1.
- Vaisman, Alejandro; Zimanyi, Esteban, "Data Warehouse Systems", Springer, 2022, ISBN : 978-3-642-54655-6
- Paulraj Ponniah, ―Data Warehousing: Fundamentals for IT Professionals‖, Wiley India, ISBN
- : 0-471-41254-6
- Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann 3rd edition, ISBN : 978-0-12-381479-1
- Reema Theraja ―Data warehousing‖, Oxford University Press, ISBN : 978-0195699616
- Introduction to data mining by Tan, Steinbach & Kumar, ISBN : 978-0133128901
- Instant Weka : How to , Bostjan Kaluza, Packt Publishing Limited

References-

- Vaisman, Alejandro; Zimanyi, Esteban, "Data Warehouse Systems", Springer, 2022, ISBN : 978-3-642-54655-6
- Golfarelli, Matteo; Rizzi, Stefano, "Data Warehouse Design : modern principles and methodologies", McGraw Hill, 2009, ISBN : 978-0071610391
- Jensen, Christian S; Pedersen, Torben Bach; Thomsen, Christian W, Morgan & Claypool, "Multidimensional Databases and Data warehousing", cop. 2010, ISBN : 9781608456017
- Kimball, Ralph, "The Data warehouse lifecycle toolkit: expert methods for designing, developing, and deploying data warehouses", John Wiley & Sons, 2nd Edition published 2008, ISBN : 0471255475
- Alex Berson, StephenJ. Smith, "Data Warehousing, Data Mining, and OLAP", MGH, 1998. ISBN : 0-201-177-676
- Learn By Examples – A Quick Guide to Data Mining with RapidmIner and Weka, Eric Goh, SVBook Pte. Ltd.

Supplementary Resources

Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory and Impartus – LCS

- https://nptel.ac.in/courses/106/105/106105174/
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation
- Decision Trees (Source: Tan, MSU) Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- https://www.cs.waikato.ac.nz
- https://jgateplus.com
- https://search.ebscohost.com
- https://www.guru99.com
- https://www.javapoint.com
- https://www.kaggle.com
- https://www.github.com
- Coursera course on "Data Warehousing for Business Intelligence Specialization" by Michael Mannino and Jahangir Karimi offered by the University of Colorado System
- Coursera course on "Data Mining" by John C. Hart offered by the University of Illinois at Urbana-Champaign
- https://elibrary.in.pearson.com

CO PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	3	3	1	2	3	1	1	-
CO2	2	2	2	2	3	1	1	-
CO3	2	3	2	2	3	1	1	-
CO4	3	3	3	2	3	2	1	-
CO5	2	3	2	2	3	2	2	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	**University / Institution**	**Instructor(s)**
Data Warehousing for Business Intelligence Specialization	University of Colorado System	Michael Mannino, Jahangir Karimi
Data Mining Specialization	University of Illinois at Urbana-Champaign	John C. Hart
Machine Learning Foundations: A Case Study Approach	University of Washington	Emily Fox, Carlos Guestrin

Suggested Guided projects

Project Name	University / Institution	Instructor(s)
Building Classification Models using WEKA	Coursera Project Network	Ammar Jawad
Customer Segmentation using K-Means Clustering in Python	Coursera Project Network	Radhika Yadav
Market Basket Analysis using Apriori Algorithm	Coursera Project Network	Omar Elgabry
Predicting Customer Churn Using Machine Learning	Coursera Project Network	Harshit Srivastava
Introduction to Data Warehousing with Big Query	Google Cloud	Google Cloud Training

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	SEE End Term Exam Theory Practical	Individual	50 25 25	At the end of the semester
CIA				
2	Class Test 1 – Theory Class Test 2 - Practical	Individual	10 10	After completion of 3 modules After completion of 5 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity): 05 Capstone project : 10	Individual	25	Full Semester

Course Title	DATABASE MANAGEMENT USING MYSQL
Term/Semester	III
Course ID	26PGB114
Credits	3

Introduction:

This course is designed to provide MBA students with a structured and comprehensive understanding of relational database management, with a focus on MySQL as a widely adopted industry-standard platform. The course emphasizes the theoretical foundations of database systems while integrating practical, application-oriented learning relevant to contemporary business environments. Students will be introduced to core database concepts, data models, relational structures, and normalization techniques essential for ensuring data integrity and efficient database design. Through systematic engagement with SQL, learners will develop proficiency in Data Definition, Manipulation, Control, and Transaction operations required for managing organizational data.

The course further enhances analytical and technical skills by enabling students to construct complex queries, apply constraints, perform joins and subqueries, and implement optimization strategies to support effective data retrieval. Advanced SQL programming components such as stored procedures, triggers, functions, and views are included to strengthen learners' ability to automate business processes and enforce robust data governance. Practical exercises, case-based learning, and experiential sessions using MySQL Workbench expose students to real-world applications including backup, recovery, and integration of MySQL with analytics tools. By the end of the course, students will be equipped to design and manage database solutions that support evidence-based decision-making, align with industry practices, and contribute to organizational efficiency and data-driven managerial competencies.

Course Outcomes (COs):

On successful completion of the course, the students will be able to:

CO1: Understand the fundamentals and architecture of relational database systems.
CO2: Apply SQL commands for creating, modifying, and querying databases in MySQL.
CO3: Implement advanced SQL features such as joins, subqueries, functions, and transactions.
CO4: Design and normalize relational databases to ensure data integrity and efficiency.
CO5: Develop and execute stored procedures, triggers, and views for business problem-solving

Course Content and Structure **36 Hours**

Module 1: Introduction to Databases and MySQL **8 Hours**

- Overview of Database Systems – Data, Information, Database Concepts
- Introduction to MySQL – Installation, MySQL Workbench Overview

- Database Design and ER Diagrams
- Data Models and Normalization (1NF, 2NF, 3NF, BCNF)
- Creating and Managing Databases in MySQL

Module 1: Introduction to Databases and MySQL **8 Hours**

- Overview of Database Systems – Data, Information, Database Concepts
- Introduction to MySQL – Installation, MySQL Workbench Overview
- Database Design and ER Diagrams
- Data Models and Normalization (1NF, 2NF, 3NF, BCNF)
- Creating and Managing Databases in MySQL

Module 2: SQL Fundamentals **8 Hours**

- Introduction to SQL – Syntax and Structure
- Data Definition Language (DDL): CREATE, ALTER, DROP, RENAME, TRUNCATE
- Data Manipulation Language (DML): SELECT, INSERT, UPDATE, DELETE
- Data Control Language (DCL): GRANT, REVOKE
- Transaction Control Language (TCL): COMMIT, ROLLBACK, SAVEPOINT

Module 3: SQL Queries and Constraints **8 Hours**

- Constraints: PRIMARY KEY, FOREIGN KEY, UNIQUE, CHECK, DEFAULT
- Operators and Functions: Arithmetic, Logical, Aggregate, and String Functions
- Joins: INNER, LEFT, RIGHT, FULL, CROSS JOIN
- Subqueries and Nested Queries
- Set Operations: UNION, INTERSECT, MINUS

Module 4: Advanced SQL Programming **6 Hours**

- Stored Procedures and Functions
- Triggers and Views
- Cursors and Exception Handling
- PL/SQL Programming – Blocks, Control Structures, Loops
- Introduction to NoSQL and MongoDB

Module 5: Practical Applications and Case Studies **6 Hours**

- Business Case Studies using MySQL
- Data Import/Export and Backup
- Query Optimization and Performance Tuning
- Integration of MySQL with Analytics Tools (e.g., Python, Power BI)

Pedagogy:

- Classroom Demonstrations
- Practice-Based Learning
- Activity and Case-Based Learning
- Lab Exercises using MySQL Workbench
- Project-Based Learning and Mini Projects
- Experiential Learning through Business Scenarios
- Master class

Teaching and Learning Resources:

Essential Readings:

- Elmasri, R., & Navathe, S. (2015). Fundamentals of Database Systems. Pearson Education.
- Silberschatz, A., Korth, H. F., & Sudarshan, S. (2020). Database System Concepts. McGraw Hill.
- Ben Forta (2020). SQL in 10 Minutes, Sams Teach Yourself. Pearson Education.
- Alan Beaulieu. (2020). Learning SQL: Generate, Manipulate, and Retrieve Data (3rd Edition). O'Reilly Media.
- Coronel, C., & Morris, S. (2019). Database Systems: Design, Implementation, and Management (13th Edition). Cengage Learning.

Reference Books:

- Coronel, C., & Morris, S. (2019). Database Systems: Design, Implementation, and Management. Cengage Learning.
- Alan Beaulieu (2021). Learning SQL: Generate, Manipulate, and Retrieve Data. O'Reilly Media.
- Steven Feuerstein & Bill Pribyl. (2021). Oracle PL/SQL Programming (6th Edition). O'Reilly Media.
- Rick F. van der Lans. (2020). SQL for Data Management and Analytics (Latest Edition). Addison-Wesley.
- Paul DuBois. (2013). MySQL (5th Edition). Addison-Wesley Professional.
- Kristina Chodorow. (2019). MongoDB: The Definitive Guide (3rd Edition). O'Reilly Media.
- Markus Winand. (2021). SQL Performance Explained (Updated Edition). Markus Winand Publications.
- Shashank Tiwari. (2020). Professional NoSQL. Wiley/Wrox Publications.

Supplementary Readings:

- https://www.w3schools.com/mysql/
- https://www.geeksforgeeks.org/sql-tutorial/
- https://www.tutorialspoint.com/mysql/
- https://leetcode.com/problemset/database/
- https://dev.mysql.com/doc/

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	2	3	-	2	3	2	1	-
CO2	1	3	-	2	3	3	1	-
CO3	1	3	-	2	3	3	1	-
CO4	2	3	–	2	3	3	1	-
CO5	1	2	-	2	3	3	1	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Managing Big Data with MySQL	Duke University	Daniel Egger, Jana Schaich Borg
SQL for Data Science	University of California, Davis	Sadie St. Lawrence
Databases and SQL for Data Science with Python	IBM Skills Network	Rav Ahuja, Hima Vasudevan

Suggested Coursera Guided Projects:

Project Name	University / Institution	Instructor(s)
Querying Databases with MySQL	Coursera Project Network	Charles Russell Severance
MySQL Basics for Data Analysts	Coursera Project Network	Andres Amir
MySQL: Data Cleaning, Filtering & Sorting	Coursera Project Network	Rhyme Instructor Team
Creating and Managing Tables in MySQL	Coursera Project Network	Rhyme Instructor Team
Writing Advanced SQL Queries in MySQL	Coursera Project Network	Amrinder Singh

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	SEE Lab Journal : 10 marks Viva-Voce : 10 marks Section A : Attempt one question out of two questions – 15 marks Section B : Attempt one question out of two questions – 15 marks	Individual	50	At the end of the semester

CIA				
2	Class Test : 10 Marks Preparatory exam : 10 Marks	Individual	20	After completion of 3 modules All modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity) : 05 Capstone project : 10	Individual	25	Full Semester

Course Title	PREDICTIVE ANALYTICS USING R
Term/Semester	I
Course ID	26PGB115
Credits	4

Introduction:

The global data ecosystem is undergoing unprecedented expansion, driven by rapid advancements in digital technologies, the widespread proliferation of IoT devices, the intensification of social media usage, and the ever-increasing digitization of organisational processes. In 2025, global data generation is projected to reach approximately 182 zettabytes, reflecting the accelerating pace of data creation. Despite substantial investments in data acquisition, a significant portion of this data remains under-utilized due to inadequate analytical frameworks or insufficient capacity for advanced analysis. The imperative of data analysis lies in its ability to transform raw information into actionable insights, thereby enabling informed, evidence-based predictions about future trends and outcomes. In this context, predictive analytics has emerged as a critical domain, deploying historical datasets to build models that inform strategic and operational decision-making.

This course is designed to provide students with a rigorous, systematic understanding of predictive analytics, integrating theoretical constructs with applied analytical practice. It develops proficiency in key modelling techniques, analytical tools, and computational methods essential for contemporary data-driven tasks. A foundational background in statistical modelling is recommended to ensure effective engagement with the course content. Through structured laboratory work, guided projects, and experiential learning components, students will apply predictive analytics concepts to complex, real-world datasets, thereby reinforcing both conceptual understanding and technical competence. Upon completion, learners will demonstrate the ability to apply predictive methodologies, interpret model outcomes, and contribute effectively to data-informed managerial, research and policy-oriented decision-making contexts. This course thus strengthens analytical capabilities, aligns with industry expectations, and supports the attainment of programme outcomes related to critical thinking, problem-solving and the application of modern IT tools.

Course Outcomes (COs):

On successful completion of the course, the students will be able to:

CO1: Prepare and visualize data effectively using R and also enables them to gain meaningful insights and communicate their findings

CO2: Perform a range of descriptive and inferential statistical analysis using R and make informed decisions

CO3: Develop predictive and classification models for various applications using supervised machine learning

CO4: Explore various patterns and structures in data and gain valuable insights for various applications using unsupervised machine learning

CO5: Explain the fundamental concepts of deep learning and neural networks and describe their applications in modern machine learning contexts

Course content and Structure: **(48 hours)**

Module 1: Data Pre-processing & Visualization **10 Hours**

- Introduction to Predictive Analytics and its applications
- Introduction and Installation of R
- Organizing and processing data with R
- Generating of normal distribution data, data cleaning (Load data by specifying formats for different columns exclusively to help with formatting while loading data itself.)
- Data split & Data merging
- Missing values, Outlier treatment, Pre-processing and cleaning.
- Data visualization – bar chart, line chart, pie chart, scatter plots, histograms and box plots

Module 2: Descriptive and Inferential Statistics **10 Hours**

- Introduction to Descriptive and Inferential statistics
- Exploratory Data Analysis – Univariate and Multivariate analysis
- Descriptive statistics: Mean, Median, Mode, Dispersion, Skewness, Kurtosis
- Inferential statistics: t-test, z-test, ANOVA, F test, Chi-square test
- Pearson Coefficient of Correlation
- Principal Component Analysis and Factor Analysis

Module 3: Supervised Machine Learning **10 Hours**

- Introduction to Supervised Machine Learning & its Applications
- Linear & Multiple Regression
- Logistic Regression
- Decision Tree
- Support Vector Machine
- Time Series Analysis (single, multiple, long and short) and trend analysis

Module 4: Unsupervised Machine Learning **10 Hours**

- Introduction to Unsupervised machine learning & its applications
- Clustering : K means and Hierarchical
- Association Algorithm

Module 5: Introduction to Deep Learning **8 Hours**

- Introduction to NLP and Gen AI Tools
- Introduction to Deep Learning & its Applications
- Neural Networks and its Types

Pedagogy:

- Classroom Discussions
- Activity Based Learning
- Practice-Based Learning
- Project-Based Learning
- Experiential Learning
- Software-Based Learning – Python
- Master class

Teaching Learning Resources:

Essential readings-

- Jeffrey S. Strickland. Predictive Analytics Using R. Simulation Educators, 2014.

- Evans, J. R. Business Analytics: Methods, Models, and Decisions. Pearson Education, 3rd Edition, 2021.
- Robert Stine & Dean Foster. Statistics for Business: Decision Making and Analysis. Pearson Education, 2nd Edition, 2013
- Robert Kabacoff. R in Action: Data Analysis and Graphics with R. Manning Publications, 3rd Edition, 2021.
- Umesh R. Hodeghatta and Umesha Nayak. Business Analytics Using R: A Practical Approach. A press, 2016

Reference Books

- Subhashini Sharma Tripathi. Learn Business Analytics in Six Steps Using SAS and R. A press, 2016.
- Wickham, H., Çetinkaya-Rundel, M., & Grolemund, G. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. O'Reilly Media, 2nd Edition, 2023.
- Cotton, R. (2013). Learning R: A Step-by-Step Function Guide to Data Analysis 1st Edition [Kindle Version]. Retrieved from http://www.amazon.in.
- Knell, R. (2013) Introductory R: A Beginner's Guide to Data Visualization,
- Statistical Analysis and Programming in R. [Kindle Version]. Retrieved from http://www.amazon.in. Murray, S. (2013) Learn R in a Day. [Kindle Version]. Retrieved from http://www.amazon.in.

Supplementary Readings:

- NPTEL Course: https://onlinecourses.swayam2.ac.in/aic20_sp35
- Coursera Course: https://www.coursera.org/learn/jhu-getting-started-data-viz-r
- https://www.coursera.org/specializations/data-science-foundations-r
- Data Sources: Kaggle: https://www.kaggle.com/
- Data world: https://data.world/,
- Data.gov.in: https://data.gov.in/
- Databases: EBSCO: https://www.ebsco.com/academic-libraries,
- JGATE: https://jgateplus.com
- Pearson E library: https://elibrary.in.pearson.com

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	1	1	2	0	1	0
CO2	2	3	1	1	2	0	1	0
CO3	1	2	3	2	2	1	1	0
CO4	1	2	2	2	2	1	1	0
CO5	1	1	2	2	2	1	1	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Data Science: Foundations using R	Johns Hopkins University	Jeff Leek, Roger D. Peng, Brian Caffo
Advanced R Programming	Johns Hopkins University	Roger D. Peng
Machine Learning with R	IBM (IBM Skills Network)	Romeo Kienzler

Suggested Coursera Guided Projects

Project Name	University / Institution	Instructor(s)
Predictive Analytics for Business with H2O in R	Coursera Project Network	Snehan Kekre
Data Analysis in R: Predictive Analysis with Regression	Coursera Project Network	Arimoro Olayinka Imisioluwa
Building Statistical Models in R: Linear Regression	Coursera Project Network	Arimoro Olayinka Imisioluwa
Decision Tree Classifier for Beginners in R	Coursera Project Network	Arimoro Olayinka Imisioluwa
Forecast Bike-Share Demand Using Time Series Models in R	Coursera Project Network	Arimoro Olayinka Imisioluwa

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	**SEE** **Lab Journal :** 10 marks **Viva-Voce :** 10 marks **Section A :** Attempt **one** question out of **two** questions – 15 marks **Section B :** Attempt **one** question out of **two** questions – 15 marks	Individual	50	At the end of the semester
CIA				
2	Class Test : 10 Marks Preparatory exam : 10 Marks	Individual	20	After completion of 3 modules

				All modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity) : 05 Capstone project : 10	Individual	25	Full Semester

Course Title	GENERATIVE ARTIFICIAL INTELLIGENCE & PROMPT ENGINEERING
Term/Semester	I
Course ID	26PGB116
Credits	3

Introduction:

Generative AI is transforming how businesses think, create, and operate. This course introduces MBA students to the world of GenAI — not through code, but through creativity and strategy. You'll explore how tools like ChatGPT, DALL·E, and Midjourney are shaping marketing, HR, finance, operations and entrepreneurship. By the end of the course, students will not only understand what GenAI is but also how to use it responsibly and effectively to make smarter business decisions.

Course Outcomes (COs):
On successful completion of the course, students will be able to:

CO1: Understand the fundamentals and business relevance of Generative AI.
CO2: Identify opportunities for GenAI across various business domains.
CO3: Develop smart prompts and workflows for productivity.
CO4: Critically analyze the ethical and societal implications of AI use.
CO5: Create integrated digital solutions by applying generative AI tools to address academic and industry-oriented requirements.

Course content and Structure: **(36 hours)**

Module 1: Introduction to Generative AI **4 Hours**

- What makes AI "generative"?
- Gen AI architecture
- Introduction to LLMS
- How models like GPT, Gemini, and Midjourney work (in simple terms).
- From prediction to creativity: the shift in AI's role.
- Real-world stories: how companies use GenAI for innovation and efficiency.

Module 2: Generative AI in Business **8 Hours**

- Marketing: Content creation, customer personalization, campaign generation.
- Finance: Forecasting, report automation, scenario modeling.
- HR: Resume screening, employee engagement, learning content generation.
- Operations: Process optimization, generative design, and planning.
- Mini-Exercise: Design a small AI-driven marketing campaign or HR workflow.

Module 3: Tools, Prompts, and Practice **6 Hours**

- Understanding prompt engineering — the art of asking AI the right way.
- Hands-on experience with ChatGPT, Gemini, Midjourney, and RunwayML.
- Enhancing productivity: using AI in Excel, PowerPoint, and CRM tools.
- Exploring low-code and no-code AI platforms.

Module 4: Ethics, Risk, and Responsible AI **4 Hours**

- The double-edged sword: creativity vs. misinformation.
- Bias, plagiarism, and data privacy — what every manager should know.
- India's AI ethics framework and global AI regulations.
- The future of work: how GenAI complements, not replaces, human intelligence.

Module 5: Applications of GenAI Tools **14 Hours**

- Video Creation Using Generative AI:InVideo, Synthesia, Runway
- Research Using AI: Elicit, Scite, ChatGPT, Research Rabbit, Semantic Scholar
- Designing Using AI: Canva AI, Adobe Firefly, Figma AI
- Image Creation Using AI: Midjourney, DALLE.3, Leonardo AI, Night Cafe
- Analysis Using AI & Text Generation Using AI: ChatGPT, Excel Copilot, Power BI Copilot, RapidMiner AI

Pedagogy:

- Practice-based teaching using GenAI tools like ChatGPT, Gemini, Midjourney, and Hugging Face.
- Classroom discussions to encourage critical thinking on AI concepts and applications.
- Case-based teaching using real business examples of GenAI adoption.
- Project-based learning through mini-projects and a GenAI business solution.
- Master classes and industry expert interactions for practical industry insights.

Teaching Learning Resources:

Essential readings-

- Josep Babcock, Raghav Bali. Generative AI with Python and Tensor Flow2. Packt publisher, 2021, 1st edition.
- Ben Auffarth, Leonid Kuligin. Generative AI with Lang Chain. Packt second edition, 2025.
- Practice-oriented GenAI Tools (ChatGPT, Gemini, Copilot, Claude): Core platforms for learning prompt engineering, automation, and business use-cases.
- DALL·E, Midjourney & RunwayML: Creative GenAI tools for marketing design, content generation, and multimodal business solutions.
- Hugging Face Models & Spaces: Hands-on resources for NLP, sentiment analysis, computer vision, and deepfake awareness.
- Responsible AI Frameworks (India AI, EU AI Act, OECD Guidelines): Key references for ethics, governance, bias, and safe GenAI deployment.
- Industry Blogs & Reports (McKinsey, Deloitte, PwC on GenAI): Updated insights on real-world GenAI adoption across HR, finance, marketing, and operations.

Reference Books:

- Dr. K Vanitha Sidambaranathan, Dr R Srividhya, Dr. P Edith Linda, Dr. Lince Rachel Varghes. Generative AI: Foundations, Models, and Applications. Published by NC Publishers. ISBN:9788198636072

- Irena Cronin. Understanding Generative AI Business Applications. Published by A press. 2024 SpringerLink
- Amit Bahree. Generative AI in Action. published by Manning Publications, ISBN: 9781633436947, 2024. Manning Publications
- Research article "Transforming Business with Generative AI: Research, Innovation, Market Deployment and Future Shifts in Business Models" — presents analysis of how GenAI reshapes business models, operations, and competitive dynamics.
- Article "Responsible Generative AI Use by Product Managers: Recoupling Ethical Principles and Practices" — useful for understanding real-world ethical, governance, and organizational challenges of GenAI deployment.

Supplementary resources-

https://ai.google.dev
https://platform.openai.com/docs
https://huggingface.co/learn
https://deepmind.google/technologies/gemini
https://www.deeplearning.ai/courses

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	-	2	1	-	1	-
CO2	2	2	-	3	3	-	1	-
CO3	1	1	-	2	2	-	1	-
CO4	3	2	-	2	1	-	1	3
CO5	2	2	1	3	3	-	1	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University Offered	Course Instructor
AI foundations for Everyone Specialization	IBM	Rav Ahuja Antonio Cangiano
Generative AI for Growth Marketing	IBM & Starweaver	Starweaver
Introduction to AI	IBM	Rav Ahuja
Generative AI for Business Intelligence – Analysts Specialization	IBM & Skillup	Skillup Rav Ahuja Antonio Cangiano Vibhuti Bharadwaj
Generative AI for Business Analyst	IBM	SkillUp Filipe Martins Rav Ahuja Antonio Cangiano

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid – Term Test	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments (Quiz, Individual assignment, Cap-Stone project, Major or minor project, Group assignments etc.)	Individual	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	CREATIVITY AND DESIGN THINKING FOR BUSINESS
Term/Semester	I
Course ID	26PGB117
Credits	1

Introduction:

Design thinking is an essential problem-solving methodology that fosters creativity and innovation. It emphasizes a deep understanding of users' needs and experiences, recognizing that these continually evolve. As a solution-oriented approach, design thinking helps uncover new opportunities, challenge existing assumptions, and inspire innovative products and services. By combining analytical reasoning with imaginative exploration, it enables organizations to craft human-centered, action-driven solutions to complex business challenges.

A richer understanding of users' expectations and pain points ultimately drives greater value creation. This user-centric philosophy lies at the heart of design thinking and contributes to enhanced products, services, and internal processes. This course equips learners to develop user-focused design solutions that directly address customer challenges while aligning with business objectives.

COURSE OUTCOME (CO):

On completion of the course students will be able to:

CO1: Understand the design thinking framework and construct an effective empathy map.

CO2: Define problems by accurately identifying and interpreting user pain points.

CO3: Evaluate and select the most suitable ideas that address user needs.

CO4: Develop prototypes informed by insights gathered from all relevant stakeholders.

CO5: Test, validate, and refine proof-of-concept solutions based on user feedback.

COURSE CONTENT AND STRUCTURE 12 Hours

Module1: Introduction To Design Thinking, Empathy Mapping (2 Hours)

- Introduction to design thinking approach, Identify the customer journey.
- Map the customer journey to understand customer's experiences with product / service.
- Develop persona(s) of your target customers (CPM).
- Usage of AI-driven sentiment analysis tools (e.g., Monkey Learn, ChatGPT, IBM Watson) to identify user emotions and behaviors; apply AI-based journey mapping platforms to visualize customer touchpoints.

Module 2: Problem Mapping (2 Hours)

- Problem statement or underlying issue and possible solution options.
- Define customer profile and needs by using ethnographic research methods (interviews and observations).
- Pinpoint target users and design interview questionnaires to understand customer pain points.
- Leverage AI-powered text and voice analytics to extract user insights; use

predictive analytics to identify latent user needs; employ NLP tools for automated transcription and keyword clustering.

Module 3: Ideate And Synthesise Solution (03 Hours)

- Brainstorm ideas to explore solutions that will help customers meet their needs
- Identify desirable features of solutions and cluster ideas, select high-quality solution ideas that can be prototyped, discussion of Indian companies using design thinking
- Apply generative AI tools (e.g., ChatGPT, DALL·E, Miro AI, Idea note AI) to enhance brainstorming; use machine learning to evaluate idea feasibility and user acceptance.

Module 4: Prototype And Experiment (03 Hours)

- Design a prototype for the selected idea to enable a conversation with the stakeholders
- Derive insights from user-prototype interactions with all stakeholder feedback. Rectify flaws, address constraints and enhance strengths.
- Discuss the importance of accepting of failing quickly and cheaply. Improvise and restart.
- Usage of AI-enabled prototyping platforms (e.g., Figma AI, Uizard, Adobe Firefly) to build and refine designs; apply AI simulation tools to test user interaction before deployment, 3D Printing for Prototypes.

Module 5: Validate And Refine (02 Hours)

- Refine prototype and solutions based on feedback from target users to better fit with user needs
- Test and refine point of concept (POC)
- Describe the applications of complementary tools of innovation: Value Proposition Designer, Business Model Canvas.
- Employ AI-based usability testing (e.g., Maze AI, Hotjar AI) to gather real-time user feedback.

Pedagogy

- MOOC driven learning
- Workshop by Experts
- Experiential Learning
- Expert Video Lecture
- Use of Templates to learn Concepts and Models
- Case Studies/Simulations

Teaching Learning Resources:

Essential Readings

- Design: Creation of Artifacts in Society by Prof. Karl Ulrich, U. Penn Change by Design by Tim Brown.
- The Design of Everyday Things: Revised and Expanded, Norman, Don. Edition. United States, Basic Books, 2013.
- Design Thinking: Understanding How Designers Think and Work, 1st edition, Pearson
- Handbook on Design Thinking –Eli Woolery, Free book.
- Elements of User Experience: User-Centered Design for the Web and Beyond, Second Edition Jesse James Garrett

- 8 Steps to Innovation –T. Krishnan Rishikesha, Harper Collins Publishers India.

Supplementary Resource:
https://www.ibedo.org/
https://blog.hypeinnovation.com/

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	0	1	2	1	1	0
CO2	2	2	1	2	2	1	1	1
CO3	2	2	1	2	2	2	1	1
CO4	1	2	1	2	2	2	1	1
CO5	1	2	1	2	2	2	1	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Sl. No.	Course Title	University / Platform	Instructor
1	Design Thinking for Innovation	University of Virginia (Coursera)	Jeanne M. Liedtka
2	Design Thinking for the Greater Good: Innovation in the Social Sector	University of Virginia (Coursera)	Jeanne M. Liedtka
3	Design Thinking – A Primer	IIT Madras (SWAYAM)	IIT Madras Faculty

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1.	**SEE** MOOC -Completion of MOOC on Design Thinking	Individual	25	On Course Completion by End of Second Sem.
2.	**SEE** Quiz on Design Thinking	Individual	25	On Course Completion by End of Second Sem.
3.	**CIA** Attendance and Class Participation in Two Day Workshop	Individual	15	Through the course and workshop
4.	Team Presentations	Team Presentation	15	For all the five modules
5.	Submit written report on the learning's from the two day workshop on Design thinking	Team Report	20	Report submission for the learning from the two day Workshop

Course Title	PROFESSIONAL COMMUNICATION & EMPLOYABILITY SKILLS
Term/Semester	I
Course ID	26PGB118
Credits	2

Introduction:

Effective communication and employability skills are essential competencies for academic success and professional readiness. This course is designed to strengthen learner's ability to express ideas clearly, interact confidently in diverse settings, and adapt to the communication demands of modern workplaces. It brings together key elements of verbal and nonverbal communication, interpersonal effectiveness, and digital communication, analytical problem-solving and career preparation. The course also focuses on career development through resume building, personal branding, digital portfolios and interview readiness. Aptitude and reasoning components further enhance student's analytical thinking and problem solving capabilities, which are critical for competitive assessments and workplace decision-making. By the end of the course, learners will be equipped with the communication skills, professional behaviour and analytical abilities required to present themselves effectively, participate meaningfully in organizational environments and pursue career opportunities with confidence.

Course Outcomes (COs):

After completion of this course, students will be able to;

CO1: Explain the principles of effective communication and apply verbal, nonverbal, listening and reading strategies to engage in professional interactions.

CO2: Demonstrate interpersonal skills through teamwork, collaboration, time management and negotiation, while practicing professional and business etiquettes.

CO3: Develop a structured career plan by creating digital portfolios, resumes, and personal branding materials and utilizing job search tools and platforms effectively.

CO4: Solve aptitude-based and analytical problems by interpreting quantitative and logical reasoning tasks relevant to workplace assessments

CO5: Participate effectively in group discussions and perform confidently in interview by adopting appropriate strategies for handling stress, presenting ideas and responding to complex questions.

Course content and Structure: **(24 hours)**

Module 1: Foundations, Verbal, and Listening Excellence **4 hours**

- Introduction to Communication. Active and Empathetic Listening. Verbal and Nonverbal Communication. Articulation and Pronunciation. Reading and Critical Reading. Business Letters, Email Drafting, Content Writing. Social Media Writing Skills, Email / Social Media Etiquettes). Conversational Skills, Debate, Public Speaking

Module 2: Interpersonal, Professionalism and Negotiation **3 hours**

- Time management. Collaboration. Team building and leadership. Giving &

Receiving Constructive Feedback (SBI Model). Negotiation Skills. Business Etiquettes (Meeting Etiquettes, Behavioural Event Interview - STAR Approach,

Module 3: Career Development & Personal Branding 4 hours

- Goal Setting
- Career Exploration & Job Search Tools/Methods
- Digital Portfolio Building
- Personal Branding
- Personal Value Proposition
- AI-Aided Resume Writing
- LinkedIn Profile Management
- Video Resumes

Module 4: Aptitude & Problem-Solving Skills 8 hours

- Number and letter series, Ratio and Proportion, Blood Relation, Direction, Ages, Percentages, Profit and Loss, Coding Decoding, Partnership, Time and work (Concept and Basic Problems, advanced level Problems)
- Syllogism, HCF/LCM, Calendars, Permutation/Combination, Data Sufficiency, Probability, Focus on Data Interpretation and Visual Reasoning.

Module 5: Interview & Group Discussion Skills 5 hours

- GD Approaches for Complex/Abstract Topics
- Common GD errors
- Interview Skills: Types of Interviews, Interview etiquette
- Handling Stress and Tricky Questions in Interviews
- Post Interview Follow-Up

Pedagogy:

- Interactive Activity-based classes
- Simulations
- Case studies
- Workshops
- Competitions/Contests
- Student Practice sessions
- Workbooks
- Experts talk
- Outbound Training
- Interaction with professional trainers

Teaching Learning Resources:

- Coursera course- Improving Communication Skills, University of Pennsylvania (Wharton)-10 hours.
- Business Writing – University of Colorado, Boulder. 10 hours.

Essential readings-

- Business Communication Essentials: Fundamental Skills for the Mobile-Digital-Social Workplace Courtland L. Bovée and John V. Thill (Pearson, Latest Edition)
- Charles Duhigg, Super communicators: How to Unlock the Secret Language

of Connection, Random House (U.S.) / Penguin (U.K.), 2024
- Chris Fenning,The First Minute: How to Start Conversations That Get Results, Chris Fenning. 2023
- Designing Your Life by Bill Burnett and Dave Evans, Knopf, Illustrated edition, 2016.
- Development of Life Skills and Professional Practice, 2014, Vikas Publication, Shalini Verma

References-

- Business Communication: Concepts, Cases and Applications by Meenakshi Raman and Prakash Singh, Oxford University Press (Latest Edition)
- Executive Presence: The Missing Link Between Merit and Success by Shital Kakkar Mehra HarperCollins Publishers India Pvt Limited (Latest Edition)

Supplementary Resources

- http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15
- http://www.colostate.edu/Depts/Speech/rccs/theory44.html
- BBC, Grammarly, Hello Talk, Slack, Base Camp,Wordmaya.
- https://onlinecourses.swayam2.ac.in/imb19_mg14/preview.
- https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-hs18/

Suggested Apps:

Thinking about your life, Pocket, Trello.

MOOs:

- https://www.mooc4dev.org/lifeskills1 (IIT Kanpur)
- https://youtu.be/KxxKrei5evM (Swayam12 week)
- https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-hs18/

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	2	2	0	1	1	1	2	1
CO2	2	2	0	2	1	3	2	2
CO3	2	1	1	1	3	2	2	1
CO4	2	3	2	2	1	1	2	1
C05	2	1	1	1	2	2	1	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Course Evaluation Plan:

CIA			
Sl. No.	**Evaluation Item**	**Unit of Evaluation**	**Marks Allotted**
1	Competitions on communication (Speaking and Presentation)	Individual	15
2	Aptitude Test, Comprehension Test	Individual	20
3	Personal Branding - video	Individual	10
4	Attendance & class participation	Individual	5

SEE

Sl. No.	**Evaluation Item**	**Unit of Evaluation**	**Marks Allotted**	**Timeline**
1	Aptitude & Writing Skill	Individual	30	At the end of semester
2	Speaking and presentation skills	Individual	20	At the end of semester

Course Title	OPEN ELECTIVE - I
Term/Semester	I
Course ID	26PGB311
Credits	1

Course Outcome:

On successful completion of the course, students will be able to:
CO1: Understand and articulate the nuances of the selected course

Guidelines:

The open electives are offered to students to provide them with a wide range of opportunities to enhance their knowledge. The students are given a chance to choose from a wide range (8000) of MOOCs offered by Coursera, NPTEL, SWAYAM, etc., and enroll themselves.

Open Elective:

Students have to complete 2 MOOC's during the I Semester based on their interest and submit the certificate. The duration of the course should be for a minimum of 6-8 weeks or at least 24 hours. The students are encouraged to choose any course from Liberal Arts/Humanities so as to conform to NEP guidelines. Students are encouraged to choose courses related to Business Analytics, Data Science, Artificial Intelligence or other emerging digital domains to align with the program's learning outcomes and NEP guidelines. After completion of the course, students have to submit the completion certificate. This will ensure eligibility for the students to complete the semester successfully.

Presentation Rubric:

Criteria	Poor	Average	Good
Coverage of Subject Matter 10	(1-4) The topic was not fully covered or material presented was inaccurate; inability to distinguish between fact and opinion; student did not have a good understanding of the topic	(5-7) The topic was covered in an appropriate depth with few or no factual errors or misinterpretations; fact and opinion were distinguished; student had a good understanding of the topic	(8-10) The topic was fully covered; no factual errors or misinterpretations were included; fact and opinion were distinguished and used appropriately; student demonstrated expertise or a clear understanding of the topic
	(1-0)	(2-3)	(4-5)

Introduction 5	Student failed to introduce topic or self appropriately; purpose of presentation unclear to audience	Student introduced topic, purpose, and self	Student introduced topic, purpose, and self along with an effective attention-getter

Organization of content flow 5	Cannot understand presentation because of poor organization; introduction is not clear/matched to the rest of the content. The presentation is not clear	Satisfactory organization of content; clear introduction; main points are well stated, even if some transitions are somewhat sudden; relation to the rest of the content is clear	Very well organized content; builds on and provides support for the rest of content of the presentation; main points well stated and argued, with each leading to the next point Of the talk.
Conclusion 5	Abrupt ending; no summary or wrap up; failure to provide references (if needed)	General summary or wrap up; speech was brought to a comfortable conclusion; appropriate referencing	Main points were reinforced or take-away messages restated; speech was brought to a purposeful conclusion; appropriate referencing

Viva Voce

Criteria	**Poor**	**Average**	**Good**
Delivery 10	(1-4) Mumble, incorrectly pronounce important content of the presentation. Only reading from the slides	(5-7) The voice is low and incorrectly pronounce terms during the presentation. Reading from slides frequently.	(8-10) Clear voice and correct, precise pronunciation of terms during the presentation. Only referring to the slides while explaining.
Q &A 10	Student did not invite questions or comments or did not handle them appropriately Not able to answer	Student invited questions and comments and answered or responded Vague answers	Student invited questions and comments and was able to answer or engage in a discussion Crisp to-the-point answers
	(0-1)	(2-3)	(4-5)

Depth of understanding 5	Poor understanding of the relevance of the course	Fair understanding of the relevance of the course	Good understanding of the relevance of the course

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	2	0	1	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Evaluation Plan:
Students are required to complete the course and take up the assessment at the end of the course.

Sl. No.		Evaluation Item	Marks Allotted
1	**Internal Marks (50)**	Presentation on the learnings from the course	25
2		Viva Voce	25
3	**External Marks (50)**	Final course assessment score and submission of the certificate to the mentor	50

Course Title	OPEN ELECTIVE - II
Term/Semester	I
Course ID	26PGB312
Credits	1

Course Outcome:

On successful completion of the course, students will be able to:
CO1: Understand and articulate the nuances of the selected course

Guidelines:

The open electives are offered to students to provide them with a wide range of opportunities to enhance their knowledge. The students are given a chance to choose from a wide range (8000) of MOOCs offered by Coursera, NPTEL, SWAYAM, etc., and enroll themselves.

Open Elective:

Students have to complete 2 MOOC's during the I Semester based on their interest and submit the certificate. The duration of the course should be for a minimum of 6-8 weeks or at least 24 hours. The students are encouraged to choose any course from Liberal Arts/Humanities so as to conform to NEP guidelines. Students are encouraged to choose courses related to Business Analytics, Data Science, Artificial Intelligence or other emerging digital domains to align with the program's learning outcomes and NEP guidelines. After completion of the course, students have to submit the completion certificate. This will ensure eligibility for the students to complete the semester successfully.

Presentation Rubric:

Criteria	Poor	Average	Good
Coverage of Subject Matter 10	(1-4) The topic was not fully covered or material presented was inaccurate; inability to distinguish between fact and opinion; student did not have a good understanding of the topic	(5-7) The topic was covered in an appropriate depth with few or no factual errors or misinterpretations; fact and opinion were distinguished; student had a good understanding of the topic	(8-10) The topic was fully covered; no factual errors or misinterpretations were included; fact and opinion were distinguished and used appropriately; student demonstrated expertise or a clear understanding of the topic
	(1-0)	(2-3)	(4-5)

Introduction 5	Student failed to introduce topic or self appropriately; purpose of presentation unclear to audience	Student introduced topic, purpose, and self	Student introduced topic, purpose, and self along with an effective attention-getter

Organization of content flow 5	Cannot understand presentation because of poor organization; introduction is not clear/matched to the rest of the content. The presentation is not clear	Satisfactory organization of content; clear introduction; main points are well stated, even if some transitions are somewhat sudden; relation to the rest of the content is clear	Very well organized content; builds on and provides support for the rest of content of the presentation; main points well stated and argued, with each leading to the next point Of the talk.
Conclusion 5	Abrupt ending; no summary or wrap up; failure to provide references (if needed)	General summary or wrap up; speech was brought to a comfortable conclusion; appropriate referencing	Main points were reinforced or take-away messages restated; speech was brought to a purposeful conclusion; appropriate referencing

Viva Voce

Criteria	**Poor**	**Average**	**Good**
Delivery 10	(1-4) Mumble, incorrectly pronounce important content of the presentation. Only reading from the slides	(5-7) The voice is low and incorrectly pronounce terms during the presentation. Reading from slides frequently.	(8-10) Clear voice and correct, precise pronunciation of terms during the presentation. Only referring to the slides while explaining.
Q &A 10	Student did not invite questions or comments or did not handle them appropriately Not able to answer	Student invited questions and comments and answered or responded Vague answers	Student invited questions and comments and was able to answer or engage in a discussion Crisp to-the-point answers
	(0-1)	(2-3)	(4-5)

Depth of understanding 5	Poor understanding of the relevance of the course	Fair understanding of the relevance of the course	Good understanding of the relevance of the course

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	2	0	1	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Evaluation Plan:
Students are required to complete the course and take up the assessment at the end of the course.

Sl. No.		Evaluation Item	Marks Allotted
1	**Internal Marks (50)**	Presentation on the learnings from the course	25
2		Viva Voce	25
3	**External Marks (50)**	Final course assessment score and submission of the certificate to the mentor	50

Second Semester Course Matrix

SUBJECT CODE		NAME OF THE COURSE	CREIDTS	MAXIMUM MARKS		TOTAL
				CIA	SEE	
26PGB121	EC2	Entrepreneurship and Start Up Management	02	50	50	100
26PGB122	SE5	Machine Learning Using Python	04	50	50	100
26PGB123	SE6	Econometrics for Decision Making	03	50	50	100
26PGB124	CC4	Emerging Technologies	03	50	50	100
26PGB125	CC5	Deep Learning and Natural Language Processing	03	50	50	100
26PGB126	CC6	Big Data Analytics	03	50	50	100
26PGB127	SE7	Data Visualization and Story Telling Using Tableau	03	50	50	100
26PGB323	OE3	Open Elective – III (MOOCs) (20-30 hrs.)	01	50	50	100
26PGB324	OE4	Open Elective – IV (MOOCs) (20-30 hrs.)	01	50	50	100
FUNCTIONAL ELECTIVES (Any one)						
26PGB221	FE1	AI and Financial Analytics	03	50	50	100
26PGB222	FE2	AI and HR Analytics				
26PGB223	FE3	Marketing & Retail Analytics				
26PGB224	FE4	SCM Technology & Analytics				
	PROJECT					
26PGB421		REAL WORLD CAPSTONE PROJECT	04	50	50	100
	TOTAL		**30**	**550**	**550**	**1100**

Course Title	ENTREPRENEURSHIP AND STARTUP MANAGEMENT
Term / Semester	II
Course ID	26PGB121
Credits	3

Introduction:

This course provides a comprehensive understanding of the entrepreneurial journey from idea conception to business growth and sustainability, focusing on both theoretical foundations and practical applications. It introduces learners to the core principles of entrepreneurship, innovation, and digital transformation essential for success in the modern business environment. The syllabus covers the entire entrepreneurial lifecycle — from identifying and testing business ideas, developing products, and building viable business models and plans, to understanding funding mechanisms and the ecosystem that supports startups. Through a blend of conceptual learning, case studies, and exposure to AI-driven tools such as Pitchbob.io, Growexa, Ideamap, and Notegpt, students gain hands-on experience in applying technology to entrepreneurship. Additionally, the course emphasizes the importance of understanding legal structures, institutional support systems, and government initiatives that facilitate entrepreneurial growth in India. By the end of the course, learners will be equipped with the skills, knowledge, and strategic perspective needed to ideate, plan, launch, and scale sustainable startups in a dynamic global economy.

Course Outcomes (COs):

After learning the course, the students should be able to

CO1: Understand the entrepreneurial process, types of entrepreneurships, and the application of digital and strategic skills essential for innovation and business growth.

CO2: Analyze and evaluate business ideas through idea generation, prototyping, and feasibility testing, integrating AI tools to enhance early-stage decision-making.

CO3: Design and develop a Minimum Viable Product (MVP) using Agile and Lean Startup methods, and apply strategies for scaling, funding, and investor engagement.

CO4: Create and evaluate a comprehensive business model and plan, incorporating financial, marketing, HR, and production aspects while leveraging AI tools and understanding legal obligations.

CO5: Examine and analyze the entrepreneurial ecosystem, identifying key support systems, funding sources, and institutional frameworks that drive sustainable startup growth.

Course Content and Structure: **(24 hours)**

Module 1: Entrepreneurship and Innovation **(06 Hours)**

- Introduction- Entrepreneurial Process; Entrepreneur Lifecycle; Entrepreneurship types- Clarence Danfoe classification, MSMEs, Social Entrepreneurship, Intrapreneurship, Other types; Success and Failures (Biographies). Effectuation Theory;
- Entrepreneurial Traits and Competencies; Entrepreneurship- Digital Skills, Data Analysis and Decision making, strategic digital marketing, cybersecurity awareness, ecommerce and online sales, agile adoption and lifelong learning

Module 2: Entrepreneurial Stages- Idea Generation, Prototyping and Feasibility Testing (06 Hours)

- Idea generation stages, Various methods of idea generation -Idea testing and Prototyping - Prototyping; IPR- importance; process.
- Identification of Business Opportunities; Evaluation of Business Opportunities, Feasibility Analysis- Market Entry Strategies; Marketing Feasibility; Financial Feasibility; Economic Feasibility; Social and Legal Feasibilities; Technical Feasibility; Managerial Feasibility, Location and Other Utilities Feasibility.
- Viability of Business- total addressable market (TAM), serviceable addressable market (SAM), and serviceable obtainable market (SOM).
- AI for idea generation and feasibility analysis- Ideamap, JIRA; mind mapping

Module 3: Product Development and Entrepreneurial Planning (5 Hours)

- Product Development and Minimum Viable Product (MVP): Product development methodologies (Agile, Lean Startup, etc.), building an MVP and iterative development.
- Business model – Meaning, designing, analysing and improving;
- Business Plan – Meaning; Scope and Need; Financial; Marketing; Human Resource; and Production/Service Plan. Content of Business Plan, Business plan Formats- Project report preparation and presentation; Common pitfalls of Business Plan;
- Enterprise AI- Pitchbob.io
-

Module 4: Scaling and funding of Entrepreneurship (04 Hours)

- Sources of startup funding (bootstrapping, angel investors, venture capital, etc.), Pitching and presenting to investors, Valuation and terms of investment, and budgeting for startups.
- Business forms and legal obligations in India to start a business
-

Module 5: Eco- System Supporting Growth of Entrepreneurship (03 Hours)

- Concept and structure of the startup ecosystem
- Exploring the roles of incubators, accelerators, support mechanisms provided by national and state-level institutions- SIDBI, NABARD, DIC, EDI, and CEDOK; Initiatives- Start-up India, Stand-up India, Make in India, and MUDRA.

Pedagogy

- Experiential Learning
- AI and Digital Tool Integration
- MOOC Courses – Coursera
- Field Visits to atleast on incubator and tinkering lab
- Case Based Learning

Recommended Books

- Entrepreneurship and Small Business Management, Mariotti and Glackin, 2nd Edition (Latest Available), Pearson Publication.

- Entrepreneurship – 11th Edition (Latest), Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Tata McGraw Hill Education Pvt. Ltd.
- New Business Ventures and the Entrepreneur – 6th Edition (Latest Available), Stevenson, Roberts, Groves, Irwin–McGraw Hill.
- New Venture Creation: Entrepreneurship for the 21st Century, 10th Edition (Latest), Jeffry A. Timmons, Stephen Spinelli, Tata McGraw Hill, 2019.
- Entrepreneurship Development and Small Business Enterprises, Poornima M. Charantimath, 5th Edition (Latest Available), Dorling Kindersley (India) Pvt. Ltd.
- Business Ethics: Ethical Decision Making and Cases, O.C. Ferrell, John Fraedrich, Linda Ferrell, 6th Edition (Latest India Edition Available), Houghton Mifflin Co., USA.
- Effectuation – Latest Edition (2022), Saras Sarasvathy, Edward Elgar Publishing.
- 8 Steps to Innovation – Latest Edition (2013), Rishikesha T. Krishnan and Vinay Dabholkar, Collins Publications.
- Entrepreneurship: Successfully Launching New Ventures, Bruce R. Barringer, R. Duane Ireland, 6th Edition (Latest, 2019), Pearson.
- Managing Start-ups for Success: Entrepreneurship in Difficult Times, Rajat Kanti Baisya, 1st Edition (2021/2022 Latest), Routledge.
- Venture Capital Investing, David Gladstone, 1st Edition (Latest, 2003), FT Press.
- Be a Startup Superstar: Ignite Your Career Working at a Tech Startup, Steven Kahan, 1st Edition (Latest), Wiley.

Reference Books (Latest Editions)

- Effectual Entrepreneurship (3rd Ed): This is the 3rd Edition (2025) of the work by Saras Sarasvathy & Glen Wheatley. Taylor & Francis+2Routledge+2
- Entrepreneurship: Successfully Launching New Ventures (7th Ed): Latest 7th edition of Bruce R. Barringer & R. Duane Ireland published by Pearson. VitalSource+1
- Entrepreneurship: Successfully Launching New Ventures (Global 7th Ed): Global edition variant of the above.
- Entrepreneurship: Successfully Launching New Ventures (Global 7th Ed, alternate): Another listing/format of the same edition.
- Entrepreneurship: New Venture Creation: A specialist text on new venture creation (useful alongside core textbooks).
- Entrepreneurship – Hisrich/Peters/Shepherd (12th Ed): The listing shows a 12th Edition of the Robert D. Hisrich / Michael P. Peters / Dean A. Shepherd text. blackwells.co.uk
- Entrepreneurship – New Age Publishers (Latest): A regional/new-age publisher version (for Indian market) capturing up-to-date regional content.
- Entrepreneurship – Hisrich/Peters/Shepherd (eBook): Digital e-Book format of the Hisrich et al text.

Supplementary Resources:

- Entrepreneurship: Do Your Venture; https://onlinecourses.swayam2.ac.in/imb19_mg03/preview

- Identifying Entrepreneurial Opportunities; https://www.classcentral.com/course/edx-identifying-entrepreneurial-opportunities-12828
- Start-up: How to Build a Successful Business?; https://www.coursera.org/learn/startup-english
- Journal of Small Business; https://www.tandfonline.com/
- JEB – Journal of Entrepreneurship and Business; https://jeb.umk.edu.my/
- Pearson eLibrary; https://elibrary.in.pearson.com/login
- J-Gate Plus; https://jgateplus.com/home/

CO PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	2	3	2	2	1	-	-	2
CO2	2	1	3	-	-	-	-	-
CO3	2	3	3	1	3	3	1	-
CO4	3	3	2	-	1	2	-	1
CO5	3	3	-	-	1	1	-	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Recommended Courses

SL No	**Course**	**Platform**	**Duration / Hours**	**University**	**Instructors**
1	Entrepreneurship	Indian Institute of Technology Madras (IIT Madras) via SWAYAM	12 weeks (15 modules) (NPTEL Online Courses)	IIT Madras	Prof. C. Bhaktavatsala Rao (NPTEL Online Courses)
2	Entrepreneurship in Emerging Economies	Harvard Business School via edX	~3-5 hours/week (self-paced) (Harvard University)	Harvard University	Prof. Tarun Khanna (Harvard University)

Course Evaluation Plan

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group , Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	MACHINE LEARING USING PYTHON
Term/Semester	II
Course ID	26PGB122
Credits	4

Introduction:

Machine learning refers to a set of popular methods and algorithms used for analyzing data and creating models. Business decision making is modern times is heavily dependent on machine learning and managers require to know the basics of machine learning so that they can analyze and make sense of the reports and data presented to them. Python is an arguably the most popular programming language that is used to solve machine learning problems. In this course, we introduce different machine learning algorithms and then create models on different datasets. The students will learn how to read different types of data (structured and unstructured) from different sources (excel or csv files), summarize the data, clean the data, select which model to build and finally build and analyze the built model.

Course Outcomes (COs):

On successfully completion of the course, the students will be able to:

CO1: Understand different categories of machine learning methods and evaluate the performance and suitability of predictive models.

CO2: Apply appropriate supervised learning techniques to build, interpret, and validate models based on the nature of the data and problem

CO3: Perform dimensionality reduction, identify underlying data patterns, and group similar observations using unsupervised learning approaches.

CO4: Detect meaningful associations within datasets, extract insights from text, and analyze sentiment and linguistic patterns for deeper interpretation.

CO5: Explain the foundational components of advanced neural models and apply suitable time-based analytical approaches for forecasting and volatility assessment.

Course Content and Structure: (48 hours)

Module 1: Introduction to Machine learning and Python 8 hours

- Recap of Python – Reading data from files, data summary generation, cleaning of data, libraries: NumPy, Pandas, Matplotlib & Seaborn
- Scaling & normalization: Minmax, Standard Scaler, Z-scores
- Basics – Hypothesis testing, different plots - Construction and their usage
- Types of Machine learning – Classification of three major types of machine learning (supervised, unsupervised and reinforcement)
- Evaluation of machine learning models: – Accuracy, Precision, Recall, ROC Curve and contingency matrix
- Basic difference between classification and regression problems – applications to different industries
- Types of Dependent and independent variables, different types of data, concept of bias and variance

Module 2: Supervised Learning Algorithms 10 hours

- Linear Regression (Single and Multiple)
- Logistic Regression
- Naïve Bayes method

- Decision Tree
- Random Forest
- Applications of supervised learning methods for business decision making

Module 3: Unsupervised Learning Methods **8 hours**

- Concept of unstructured data
- Clustering – K-Means, Hierarchical Clustering
- Hyper parameter tuning
- Dimensionality Reduction – PCA and Common Factor Analysis
- Applications of unsupervised methods for business decision making

Module 4: Association Mining and Text Mining **10 hours**

- Introduction to association mining
- Market Basket Analysis (Apriori Algorithm)
- Introduction to Text Mining – Definitions of Document, Corpus, Dictionary
- Basic text operations – Tokenization, lemmatization and removal of stop words
- Sentiment Score Calculation and part of speech identification
- TF-IDF calculation

Module 5: Neural Network and Time Series Analysis **12 hours**

- Introduction to neural network
- Theoretical background of Basic neural network types
- Implementation of Vanilla neural network using Dense layer
- Concept of time series data and volatility
- Time series analysis using python and its applications (only theory)

Pedagogy:

- Case based teaching
- Classroom discussion
- Activity based teaching
- Talk by the industry experts
- Software based learning – Python
- Master class

Teaching Learning Resources:

Essential Readings

- Machine learning using Python, Manaranjan Pradhan and U Dinesh Kumar, Wiley.
- Machine Learning using Python – A practical guide, Binit Patel, Blue Rose Publishers.

References Books

- Introduction to Machine learning using Python – A guide for data scientists, Andreas C Miller and Sarah Guido, O'Reilly

Supplementary resources-

- https://www.kaggle.com/
- https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data- science-python-scratch-2/
- https://www.w3schools.com/python/python_ml_getting_started.asp
- https://scikit-learn.org/stable/user_guide.html
- https://scikit-learn.org/stable/modules/decomposition.html

- http://rasbt.github.io/mlxtend/user_guide/frequent_patterns/apriori/
- https://www.nltk.org/book/
- https://scikit-learn.org/stable/modules/feature_extraction.html#text-feature-extraction
- https://github.com/cjhutto/vaderSentiment
- https://keras.io/guides/
- https://www.statsmodels.org/stable/tsa.html
- https://arch.readthedocs.io/en/latest/

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	3	2	2	1	0	2	0
CO2	2	3	3	2	2	0	2	0
CO3	1	3	2	2	2	0	2	0
CO4	2	3	2	2	1	0	2	1
CO5	1	2	3	3	2	0	2	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No Contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Machine Learning with Python	IBM Skills Network	Rav Ahuja, Saeed Aghabozorgi
Applied Machine Learning in Python	University of Michigan	Kevyn Collins-Thompson
Applied Text Mining in Python	University of Michigan	V.G. Vinod Vydiswaran

Suggested Guided Projects:

Project Name	University / Institution	Instructor(s)
Machine Learning with Python: Linear Regression Model	Coursera Project Network	Rhyme Instructor Team
Classification with Python: Build a Logistic Model	Coursera Project Network	Rhyme Instructor Team
Image Classification with Python: Building a CNN	Coursera Project Network	Amrinder Singh
Predictive Modelling with Python	Coursera Project Network	Rhyme Instructor Team

K-Means Clustering with Python for Data Science	Coursera Project Network	Rhyme Instructor Team

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	**SEE** **Lab Journal :** 10 marks **Viva-Voce :** 10 marks **Section A :** Attempt **one** question out of **two** questions – 15 marks **Section B :** Attempt **one** question out of **two** questions – 15 marks	Individual	50	At the end of the semester
CIA				
2	Class Test : 10 Marks Preparatory exam : 10 Marks	Individual	20	After completion of 3 modules All modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project (Class room activity) : 05 Capstone project : 10	Individual	25	Full Semester

Course Title	ECONOMETRICS FOR DECISION MAKING
Term/Semester	II
Course ID	26PGB123
Credits	3

Introduction

This course offers a structured, practical exploration of time series analysis, beginning with the fundamentals of forecasting and progressing to advanced statistical, machine learning, and deep learning methods. Students are introduced to the core behaviour of time-dependent data, including trend, seasonality, and autocorrelation, and learn how these characteristics influence forecasting methods in business, finance, and operations. As the course advances, learners examine both univariate and multivariate time series models, gaining the ability to test for stationarity, estimate stochastic processes, and interpret dynamic relationships across multiple variables. The curriculum further extends into modern forecasting practices where machine learning models and hybrid techniques are applied to real business problems such as marketing campaign prediction and financial market volatility. The final part of the course focuses on the growing role of AI in time series modelling. Students work with deep learning architectures, transformer-based forecasting, anomaly detection techniques, and reinforcement learning concepts used in strategic decision-making. By the end of the course, learners will be prepared to build, evaluate, and implement forecasting models that support data-driven decision-making in diverse industry settings.

COURSE OUTCOME:

On successful completion of the course, the students will be able to:

CO1: Identify and explain the components, types and basic forecasting techniques used in time series analysis

CO2: Apply stationarity tests and stochastic modelling techniques to analyze and transform univariate time series data.

CO3: Analyze multivariate relationships to interpret dynamic interactions among variables.

CO4: Construct, evaluate and compare advanced ML forecasting models and hybrid volatility models for real-world business and financial applications.

CO5: Design and develop AI-driven forecasting models for complex time series problems.

Course Content and Structure: 36 Hours

Module 1: Introduction to Time Series Analysis & Forecasting 4 Hours

- Time Series Analysis: definition, components and types of time series data
- Forecasting: need, importance, types of forecasting, applications in business, finance and operations
- Basic Forecasting Techniques: moving average and its types, exponential smoothing and its types, Lasso and Ridge regressions

Module 2: Univariate Stationarity and Stochastic Modeling 6 Hours

- Characteristics of Time Series data: mean, auto covariance and autocorrelation
- Stationarity & Unit Root Test: need and types (ADF and PP test)
- Stochastic time series models & its types

Module 3: Multivariate Time Series Analysis 5 Hours

- Multivariate Time Series: need and applications from business and economics
- VAR models
- Granger Causality
- Impulse Response Function

Module 4: Advanced ML for Time Series Forecasting and Volatility Modeling 11 hours

- Stock market volatility prediction using LSTM-GARCH hybrid
- Marketing Campaign forecasting Using Prophet
- ML in time series forecasting: SVM, GAM, RVM, CUBIST, BayesGLM, and Gradient Boosting

Module 5: Applications of AI in Advanced Time Series Modelling 10 Hours

- Deep Learning Networks: LSTM
- Transformer models for long range forecasting
- Hybrid forecasting ARIMA/AI models
- AI-driven anomaly detection
- AI-based probabilistic forecasting
- Reinforcement learning: Algorithmic trading

Pedagogy:

- Classroom Discussions
- Activity Based Learning
- Practice-Based Learning
- Project-Based Learning
- Experiential Learning
- Software-Based Learning – Python
- Master class

Teaching Learning Resources:

Essential readings-

- Thomopouls, N.T (1980): Applied Forecasting Methods. Engle Wood Cliffs, N.J, Prentice Hall.
- Wheel Wishart, S.C; and S. Makridaks (1980): Forecasting Methods for Management III edition, New York. John Wiley.
- Sullivan, William G. and Wayne Claycambe. W (1977): Fundamentals of Forecasting. Prentice Hall. Virginia.
- Gupta. S.C and V.K. Kapoor (1995): Fundamentals of Applied Statistics, Sulthan & Chand Sons. New Delhi.
- Bovas, Abraham and Johannes Ledolter (1983): Statistical Methods for Forecasting, John Wiley & Sons. New York.

Reference Books

- Box, G.E.P and Jenkins, G.M (1976): Time Series Analysis Forecasting and Control, Holden Day, San Francisco.
- Anderson, T.W (1971): The Statistical Analysis of Time Series, John Wiley,

New York.
- Markidakis, S Steven C. Wheel Wright and Victor E. Mcgee (1983): Forecasting: Methods and Applications, 2nd Edition, New York, John Wiley & Sons.
- Damodar Gujarati, Basic Econometrics, New York, McGraw Hill
- Jan Tinbergen: Econometrics, London: Routledge
- Henri Theil: Introduction to Econometrics, Prentice Hall, New Delhi
- Marno Verbeek: Guide to Modern Econometrics, John Wiley, London
- P G Apte: Textbook of Econometrics, Tata McGraw Hill, New Delhi
- Hashem M Mesaran, Peter Schmidit: Handbook of Applied Econometrics - Micro Economics, Volume 13, Massachusetts
- Ragnar Frisch: Econometrics in the World of Today, OSLO: Institute of Economics
- Dennis J Aigner: Basics of Econometrics, Prentice Hall, New Jersey

Supplementary Readings:

- NPTEL Course: https://onlinecourses.swayam2.ac.in/aic20_sp35
- Coursera Course: https://www.coursera.org/learn/jhu-getting-started-data-viz-r
- https://www.coursera.org/specializations/data-science-foundations-r
- Data Sources: Kaggle: https://www.kaggle.com/
- Data world: https://data.world/,
- Data.gov.in: https://data.gov.in/
- Databases: EBSCO: https://www.ebsco.com/academic-libraries,
- JGATE: https://jgateplus.com
- Pearson E library: https://elibrary.in.pearson.com

CO-PO Mapping:
Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	1	1	2	1	1	1
CO2	2	3	3	3	2	-	2	-
CO3	3	3	3	3	3	-	2	-
CO4	2	3	3	3	3	1	3	-
CO5	2	3	3	3	3	1	3	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Time Series Mastery: Forecasting with ETS, ARIMA, Python	Coursera	Diogo Resende Starweaver
Analyzing Time Series and Sequential Data Specialization	SAS	Danny Modlin Jay Laramore

		Marc Huber Chip Wells Ari Zitin
Econometrics: Methods and Applications	Erasmus University Rotterdam	Francine Gresnight, Dennis Fok, Michel van der Wel, Erik Kole, Markus Mueller, Christiaan Heij, Wendum Wang, Dick van Dijk, Philip Hans Franses and Myrthe van Dieijen
Specialized Models: Time Series and Survival Analysis	IBM	Mark J Grover Miguel Maldonado
Univariate Time Series Analytics & Modelling with EViews	EDUCBA	EDUCBA

Suggested Guided Projects

Project Name	**University / Institution**	**Instructor(s)**
Apply and Predict: Time Series Forecasting	EDUCBA	EDUCBA
Time Series Mastery: Forecasting with ETS, ARIMA Using Python	Coursera	Diogo Resende
Practical Time Series Analysis	The State University of New York	Tural Sadigov William Thistleton
Analyzing Time Series and Sequential Data	SAS	Danny Modlin

Course Evaluation Plan:

Sl. No.	**Evaluation Item**	**Unit of Evaluation**	**Marks Allotted**	**Timeline**
1	SEE Lab Journal : 10 marks Viva-Voce : 10 marks Section A : Attempt one question out of two questions – 15 marks	Individual	50	At the end of the semester

	Section B : Attempt one question out of two questions – 15 marks			
CIA				
2	Class Test : 10 Marks Preparatory exam : 10 Marks	Individual	20	After completion of 3 modules All modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity) : 05 Capstone project :10	Individual	25	Full Semester

Course Title	EMERGING TECHNOLOGIES
Term/Semester	II
Course ID	26PGB124
Credits	3

Introduction:

This course provides a foundational understanding of key emerging technologies shaping the modern business landscape. It explores how technological innovations evolve, are adopted by organizations, and transform industries through digitalization, automation, and intelligent systems. Students will gain both conceptual clarity and practical awareness of technologies such as Cloud Computing, IIoT, AI, Blockchain, VR/AR, Sensors, Actuators, Digital Twin, Drones, 3D Printing and Cybersecurity.

Course Outcomes (COs):
On successful completion of the course, the students will be able to:

CO1: Understand the foundations, capabilities, and evolution of Generative AI in modern business environments.
CO2: Analyze how GenAI-driven digital transformation influences organizational processes, strategy, and decision-making.
CO3: Explore practical applications of GenAI across domains such as marketing, operations, HR, finance, and customer experience.
CO4: Evaluate the ethical, legal, privacy, and security considerations related to deploying GenAI solutions.
CO5: Examine real-world case studies to assess how organizations leverage GenAI for innovation, automation, and competitive advantage.

Course content and Structure: (36 hours)

Module 1: Overview of Basic Principles of Emerging Technologies 6 Hours

- Introduction to IT Risk; Definitions of IT Risk; Four "A"s(Availability, access, accuracy, agility) ; IT Risk Disciplines; Cause of IT Risk. Digital Forensics fundamentals and the role of incident response teams.
- Types of Cyber / Digital Frauds - Phishing Fraud, Vishing & Smishing, Identity Theft, Online Banking Fraud, Ransomware Fraud, Malware-Based Fraud, E-commerce Fraud, Social Engineering Fraud, etc.
- Network Security Threats – Spyware, Search, Denial of Services, Misrepresentation, Playback & Session Hijacking, Redirections, Viruses, Trojan Horses, Worms
- Cyber Security: Evolution; Principles; CIA – Confidentiality, Integrity, Availability
- Vulnerabilities: People-Process-Technology based vulnerabilities; Zero-Day Vulnerability
- Threats : Actors ; Tools (Types of cyber-attacks (viruses, worms, Trojan, RAT, etc.) phishing, social engineering, ransom ware).
- Counter measures: Cryptography, hashing, authentication, authorization, accountability
- Introduction to Secure Software Development Life Cycle (SSDLC) concepts.

Module 2: Virtual, Mixed, and Augmented Reality (VR, MR & AR) 8 Hours

- Overview and differences between Virtual, Mixed, and Augmented Reality.
- Applications of AR, VR, and XR (Extended Reality) in business.
- Communication Technologies: Evolution of wireless technologies (2G to 5G), foundational standards (GSM, CDMA, TDMA, FDMA, OFDM), and implications for connectivity.

Module 3: Cloud Computing and Internet of Things (IoT) 8 Hours

- Cloud Computing: Overview, architectures, security and performance considerations, applications, and cloud service models (IaaS, PaaS, SaaS, BPaaS). MSFT AZURE
- Internet of Things (IoT): Definition, market trends, real-world applications, and impact on marketing and customer service.
- - Industrial Internet of Things (IIoT), Big Data in manufacturing, and software tooling.
- Concept of Data Science, Artificial Intelligence (AI), and Machine Learning (ML).
- Problem spaces, search, knowledge, and rationality.
- Differences between AI, ML, and Deep Learning; their processes and applications. Image Classification-Cancer Prediction Problem, Image Segmentation

Module 4: Artificial Intelligence and Data Science 8 Hours

- Natural Language Processing (NLP) and real-world use cases and Sentiment Analysis
- Applications: AI agents in location analytics, personalization, social networking, and content analytics (sentiment and opinion analysis).
- Blockchain: Key concepts, applications, blockchain and decentralization, use in financial systems and digital governance.
- Cryptocurrency: Legal aspects, applications in traditional finance, and blockchain-enabled innovations.
- Robotics: Types, components, classification, industrial applications, and performance metrics (accuracy and repeatability).
- Quantum Computing: Fundamental principles and emerging business implications.
- Cybersecurity and Data Privacy: Threats, methodologies, frameworks, and applications across infrastructure, network, IoT, and cloud; includes malware and threat detection.

Module 5: Emerging Technologies and Contemporary Issues 6 Hours

- Introduction to Drones – Business applications
- The rise of UAVs: from hobby gadgets to powerful industrial automation tools
- Core technologies – GPS, Sensors, AI navigation and high resolution imaging
- Mission critical applications: agriculture, logistics, construction and surveillance
- Data-driven operations: mapping, 3D modeling, inspections and real-time analytics.
- Safety, regulations, airspace rules and India's DGCA Drone 2021 framework

- Future trends: autonomous drone swarms, drone taxis, and AI-powered decision systems
- 3D printing: Applications in prosthetic limbs, customized products, the evolution of additive manufacturing from prototyping
- Key technologies – FDM, SLA, SLS and metal 3D printing that power modern innovation
- Material that shape the
- Design – to –production workflow: CAD modeling, slicing, printing and post-processing
- Industry impact – health care implants, aerospace parts, rapid manufacturing and construction
- Seven future trends: 4D printing, sustainable materials, and large-scale automated fabrications.

Pedagogy:

- Case-based teaching
- Classroom discussion
- Activity-based teaching
- Master class

Teaching Learning Resources:

Essential readings-

- Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice- Hall. ISBN: 9781537600314
- Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill. ISBN:9780070087705
- Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-on Approach", University Press. ISBN:9780996025515
- Jai Singh Arun, Jerry Cuomo, Nitin Gaur, "Blockchain for Business", Pearson publications, ISBN: 9789389588880
- Thomas Erl, Zaigham Mahood, Ricardo Puttini, "Cloud Computing, Concept, Technology & Architecture", Prentice-Hall, 2013. ISBN: 9789332535923
- Sinan Kufelglu, " Emerging Technologies Value Creation for Sustainable Development", Springer

Reference Books

- Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi. ISBN: 9788190698894
- Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press. ISBN: 9781351981927
- Barrie Sosinsky, "Cloud Computing Bible", Wiley India, 2011. ISBN: 9780470903568
- Journal of Business Analytics – Taylor & Francis Online Journal ISSN : 2573-2358
- Sucet Jimena Martinez Vergara, "Business Strategies and Disruptive Technologies: An Overview within Disruptive Innovation Theory"
- http://nifm.ac.in/business-analytics-and-statistics
- https://cloud.gov.in/services_da.php

- https://dst.gov.in/data-science-research-initiative

Supplementary resources-

- https://jgateplus.com/home/
- https://search.ebscohost.com/
- https://www.coursera.org/specializations/emerging-technologies
- https://elibrary.in.pearson.com

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	2	2	1	2	1	0	2	-
CO2	3	3	1	3	1	0	2	-
CO3	2	2	3	3	3	0	2	-
CO4	3	2	1	2	0	0	2	3
CO5	3	2	2	3	2	1	2	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No Contribution

Suggested Coursera Courses:

Course Name	**University Offered**	**Course Instructors**
Emerging Technologies & Digital Business	OP Jindal Global University	Harit Joshi
Emerging Technologies: From Smartphones to IoT to Big Data Specialization	Yonsei University	Jong Moon Chung
Exploring Emerging Technologies for Lifelong Learning and Success	The State University of New York	Roberta Sullivan Cherie Van Putten
IoT Wireless & Cloud Computing Emerging Technologies	Yonsei University	Jong Moon Chung
Big Data Emerging Technologies	Yonsei University	Jong Moon Chung

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid – Term Test	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments (Quiz, Individual assignment, Cap- Stone project, Major or minor project, Group assignments etc.)	Individual	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	DEEP LEARNING AND NATURAL LANGUAGE PROCESSING
Term/Semester	II
Course ID	26PGB125
Credits	3

Introduction:

This course provides a practical and structured foundation in Natural Language Processing using deep learning methods. Students begin by exploring how text is prepared and represented for computational use. They then learn how neural networks process languages, followed by an introduction to recurrent models that can handle sequences and context. The course moves into real-world applications such as translation, summarization, sentimental analysis, spam detection and chatbot development. By the end of the program, learners will be equipped to build and evaluate simple NLP systems using modern tools and libraries.

Course Outcomes (COs):

On successful completion of the course, the students will be able to:

CO1: Explain how raw text is cleaned, structured and represented using fundamental NLP preprocessing and embedding techniques

CO2: Apply basic neural network models to classify text data and demonstrate how deep learning improves language-related tasks.

CO3: Analyze how sequence models capture contextual information and use RNN-based architectures to process sequential text.

CO4: Evaluate different embedding and attention-based approaches for tasks such as translation, search and summarization.

CO5: Design and implement simple NLP applications using standard NLP libraries.

Course Content and Structure: (36 hours)

Module 1: Basics of NLP and Text Processing 8 hours

- Introduction to natural language processing, real life examples – google search, chatbots, spam filter
- Types of text data: sentences, documents, messages
- Text data and cleaning: tokenization, sentence splitting, lowercase/uppercase, punctuation removal, stop-words, basic normalization
- Representing text as data: bag of words (BoW), TF-IDF, Word2Vec, and fast Text

Module 2: Neural Networks & Deep Learning for NLP 6 hours

- Neural Networks: perceptron and feed-forward networks
- Importance of deep learning for language
- Text/image/number classification

Module 3: Sequence Processing with Recurrent Networks/LSTM Using AI 6 Hours

- Introduction to RNN, GRU & LSTM
- Sequence classification
- Applications of RNN and LSTM

Module 4: NLP Applications - I **8 Hours**

- Sentence and word embedding techniques
- Machine translation and document search
- Neural machine translation with attention models
- Text summarization

Module 5: NLP Applications - II **8 Hours**

- NLP libraries: NLTK, spaCY, Hugging Face
- Sentiment analysis for movie reviews
- Classifying emails as spam or not
- Build a FAQ chatbot for a college / build a mini chatbot
- Generate simple text
- Model evaluation: accuracy, train/test split

Pedagogy:

- Classroom Discussions
- Activity Based Learning
- Practice-Based Learning
- Project-Based Learning
- Experiential Learning
- Software-Based Learning – Python
- Master class

Teaching Learning Resources:

Essential readings-

- Jeremy Howard, Sylvain Gugger. Deep Learning for Coders with Fastai & PyTorch. O'Reilly Media, First edition
- Ian Goodfellow, Yshua Bengio, Aaron Courville. Deep Learning. The MIT Press. Illustrated edition.
- David Foster. Generative Deep Learning. O'Reilly Media. Second edition.

Reference Books

- Steven Bird, Ewan Klein and Edward Loper. Natural Language Processing with Python – Analyzing Text with the Natural Language Toolkt. NLTK books, 3rd edition. NLTK Book
- Amita Kapoor, Antonio Gulli, Sujit Pal. Deep Learning with Tensorflow and Keras. Packt Publishing, 3rd edition.
- Francois Chollet. Deep Learning with Python. Manning Publisher, 2nd edition.
- Andrew Glassner. Deep Learning-A Visual Approach. Published by No Strach Press, illustrated edition.
- Magnus Ekman. Learning Deep Learning. Addison-Wesley Professional Publisher, 1st edition.
- Ronald T Kneusel. Practical Deep Learning-A Python Based Introduction. Published by No Strach Press, 1st edition

Supplementary Readings:

- NPTEL Course: https://onlinecourses.swayam2.ac.in/aic20_sp35

- https://www.coursera.org/specializations/data-science-foundations-r
- Data Sources: Kaggle: https://www.kaggle.com/
- Data world: https://data.world/
- Data.gov.in: https://data.gov.in/
- Databases: EBSCO: https://www.ebsco.com/academic-libraries,
- JGATE: https://jgateplus.com
- Pearson E library: https://elibrary.in.pearson.com

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	2	2	1	2	-	1	-
CO2	1	2	3	2	2	-	2	-
CO3	-	2	3	2	2	-	2	-
CO4	-	3	3	2	2	-	2	-
CO5	1	2	3	2	3	-	2	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Deep Learning	Deep Learning.AI	Andrew Ng, Younes Bensouda Mourri
Deep Learning With Python: CNN, ANN, RNN Specialization	EDUCBA	EDUCBA
Neural Networks and Deep Learning	Deep Learning.AI	Andrew Ng
IBM Deep Learning with PyTorch, Keras and Tensorflow Professional Certificate	IBM	Wojchiech Victor Fulmyk, Ricky Shi, Aman Aggarwal, Tenzin Migmar, Romeo Kienzler, Joseph Santarcangelo, Alex Aklson, Samaya Madhavan, Jeremy Nilmeier

Suggested Guided Projects

Project Name	University / Institution	Instructor(s)
Deep Learning with PyTorch: Generative Adversarial Network	Coursera	Parth Dhameliya
Deep Learning with PyTorch: Image Segmentation	Coursera	Parth Dhameliya
Machine Learning with ChatGPT: Image Classification Model	Coursera	Jousef Murad

Mining Quality Prediction Using Machine & Deep Learning	Coursera	Ryan Ahmed
Visualizing Filters of a CNN using TensorFlow	Coursera	Amit Yadav
CNNs with TensorFlow: Basics of Machine Learning	Coursera	Cesar Arturo Garza
Machine Learning with Pyspark: Recommender System	Coursera	Ahmad Varasteh

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	SEE Lab Journal : 10 marks Viva-Voce : 10 marks Section A : Attempt one question out of two questions – 15 marks Section B : Attempt one question out of two questions – 15 marks	Individual	50	At the end of the semester
	CIA			
2	Class Test : 10 Marks Preparatory exam : 10 Marks	Individual	20	After completion of 3 modules All modules
3	Attendance and Class Participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity) : 05 Capstone project : 10	Individual	25	Full Semester

Course Title	BIG DATA ANALYTICS
Term/Semester	II
Course ID	26PGB126
Credits	3

Introduction:

Big Data Analytics has become a critical managerial capability, enabling organizations to convert high-volume, high-velocity, and diverse data into strategic insights. This course equips students with the conceptual understanding and practical skills required to work with modern data ecosystems, including SQL, NoSQL, Hadoop, Hive, Pig, and Apache Spark.

Students will learn how to design Big Data pipelines, process structured and unstructured data, and apply analytical techniques for real-time business decision-making. The course also emphasizes the role of Big Data in digital transformation, customer analytics, operations optimization, fraud detection, and AI/ML workflows. Through hands-on labs and case-based learning, students will gain competency in using distributed computing platforms and contemporary tools widely adopted in the industry.

Course Outcomes (COs):

Post Completion of this course students should be able to:

CO1: Explain the foundational concepts, characteristics, applications, and lifecycle of Big Data in managerial contexts.

CO2: Design and query structured databases using SQL for data extraction, transformation, and business analysis

CO3: Illustrate and interpret the architecture of the Hadoop ecosystem and its role in distributed data processing.

CO4: Apply NoSQL models (key-value, document, columnar) for handling large-scale unstructured and semi-structured data.

CO5: Develop and evaluate Big Data solutions for real-time business problems using Hadoop, Hive, Pig, and Spark.

Course content and Structure: (36 hours)

Module 1: Introduction to Big Data & Ecosystems and its applications
10 Hours

- Evolution of Big Data – 5Vs: Volume, Velocity, Variety, Veracity, Value, Traditional analytics vs. Big Data analytics, Big Data lifecycle: ingestion, storage, processing, analysis, visualization, Business applications in Retail, BFSI, Healthcare, Manufacturing, HR & Marketing Analytics, Big Data architecture layers, Social media analytics IoT analytics and sensor data, Big Data in AI/ML workflows, Cases : Predictive Retail Analytics, Fraud Detection ,Customer 360 & Churn Analysis, Supply Chain Optimization, Cloud-based Hands-on Labs (AWS/GCP Big Query / Azure)

Module 2: Hadoop Ecosystem **8 Hours**

- Hadoop: History of Hadoop; the Hadoop Distributed File System, Components of Hadoop HDFS: Design of HDFS Concepts; Command Line Interface Hadoop file system interfaces, Application of Hadoop as a Management Technique.
- Java interfaces to HDFS: Reading Data Using the File System API, FS Data Input Stream, Writing Data, FS Data Output Stream, Querying the File system, examples of using the java API for hdfs, File patterns, Path Filter
- Map Reduce: Anatomy of a Map Reduce Job Run; Failures Job Scheduling Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features

Module 3: HIVE Basics **6 Hours**

- HIVE: Semi structured Data, OLTP Vs OLAP, What is Hive? Hive Installation, Data Types, Create Database, Drop Database, Create Table, Alter Table, Drop Table, Partitioning, Hive - Built-in Operators, Hive - Built-in Functions, Hive - View and Indexes,

Module 4: NoSQL Databases & Apache Pig **8 Hours**

- Introduction to NoSQL : Need for NoSQL in Big Data ,Types of NoSQL databases: Key-value stores: Redis, Amazon DynamoDB, Document stores: MongoDB, Column-family stores: Cassandra, HBase, Graph databases: Neo4j (awareness only),Schema-on-read vs Schema-on-write, Handling unstructured & semi-structured data (JSON, XML, logs)
- Apache Pig Basics : Pig architecture, installation, Grunt Shell operations, Pig Latin: Load & Store Operators, Grouping, Joining, Splitting, Filtering, Sorting, Diagnostic operators, Built-in functions, Processing semi-structured & unstructured data using Pig

Module 5: Apache Spark Basics **4 Hours**

- Spark Basics, Building blocks of Spark, Architecture RDDs, Kafka: Zookeeper; API; Clusters; Brokers, Spark Terminologies Pyspark, Pyspark Illustrative code notebooks

Pedagogy:

- Classroom Discussions
- Activity Based Learning
- Practice Based Learning
- Project Based Learning
- Experiential Learning
- Software Based Learning -MySQL Workbench and Cloudera/Horton works/Hue/Apache Pig
- Case Based Learning
- Lab

Teaching Learning Resources:

Essential Readings

- Big Data Simplified ,First Edition , Pearson 18 July 2019
- Ralph Kimball and Margy Ross- "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling"- (Third Edition). John Wiley and Sons.ISBN-

10 : 1118530802,ISBN-13 : 978-1118530801

- J. Han and M. Kamber- "Data Mining: Concepts and Techniques"- Morgan Kaufman- 3/E- 2011.ISBN-10 : 9780123814791,ISBN-13 : 978-9380931913
- Vaisman- Alejandro; Zimanyi- Esteban- "Data Warehouse Systems"- Springer- 2014. ISBN-10 : 3642546544 ,ISBN-13 : 978-3642546549
- by Sourabh Mukherjee (Author), Amit Kumar Das (Author), Sayan Goswami (Author) ISBN-10 : 9386263610,ISBN-13 : 978-9353435110

Reference

- Kimball- Ralph- "The Data warehouse lifecycle toolkit: expert methods for designing- developing- and deploying data warehouses"- John Wiley & Sons- 1998.ISBN-10 : 0471255475, ISBN-13 : 978-0471255475
- Alex Berson- Stephen J. Smith- "Data Warehousing- Data Mining- and OLAP"- MGH-1998 ISBN-10 : 0070062722,ISBN-13 : 978-0070062726

Supplementary Readings:

- NPTEL Course: https://nptel.ac.in/courses/106/104/106104189/ Coursera: https://www.coursera.org/learn/hadoop https://www.coursera.org/learn/big-data-analysis
- Data Sources : Kaggle: https://www.kaggle.com/ Data world: https://data.world/ Data.gov.in: https://data.gov.in/
- Databases: EBSCO: https://www.ebsco.com/academic-libraries, JGATE: https://jgateplus.com
- Pearson E library: https://elibrary.in.pearson.com
- https://timepasstechies.com/java-interface-hadoop-hdfs-filesystems-examples-concept/

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	-	-	2	1	1	1
CO2	2	2	2	1	2	1	1	-
CO3	2	3	3	2	2	1	1	-
CO4	2	3	3	2	2	1	1	-
CO5	2	2	3	2	3	2	2	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University / Institution	Instructor(s)
Big Data Specialization – *Introduction to Big Data*	University of California, San Diego (UCSD)	Ilkay Altintas, Amarnath Gupta, Mai Nguyen
Hadoop Platform and Application Framework	University of California, San Diego (UCSD)	Ilkay Altintas, Amarnath Gupta
SQL for Data Science	University of California, Davis	Sadie St. Lawrence

Suggested Guided projects

Project Name	University / Institution	Instructor(s)
Big Data Analysis with Hadoop	Coursera Project Network	Raghavendra Dixit
Getting Started with Apache Spark	Coursera Project Network	Raghavendra Dixit
Working with Big Query ML on Google Cloud	Google Cloud / Coursera Project Network	Google Cloud Training Team
NoSQL Basics with MongoDB Atlas	Coursera Project Network	Dr. Emily Cole
Data Processing using Apache Pig	Coursera Project Network	Amit Yadav

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	SEE End Term Exam Theory Practical	Individual	 50 25 25	 At the end of the semester
CIA				
2	Class Test 1 – Theory Class Test 2 - Practical	Individual	10 10	After completion of 3 modules After completion of 5 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Certification Course (Coursera) : 10 Guided project(Class room activity) : 05 Capstone project : 10	Individual	25	Full Semester

Course Title	DATA VISUALIZATION AND STORY TELLING USING TABLEAU
Term / Semester	II
Course ID	26PGB127
Credits	3

Introduction

Tableau is a powerful and rapidly evolving data visualization platform. Although it is designed to be accessible to business users and non-technical audiences, it also offers robust computational capabilities for advanced data analytics. Its flexibility stems from its ability to connect with a wide range of data sources. Tableau serves as an integrated solution for problem framing, data import and cleaning, analysis and visualization, decision-making, and insight communication. Organizations across the globe and across diverse industries rely on Tableau for effective visualization and reporting. With a market share of approximately 14.2% in the Business Intelligence segment, Tableau remains the most widely adopted BI tool today.

COURSE OUTCOMES (COs):

Post Completion of this course students should be able to:

CO1: Demonstrate a comprehensive understanding of the fundamental concepts, components, and features of Tableau.

CO2: Develop and design effective data visualizations using Tableau to represent business insights.

CO3: Analyze and apply various data modeling techniques and functionalities available in Tableau.

CO4: Design and construct interactive dashboards to facilitate data-driven decision-making.

CO5: Create and present analytical stories in Tableau to communicate insights effectively and strategically.

COURSE CONTENT AND STRUCTURE: 36 Hours

Module 1: Getting Started with Tableau 4 Hours

- Introduction to tableau
- Data Connection: connecting to data; loading data
- Navigating in tableau: Menu Commands; File Menu; Data Menu; Worksheet Menu; Dashboard Menu; Story Menu; Analysis Menu; Map Menu; Format Menu
- Loading workbooks - Connection - Live and Extract.
- Types of Data - Dimensions and measures, Discreet and Continuous, Changing Data type in Tableau.
- Combining Data with Joins – Types of Joins, Unions, Relationship, Blending, Physical and Logical Layer.

Module 2: Building and Customizing Visualizations 8 Hours

- Creating Visualizations: Bar chart ; Line chart; pie chart; crosstab; scatter plot; bubble chart; histogram ; waterfall charts, Map Chart, and other available chart options
- Customizing Charts using Marks Shelf.
- Filtering: filters; quick filters; context filters; condition filters; Hierarchical

filters; Collaborative filters; top filters and others top filters
- Grouping Data.
- Sorting; through selection; excluding multiple fields
- Filtering for null values
- Aggregation
- Calculated fields: introduction; creating calculated fields
- Understanding Sets and Parameters in Tableau.

Module 3: Analysis through tableau **8 Hours**

- Mapping your data
- Creating a symbol map
- Working with dates
- Visualizing dates in data: Drill down and roll up; date formatting options; date filters
- reference lines; Spread analysis using reference lines
- Trend lines
- Forecasting
- LOD Functions – Understanding LOD Expressions.
- Understanding Analytics Pane.

Module 4: Dashboard Design and Data Communication **6 Hours**

- Best practices for formatting your visualization
- Using color purposefully and readable fonts
- Use tooltips and adjust access as necessary
- Creating dashboards – Exploring Objects tiles for smart and dynamic Dashboard.
- Customizing dashboards: Add a tiled textbox; add floating images and buttons, layout pane.
- Creating stories
- Customizing stories: Tailor your caption; Adjust layout.

Module 5: Creating Stories in Tableau **10 Hours**

- Concept: Introduction to Tableau Stories
- CXO level data story Vs Operational data story
- Demo: Creating a Data Story
- Demo: Formatting a Story
- Activity: What's the Story?
- Saving and Sharing the work.

Pedagogy:

- Software based teaching
- Practice based learning
- Activity based learning
- Classroom discussions
- Project based learning
- Master Class

Teaching Learning Resources:
Essential Readings

- Business Intelligence and Analytics Software | Tableau | Tableau
- Daniel G. Murray, Tableau Your Data: Fast and Easy Visual Analysis with

Tableau Software 2nd Edition, WILEY publication. ISBN: 978-1-119-00119-5

- Ryan Lindy, Visual Data Storytelling with Tableau, Pearson Publication. ISBN:10- 9353063590
- Lindy Ryan, Visual Data Storytelling with Tableau, Pearson Education.

Reference

- Ryan Sleeper, Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master 1st Edition, O'REILLY publication. ISBN-13 978-1491977316
- Joshua N. Milligan, Learning Tableau: Tools for Business Intelligence, Data Prep, and Visual Analytics, 3rd Edition, Packt publication. ISBN-13 : 978-1784391164
- Jane A Crofts, Tableau Desktop: A Practical Guide for Business Users. ISBN-13 : 978- 1518675157
- Alexander Loth, Visual Analytics with Tableau 1st Edition,
- WILEY publication ISBN:9781119560203
- Learning Tableau by Joshua Milligan. Packt Publication. ISBN-13 : 978-1800200364
- Communicating Data with Tableau by Ben Jones. OREILLY publication ISBN-13 : 978- 1449372026
- Alex Campbell, Data Visualization Guide: Clear Introduction to Data Mining, Analysis and Visualization.

Supplementary resources-

- https://jgateplus.com/home/
- https://search.ebscohost.com/
- https://elearning.tableau.com/tableau-fundamentals
- https://www.coursera.org/specializations/data-visualization
- https://elibrary.in.pearson.com

CO-PO Mapping:

Mapping of Course Outcomes to Program Outcomes:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	1	1	1	2	1	1	–
CO2	-	2	1	1	2	1	1	–
CO3	-	1	2	2	2	2	2	–
CO4	1	2	1	2	3	1	2	-
CO5	1	1	2	2	3	2	2	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	University/Provider	Course Link
Data Visualization with Tableau Specialization	UC Davis	https://www.coursera.org/specializations/data-visualization
Creating Dashboards and Storytelling with Tableau	UC Davis	https://www.coursera.org/learn/dataviz-dashboards

Data Visualization and Communication with Tableau	Duke University	https://www.coursera.org/learn/analytics-tableau
Tableau Data Analysis and Visualization Specialization	Packt Publishing	https://www.coursera.org/specializations/packt-tableau-data-analysis-and-visualization

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Internal Test	Individual	10	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group , Cap-Stone project Individual/Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester
6	Lab Journal	Individual	5	Full Semester

Course Title	OPEN ELECTIVE - III
Term/Semester	II
Course ID	26PGB323
Credits	1

Course Outcome:

After the successful completion of the course, students will be able to:
CO1: Understand and articulate the nuances of the selected course

Guidelines:

The open electives are offered to students to provide them with a wide range of opportunities to enhance their knowledge. The students are given a chance to choose from a wide range (8000) of MOOCs offered by Coursera, NPTEL, SWAYAM, etc., and enroll themselves.

Open Elective:

Students have to complete 2 MOOC's during the II Semester based on their interest and submit the certificate. The duration of the course should be for a minimum of 6-8 weeks or at least 24 hours. The students are encouraged to choose any course from Liberal Arts/Humanities so as to conform to NEP guidelines. Students are encouraged to choose courses related to Business Analytics, Data Science, Artificial Intelligence or other emerging digital domains to align with the program's learning outcomes and NEP guidelines. After completion of the course, students have to submit the completion certificate. This will ensure eligibility for the students to complete the semester successfully.

Presentation Rubric:

Criteria	Poor	Average	Good
Coverage of Subject Matter 10	(1-4) The topic was not fully covered or material presented was inaccurate; inability to distinguish between fact and opinion; student did not have a good understanding of the topic	(5-7) The topic was covered in an appropriate depth with few or no factual errors or misinterpretations; fact and opinion were distinguished; student had a good understanding of the topic	(8-10) The topic was fully covered; no factual errors or misinterpretations were included; fact and opinion were distinguished and used appropriately; student demonstrated expertise or a clear understanding of the topic
	(1-0)	(2-3)	(4-5)

Introducti on 5	Student failed to introduce topic or self appropriately; purpose of presentation unclear to audience	Student introduced topic, purpose, and self	Student introduced topic, purpose, and self along with an effective attention-getter
Organizati on of content flow 5	Cannot understand presentation because of poor organization; introduction is not clear/matched to the rest of the content. The presentation is not clear	Satisfactory organization of content; clear introduction; main points are well stated, even if some transitions are somewhat sudden; relation to the rest of the content is clear	Very well organized content; builds on and provides support for the rest of content of the presentation; main points well stated and argued, with each leading to the next point Of the talk.
Conclusio n 5	Abrupt ending; no summary or wrap up; failure to provide references (if needed)	General summary or wrap up; speech was brought to a comfortable conclusion; appropriate referencing	Main points were reinforced or take-away messages restated; speech was brought to a purposeful conclusion; appropriate referencing

Viva Voce

Criteria	**Poor**	**Average**	**Good**
Delivery 10	(1-4) Mumble, incorrectly pronounce important content of the presentation. Only reading from the slides	(5-7) The voice is low and incorrectly pronounce terms during the presentation. Reading from slides frequently.	(8-10) Clear voice and correct, precise pronunciation of terms during the presentation. Only referring to the slides while explaining.
Q&A 10	Student did not invite questions or comments or did not handle them appropriately Not able to answer	Student invited questions and comments and answered or responded Vague answers	Student invited questions and comments and was able to answer or engage in a discussion Crisp to-the-point answers
	(0-1)	(2-3)	(4-5)
Depth of understandi ng 5	Poor understanding of the relevance of the course	Fair understanding of the relevance of the course	Good understanding of the relevance of the course

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	2	0	1	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Evaluation Plan:

Students are required to complete the course and take up the assessment at the end of the course.

Sl. No.		Evaluation Item	Marks Allotted
1	**Internal Marks (50)**	Presentation on the learnings from the course	25
2		Viva Voce	25
3	**External Marks (50)**	Final course assessment score and submission of the certificate to the mentor	50

Course Title	OPEN ELECTIVE - IV
Term/Semester	II
Course ID	26PGB324
Credits	1

Course Outcome:

After the successful completion of the course, students will be able to:
CO1: Understand and articulate the nuances of the selected course

Guidelines:

The open electives are offered to students to provide them with a wide range of opportunities to enhance their knowledge. The students are given a chance to choose from a wide range (8000) of MOOCs offered by Coursera, NPTEL, SWAYAM, etc., and enroll themselves.

Open Elective:

Students have to complete 2 MOOC's during the II Semester based on their interest and submit the certificate. The duration of the course should be for a minimum of 6-8 weeks or at least 24 hours. The students are encouraged to choose any course from Liberal Arts/Humanities so as to conform to NEP guidelines. Students are encouraged to choose courses related to Business Analytics, Data Science, Artificial Intelligence or other emerging digital domains to align with the program's learning outcomes and NEP guidelines. After completion of the course, students have to submit the completion certificate. This will ensure eligibility for the students to complete the semester successfully.

Presentation Rubric:

Criteria	Poor	Average	Good
Coverage of Subject Matter 10	(1-4) The topic was not fully covered or material presented was inaccurate; inability to distinguish between fact and opinion; student did not have a good understanding of the topic	(5-7) The topic was covered in an appropriate depth with few or no factual errors or misinterpretations; fact and opinion were distinguished; student had a good understanding of the topic	(8-10) The topic was fully covered; no factual errors or misinterpretations were included; fact and opinion were distinguished and used appropriately; student demonstrated expertise or a clear understanding of the topic
	(1-0)	(2-3)	(4-5)

Introducti on 5	Student failed to introduce topic or self appropriately; purpose of presentation unclear to audience	Student introduced topic, purpose, and self	Student introduced topic, purpose, and self along with an effective attention-getter
Organizati on of content flow 5	Cannot understand presentation because of poor organization; introduction is not clear/matched to the rest of the content. The presentation is not clear	Satisfactory organization of content; clear introduction; main points are well stated, even if some transitions are somewhat sudden; relation to the rest of the content is clear	Very well organized content; builds on and provides support for the rest of content of the presentation; main points well stated and argued, with each leading to the next point Of the talk.
Conclusio n 5	Abrupt ending; no summary or wrap up; failure to provide references (if needed)	General summary or wrap up; speech was brought to a comfortable conclusion; appropriate referencing	Main points were reinforced or take-away messages restated; speech was brought to a purposeful conclusion; appropriate referencing

Viva Voce

Criteria	**Poor**	**Average**	**Good**
Delivery 10	(1-4) Mumble, incorrectly pronounce important content of the presentation. Only reading from the slides	(5-7) The voice is low and incorrectly pronounce terms during the presentation. Reading from slides frequently.	(8-10) Clear voice and correct, precise pronunciation of terms during the presentation. Only referring to the slides while explaining.
Q&A 10	Student did not invite questions or comments or did not handle them appropriately Not able to answer	Student invited questions and comments and answered or responded Vague answers	Student invited questions and comments and was able to answer or engage in a discussion Crisp to-the-point answers
	(0-1)	(2-3)	(4-5)
Depth of understandi ng 5	Poor understanding of the relevance of the course	Fair understanding of the relevance of the course	Good understanding of the relevance of the course

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	1	2	0	1	0

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Evaluation Plan:

Students are required to complete the course and take up the assessment at the end of the course.

Sl. No.		Evaluation Item	Marks Allotted
1	**Internal Marks (50)**	Presentation on the learnings from the course	25
2		Viva Voce	25
3	**External Marks (50)**	Final course assessment score and submission of the certificate to the mentor	50

Course Title	AI AND FINANCIAL ANALYTICS
Term/Semester	II
Course ID	26PGB221
Credits	3

Introduction:

Generative AI is rapidly reshaping the finance industry by changing how information is analysed, interpreted, and used for decision making. Financial institutions today rely on AI systems not only to process large volumes of structured and unstructured data, but also to generate insights, forecast market trends, support portfolio decisions, and strengthen risk and fraud monitoring. As Large Language Models (LLMs) and other generative tools continue to evolve, they are becoming essential in modern financial workflows.

This course introduces students to the fundamentals of Generative AI and its growing role in financial analytics. It explains how GenAI models work, how they support financial tasks, and how they are applied in banking, investment management, corporate finance, insurance, and fintech. Students will learn how AI can assist in analysing financial statements, building forecasting narratives, identifying market patterns, generating investment insights, and supporting portfolio optimisation. The course also highlights how GenAI enhances risk prediction, fraud detection, credit analysis, and compliance activities within regulated financial environments.

By the end of the course, students will have a clear understanding of how Generative AI can transform financial analysis, how it can be incorporated into routine workflows, and how businesses can adopt these technologies responsibly. The course prepares students to evaluate practical opportunities, apply GenAI tools for financial tasks, and understand the broader strategic implications of AI-driven innovation in the finance sector.

Course Outcomes:

At the end of the course, students will be able to:

CO1: Explain the fundamentals of Generative AI and describe how different models support financial applications

CO2: Apply GenAI tools to analyse financial data, summarise key metrics, and generate insights

CO3: Interpret GenAI-assisted forecasts and portfolio analyses to support financial decisions

CO4: Assess financial risks, fraud patterns, and credit evaluations using GenAI-based analytical approaches

CO5: Evaluate ethical, regulatory, and organizational factors required for responsible GenAI adoption in financial services

Course Content & Structure **36 hours**

Module 1: Foundations of Generative AI in Finance **4 hours**

- Introduction to Generative AI & its technologies
- Types of Generative AI models Used in Finance
- Prompt Engineering for Financial Applications
- Impact of Large Language Models in Finance
- Real-world AI applications across Banking, Finance & Insurance
- The Future of GenAI in Finance

Module 2: GenAI for Financial Data Analysis & Insights 6 hours

- AI-powered Financial Tools: Forecasting, Budgeting & Reporting
- AI in financial data analysis (structured and unstructured data)
- AI-assisted Financial Statement Analysis & Sentimental Analysis
- AI-assisted Financial Modeling
- (Integrating GenAI with Excel / Power BI / Python for the analysis)

Module 3: GenAI-Driven Forecasting, Modelling & Portfolio Analytics 8 hours

- Time Series Forecasting with GenAI
- GenAI in trading, risk modelling and portfolio intelligence
- Portfolio Optimization with GenAI
- AI-generated Investment Insights

Module 4: GenAI in Risk & Fraud Analytics 10 hours

- AI for risk prediction in the financial market
- Fraud detection and prevention
- AI-based credit scoring & loan risk evaluation
- AI-powered audits & regulatory compliances
- ESG risk evaluation using GenAI
- Anomaly detection using GenAI

Module 5: Automation, Governance & Emerging Trends in GenAI for Finance 8 hours

- AI-driven financial automation: Automated financial reporting and auto-generated dashboards
- New innovations in GenAI for finance
- Real World Applications of AI in Finance
- Emerging Trend in AI-Driven Financial Innovations
- Impact of Large Language Models in Finance

Pedagogy:

- Classroom Discussions
- Activity Based Learning
- Practice-Based Learning
- Project-Based Learning
- Experiential Learning
- Software-Based Learning – Python
- Master class

Teaching Learning Resources:

Essential readings-

- Pitabas Mohanty. Financial Analytics. Published by Wiley (2023), ISBN-13: 978-9354644177
- R K Arora, Perna Lal. Credit Risk Analytics With R. Published by Wiley (2023), ISBN-13: 978-9357461559
- R K Arora, Prerna Lal (2022). Financial Risk Analytics: Measurement, Management and Examples in R, published by Wiley, ISBN-13: 978-9354642135

Reference Books

- Ivan Grindin (2021). Time Series Forecasting Using Deep Learning. BPB Publications, ISBN-13: 978-9391392574
- Michalis Doumpos (2018). Analytical Techniques in the Assessment of Credit Risk: An Overview of Methodologies and Applications. Springer Nature Switzerland AG, ISBN-13: 978-3030075996.
- Dr. Anuradha B (2021). Financial Analytics and Control. Notion Press, ISBN-13:978-1639749690
- Shuangzhe Li (2021). Financial Statistics and Data Analytics. Mdpi AG, ISBN-13: 978-3039439751
- Zebra Learn (2023). Financial Modeling Handbook: Learn to Build Financial Models from Scratch & Value Companies for Investment Banking, Equity Research, PE/VC. Published by Zebralearn Pvt Ltd., first edition, ISBN-13: 978-8195895045

Supplementary Readings:

- NPTEL Course: https://onlinecourses.swayam2.ac.in/aic20_sp35
- Coursera Course: https://www.coursera.org/learn/jhu-getting-started-data-viz-r
- https://www.coursera.org/specializations/data-science-foundations-r
- Data Sources: Kaggle: https://www.kaggle.com/
- Data world: https://data.world/,
- Data.gov.in: https://data.gov.in/
- Databases: EBSCO: https://www.ebsco.com/academic-libraries,
- JGATE: https://jgateplus.com
- Pearson E library: https://elibrary.in.pearson.com

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	2	2	-	1	-
CO2	1	3	2	2	3	-	1	-
CO3	2	3	1	2	3	-	1	-
CO4	2	3	2	2	3	-	1	-
CO5	3	2	1	2	1	-	1	3

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course Name	Offered by / University	Instructor
AI-Powered Finance: Forecasting, Planning & Reporting Specialization	Coursera	Arkadi Avanesyan Manish Gupta Starweaver Felix Garofalo Manas Dasgupta Rachel G Aseem Singhal

		Shashank Vailaya Suresh Varma
Introduction to Generative AI in Finance	Coursera	Shashank Vailaya
Artificial Intelligence in Finance and Wealth Management Specialization	ILLINOIS	Vania Carvalho de Castro Dr. Craig Lemoine Dr. William Cope JC Morgan
AI in Financial Services: Foundations through future trends Specialization	Said Business School, University of Oxford	Martin Schmalz Pinar Ozcan
GenAI for Financial Data Analysis	Coursera	Manish Gupta Starweaver

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group, Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	AI AND HR ANALYTICS
Term/Semester	III
Course ID	26PGB222
Credits	3

Introduction:

Human Resource Analytics is an emerging strategic discipline that enables organizations to make informed, evidence-based decisions about people by integrating data, technology, and business intelligence. This course equips students with a comprehensive understanding of HR Information Systems, analytical tools, and data-driven decision-making methodologies that strengthen HR's role as a strategic business partner. It emphasizes the importance of linking people metrics to organizational performance indicators and demonstrates how analytics can transform HR functions from transactional to value-creating.

The course also explores the growing impact of Artificial Intelligence (AI) in HR, including automation, intelligent decision support systems, predictive modelling, and machine-learning applications. Students will gain exposure to digital HR tools, HR dashboards, and real-time industry datasets, enabling them to understand workforce dynamics and emerging trends. Through case studies, hands-on exercises, and visualization tools, learners will develop the capability to diagnose workforce issues, predict outcomes, design HR strategies, and contribute to sustainable business growth.

Course Outcomes (COs):

On completion of this course, students will be able to;

CO1: Explain the concepts, significance, and applications of AI and HR analytics in enhancing HR decision-making.

CO2: Apply quantitative and qualitative analytics to interpret trends and patterns in workforce data.

CO3: Design and interpret dashboards using HR metrics to connect HR performance with business outcomes.

CO4: Apply predictive models and statistical tools to solve HR problems.

CO5: Discuss emerging advancements and digital technologies transforming HR analytics.

Course content and Structure: (36 hours)

Module 1: Foundations of AI and HR Analytics 8 Hours

- Introduction to AI in HR: Meaning & Scope; Types of AI (Narrow AI, General AI); Machine Learning, Deep Learning & Natural Language Processing in HR.
- Applications of AI in HR: Talent acquisition & screening, candidate experience, employee engagement analytics, performance prediction, AI-based learning and development, chatbots in HR services, and AI-enabled decision making.
- Role of Analytics: Defining HR Analytics; Basics of HR Analytics; Evolution and types of analytics (Descriptive, Diagnostic, Predictive & Prescriptive); Analytical capabilities; Analytic value chain; Analytical Models.
- Typical applications of HR Analytics across HR functions.

Module 2: HRA Frameworks **5 Hours**

- HRA Framework: Current approaches to measuring HR and reporting value from HR contributions; Strategic HR Metrics versus Benchmarking; HR Scorecards & Workforce Scorecards and how they are different from HR Analytics;
- HR Maturity Framework: From level 1 to level 5; HR Analytics Frameworks (a) LAMP framework; (b) HCM: 21 Framework and (c) Talent ship Framework; 5 predominant components of an effective Analytics framework. Class Discussion on horizon of prediction, HR intervention strategies using analytics. (Focus to be given Benchmarking; HR Scorecards)

Module 3: Predictive Analytics based on Regression **8 Hours**

- Steps involved in predictive analytics: Determine key performance indicator; analyse and report data; interpreting the results and predicting the future.
- Metrics and Regression analysis and Causation.

Module 4: Insight into Data Driven HRA: **9 Hours**

- Data Driven HRA: Typical data sources; Typical questions faced (survey); Typical data issues; Connecting HR Analytics to business benefit (case studies); Techniques for establishing questions; Building support and interest; Obtaining data, Cleaning data (exercise); Supplementing data. Introduction to the concept of "bias" concept w.r.t surveys.

Module 5: Emerging Trends in HR Analytics **6 Hours**

- Recruitment Analytics
- Training Analytics
- Compensation Analytics and
- Performance Management Analytics

Pedagogy:

- Classroom Discussion
- Lab Driven course by using the R Programme and Tableau
- Project-based teaching
- Case study-based teaching
- Interaction with the Practitioner

Teaching Learning Resources:

Essential readings-

- Edwards, M. R., & Edwards, K. (2019). Predictive HR analytics: Mastering the HR metric. Kogan Page Publishers: London.
- Soundararajan, R., & Singh, K. (2016). Winning on HR Analytics: Leveraging Data for Competitive Advantage. SAGE Publications: India.
- Bhattacharyya, D. K. (2017). HR Analytics: Understanding Theories and Applications. SAGE Publications India Pvt Limited.
- Moore, McCabe, Duckworth, and Alwan. The Practice of Business Statistics: Using Data for Decisions, Second Edition, New York: W.H.Freeman, 2008.

- Predictive analytics for Human Resources, Jac Fitz- enz, John R. Mattox, II, Wiley, 2014.
- Human Capital Analytics: Gene Pease Boyce Byerly, Jac Fitz-enz, Wiley, 2013.

References-

- Napper, C. (2025). People Analytics: Using Data-Driven HR and Gen AI as a Business Asset. Kogan Page.
- Edwards, M., & Edwards, K. (2024). Predictive HR Analytics: Mastering the HR Metric. Kogan Page.
- Waters, S. D., Streets, V. N., McFarlane, L., & Johnson-Murray, R. (2018). The Practical Guide to HR Analytics: Using Data to Inform, Transform, and Empower HR Decisions. Kogan Page.
- Rosett, C. M. (Ed.). (2020). Introducing HR Analytics with Machine Learning. Springer.
- West, M. (2023). People Analytics for Dummies. For Dummies.
- Saxena, A. (2023). HR Analytics: Quantifying the Intangible — Linking People, Processes and Analytics. Blue Rose Publishers.

Supplementary reading:

- https://jgateplus.com/home/
- https://capitaline.com/
- http://web.b.ebscohost.com/ehost/search/basic?vid=1&sid=c8b5124d-307d-4f0a- 843e-3b13e9156a4a%40pdc-v-sessmgr06
- https://elibrary.in.pearson.com/login

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	2	1	1	2	2	-	1	1
CO2	1	3	1	2	2	-	1	-
CO3	1	2	1	2	3	-	1	-
CO4	1	3	3	2	2	-	1	-
CO5	1	1	1	2	2	-	2	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Course

Title of the Course	**University**	**Instructor Name**
Human Resources Analytics	University of California	Amber Gould
People Analytics	Wharton School of the University of Pennsylvania	Cade Massey
Generative AI in HR Professional Specialization	IBM / Coursera	Skillup Jayashree Sridhar Ray Ahuja Antonio Cangiano

AI for HR Specialization	AI Business School (via Coursera)	AI Business School

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group , Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	MARKETING & RETAIL ANALYTICS
Term/Semester	II
Course ID	26PGB223
Credits	3

Introduction:

Data has become indispensable for organizations, playing a central role in enabling managers to make informed and effective decisions. Businesses today have access to extensive data from customers, channel partners, vendors, and other stakeholders. Once collected, this data must be transformed into meaningful information and interpreted accurately for organizations to compete, grow, and sustain in a dynamic marketplace. Analytics provides the tools required to convert raw data into actionable insights, supporting timely and impactful decision-making. This course introduces the fundamentals of marketing analytics and equips students with essential techniques used to address key marketing challenges through data-driven approaches.

Course Outcomes (COs)

On successful completion of course students will be able to

CO1: Differentiate between descriptive, predictive, and prescriptive analytics and select appropriate analytical models for fundamental marketing challenges.

CO2: Apply predictive models (e.g., Regression, Classification) to forecast sales, predict customer churn, and determine Customer Lifetime Value (CLV).

CO3: Execute customer segmentation using Clustering techniques and Market Basket Analysis (MBA) to generate actionable insights for cross-selling and product strategy.

CO4: Measure and optimize digital marketing performance using Web/Mobile Analytics (e.g., Google Analytics) and Marketing Mix Modeling (MMM).

CO5: Develop professional, data-driven Dashboards (e.g., using Tableau/Power BI) that effectively connect marketing activities to core business and financial results.

Course content and structure (36 hours)

Module 1: Analytical Foundation and Core Metrics (6 Hours)

- Marketing Analytics Landscape: Evolution and definition of Marketing Analytics; Data Sources (Internal data, External data, Big Data) and the Analytical Continuum (Descriptive, Diagnostic, Predictive, Prescriptive).
- Key Performance Indicators (KPIs): Measuring Market Performance (Penetration, Usage, Market Share); Brand Performance (Awareness, Consideration, Satisfaction).
- Financial Metrics for Marketing: Customer Acquisition Cost (CAC), Customer Retention Rate, and Return on Marketing Investment (ROMI).
- Sales Forecasting & Market Sizing: Qualitative Methods (Delphi, Jury of Executive Opinion); Quantitative Methods (Time Series Analysis - simple smoothing and trend analysis); Introduction to Forecasting Accuracy Metrics (e.g., MAPE).

Module 2: Customer-Centric Predictive Modeling (10 Hours)

- Customer Segmentation: Clustering Analysis (K-Means and Hierarchical) for finding natural market segments; RFM Analysis (Recency, Frequency, Monetary value) for behavioral segmentation.

- Customer Lifetime Value (CLV): Calculation of CLV using simplified and discounted cash flow models; Using CLV for prioritizing customers and allocating marketing spend.
- Churn Analysis and Retention: Introduction to Classification Models (Logistic Regression, Decision Trees) for predicting customer churn; Strategies derived from churn drivers.
- Cross-Selling and Up-Selling: Association Rule Mining; Detailed study of Market Basket Analysis (MBA) using the Apriori Algorithm; Applying MBA to product placement and recommendations.

Module 3: Digital, Web, and Social Media Analytics (8 Hours)

- Web Analytics Fundamentals: Google Analytics (GA4) ecosystem; Key metrics (Users, Sessions, Bounce Rate, Conversion Rate); Setting up Goals and Funnels.
- Digital Campaign Measurement: Attribution Models (Last-Click, First-Click, Linear, Time Decay, Data-Driven); Measuring ROI of Search Engine Marketing (SEM) and Social Media Advertising.
- Social Media Analytics: Sentiment Analysis using text mining and Natural Language Processing (NLP); Measuring Engagement and Virality (Share Rate, Comment Rate); Social Listening for competitor and new product insights.
- A/B Testing and Optimization: Principles of Conversion Rate Optimization (CRO); Designing and evaluating A/B and Multivariate Tests for website and campaign optimization.

Module 4: Advanced Marketing Mix Modelling (8 Hours)

- Marketing Mix Modeling (MMM): Introduction and scope; Using Multiple Regression to quantify the impact of different marketing elements (Advertising, Promotions, Pricing, Distribution) on sales.
- Pricing Analytics: Measuring Price Elasticity of Demand; Using analytics to inform dynamic pricing and promotional effectiveness; Cannibalization analysis.
- Product and Advertising Analytics: Conjoint Analysis for new product design and feature prioritization; Measuring Advertisement Effectiveness (Ad stock and carry-over effects).
- Sales and Distribution Analytics: Sales territory optimization; Analyzing channel performance; Geospatial Analytics for optimal store/distribution point location in the Indian context.

Module 5: Data Visualization and Emerging Trends (4 Hours)

- The Analytics Workflow: The CRISP-DM methodology (Cross-Industry Standard Process for Data Mining) for structured analytical projects.
- Data Visualization and Storytelling: Principles of effective data visualization; Designing marketing dashboards using tools like Tableau or Power BI; Connecting Marketing KPIs to the Executive/CEO dashboard
- Prescriptive Analytics and AI: Introduction to Prescriptive Analytics (Recommender Systems); Application of Artificial Intelligence (AI) in augmented analytics (automated insights, dynamic media buying).
- Ethical Considerations: Data privacy (GDPR, India's DPDP Bill implications); Algorithmic bias and responsible use of customer data.

Pedagogy:

- Class room discussions
- Project based learning
- Interaction with Practioners
- Case based teaching

- Practice based teaching using R and Tableau
- Research based teaching
- Field Visits

Teaching Learning Resources:

Recommended Books

- Marketing Analytics: A Practical Guide to Improving Consumer Insights Using Data Techniques - Mike Grigsby -2nd Edition, Pearson
- Principles of Marketing Engineering, 2nd Edition, by Gary Lilien, Arvind Rangaswamy and Arnaud De Bruyn (Decision Pro, Inc. 2012), ISBN: 978-0985764807
- Database Marketing: Analyzing and Managing Customers, by Robert C. Blattberg, Byung -Do Kim, and Scott A. Neslin (Springer, 2009), ISBN: 978-1441903327

Reference Books

- Marketing Analytics: Strategic Models and Metrics –Stephan Sorger -Amazon Digital
- Services; 1st edition, ISBN-10: 1481900307
- Marketing Metrics, Paul W. Farris, Phillip E. Pfeifer et al, Pearson Education India; Third edition

Supplementary Resources

- https://elibrary.in.pearson.com/bookshelfDashboard
- https://www.ebsco.com/search?search=supplychainmodel
- https://jgateplus.com/home/resources/
- https://www.edx.org/course/marketing-analytics
- https://www.coursera.org/learn/uva-darden-market-analytics
- https://capitaline.com/
- http://web.b.ebscohost.com/ehost/search/basic?vid=1&sid=c8b5124d-307d-4f0a-843e-3b13e9156a4a%40pdc-v-sessmgr06

CO-PO Mapping:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	2	2	2	-	1	-
CO2	1	3	3	2	3	-	1	-
CO3	1	3	2	2	3	-	1	-
CO4	2	2	2	3	3	-	1	-
CO5	2	2	1	2	3	-	1	-

LEVEL 3-Substantial 2-Moderate 1-Slight - No contribution

Suggested Coursera Courses:

Course / Specialization	Approx Duration	Provider / University	Relevance to Your Module Syllabus
Google Digital Marketing & E-Commerce Professional Certificate	~ 166 hours (entire certificate) Coursera+2Coursera Blog+2	Google on Coursera	Very relevant: includes marketing analytics, e-commerce store setup, use of Google Analytics,

			attribution, and e-commerce strategies. Coursera
Google Analytics Course: Track, Analyze & Grow	~ 8 hours Coursera	Learn Karts via Coursera	Specifically covers GA4 setup, e-commerce event tracking, user behavior, and building custom reports—aligns well with your Modules 1, 2 and 3. Coursera
Assess for Success: Marketing Analytics and Measurement	~ 11 hours approx. (part of the Google Professional Certificate) MOOC List	Google via Coursera	Focused on analytics: A/B testing, metrics, campaign measurement, attribution — very useful for understanding and applying techniques in your Module 1 (A/B testing) and Module 3 (ads analytics). MOOC List

Course Evaluation Plan:

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group, Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	SCM TECHNOLOGY AND ANALYTICS
Term/Semester	II
Course ID	26PGB224
Credits	3

Introduction

This course provides the skills needed to build and manage a modern, data-driven supply chain. The course covers essential ERP operations and the use of analytical models for accurate demand forecasting and network optimization. The curriculum also addresses current supply chain concerns such as performance analysis, risk management, and resilience strategies, including sustainability. In addition, the course introduces newer SCM technologies that are poised to drive supply chain efficiencies and transparency.

Course Outcomes (COs):

On successful completion of this course, the student will be able to:

CO1: Analyze core SCM transactional and planning cycles (by applying functional knowledge of ERP and WMS modules.

CO2: Construct quantitative models to support advanced demand forecasting, inventory optimization, and logistics network design.

CO3: Develop data-driven performance dashboards using key SCM metrics and interpret the results of Process and Performance Analytics.

CO4: Assess and prioritize supply chain risks using structured tools and formulate comprehensive strategies for resilience and ethical compliance.

CO5: Evaluate the strategic value of emerging technologies in enhancing visibility and efficiency across the supply chain.

Course Content and Structure: (36 hours)

Module 1: Foundations of SCM and Digitalization (5 Hours)

- Evolution of ERP: History of Inventory systems, MRP, MRP II, ERP and extended ERP
- Introduction to Digital SCM: Digital Transformation in SCM (SCM 1.0 to SCM 4.0), Role of Enterprise Resource Planning (ERP) in SCM, Functional Overview of ERP Modules (Material Management, Sales and Distribution, Production Planning, Warehouse Management).
- Information Systems and Architecture: Core Information Systems: Transaction Processing Systems (TPS) and Management Information Systems (MIS), Introduction to Cloud-Based SCM Systems

Module 2: ERP Applications and Transactions (11 Hours)

- Procurement and Supplier Management in ERP (SAP): Purchase Order (PO) Processing, Goods Receipt and Invoice Verification (3-way match), Master Data Management (Supplier and Material Master)
- Warehouse Operations and Inventory Management: Stock Keeping and Warehouse Management Systems (WMS), Inventory Types and Control Techniques (ABC/VED/FSN), Cycle Counting and Physical Inventory Processes
- Logistics and Distribution Execution: Sales Order (SO) Processing and Delivery Creation, Transportation Planning and Execution (TMS overview), Tracking, Tracing, and Proof of Delivery (POD)

- Sales and Operations Planning (S&OP) Cycle: Demand Planning Input into ERP, Production Planning/Master Production Scheduling (MPS), Connecting S&OP with Financial Planning

Module 3: Data Analytics and Modelling (10 Hours)

- SCM Data Sources and Quality Management: Descriptive Analytics and Key Performance Indicators (KPIs), Data Visualization for Supply Chain Dashboards (using Tableau/Power BI).
- Demand Forecasting and Prediction: Time-Series Forecasting Methods (Moving Average, Exponential Smoothing), Forecasting Error Metrics (MAD, MAPE), Incorporating Causal Factors and Qualitative Forecasting
- Inventory and Network Optimization: Economic Order Quantity (EOQ) and Reorder Point Models, Safety Stock Calculation and Service Level, Supply Chain Network Design (Facility Location, Capacitated Plant Models)

Module 4: Performance Analysis, Risk and Resilience (6 hours)

- Process and Performance Analytics: Process Mapping and Bottleneck Analysis Benchmarking and Competitive Supply Chain Analysis
- Supply Chain Risk and Resilience: Risk Identification and Assessment, Risk Matrix, Developing Supply Chain Resilience and Agility Strategies, Disruption Management and Contingency Planning
- Sustainability and Ethical SCM: Green SCM Principles and Reverse Logistics, Measuring and Reporting Carbon Footprint, Ethical Sourcing and Regulatory Compliance

Module 5: Emerging Technologies in SCM – (4 hours)

- Artificial Intelligence (AI) and Machine Learning (ML) for SCM (Predictive Maintenance, Cognitive Automation)
- Blockchain for Supply Chain Traceability and Transparency
- Internet of Things (IoT) for Real-Time Asset Tracking and Condition Monitoring.

Pedagogy:

- Classroom discussion
- Project-based learning
- MOOC Courses
- Workshop from practitioners
- Case-based teaching
- Experiential learning

Teaching-Learning Resources:

Recommended Books:

- "Supply Chain Management" by Chopra, Sunil, and Peter Meindl (Latest edition, Pearson).
- “Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies” David Simchi-Levi, Philip Kaminsky, & Edith Simchi-Levi
- “Supply Chain Analytics” by T. A. S. Vijayaraghavan (PHI Learning)

Reference Books:

- The Supply Chain Revolution: Innovative Sourcing and Logistics for a Fiercely Competitive World by Suman Sarkar
- The New (Ab)Normal: Reshaping Business and Supply Chain Strategy Beyond Covid-19 by Yossi Sheffi

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	1	2	3	-	1	-
CO2	1	3	3	2	3	-	1	-
CO3	1	2	1	2	3	-	1	-
CO4	3	2	1	2	1	-	1	3
CO5	2	1	1	3	3	-	2	1

LEVEL 3-Substantial 2-Moderate 1-Slight - No Contribution

Suggested Coursera courses:

Course Name	Offered by	Instructor(s)
Supply Chain Management Specialization	Rutgers University	Rudolf Leuschner
Supply Chain Logistics	Rutgers University	Rudolf Leuschner
Supply Chain Analytics Specialization	Rutgers University	Yao Zhao
Supply Chain Management and Analytics	Unilever	Unilever Team

Course Evaluation Plan

Sl. No.	Evaluation Item	Unit of Evaluation	Marks Allotted	Timeline
1	End Term Exam	Individual	50	At the end of the semester
2	Mid- term Examination	Individual	15	After completion of 2-3 modules
3	Attendance and Class participation	Individual	5	At the end of the semester
4	Assignments -Individual /Group, Cap-Stone project- Individual /Group, Major or minor project - Individual /Group	Individual/ Group	20	Full Semester
5	Completion of a recommended course/ guided project from Coursera /NTPEL /any other platforms	Individual	10	Full Semester

Course Title	REAL WORLD CAPSTONE PROJECT
Term/Semester	II
Course ID	26PGB421
Credits	4

Introduction

The Real World Capstone Project enables students to apply their disciplinary knowledge to genuine business situations. Unlike a traditional internship, this project allows students to identify and work on a problem aligned with their specialization, career goals or an organizational requirement. Students may complete the project within a company or independently as a freelancer or consultant, engaging directly with real-time business challenges. The purpose of the project is to strengthen students ability to diagnose practical issues, select suitable analytical approaches, work with qualitative or quantitative data and provide evidence-based recommendations that support managerial decision making.

CAPSTONE PROJECT LEARNING OUTCOMES

On successful completion of the Real World Capstone Project, students will be able to:

CO1: Identify a relevant business problem within their specialization area/ area of interest and formulate a clear problem statement

CO2: Develop an appropriate project framework, including objectives, scope, methodology, data requirements, and expected outcomes.

CO3: Use organizational information, real-time data, or field inputs to analyse the selected problem systematically.

CO4: Apply analytical tools, functional knowledge, and multidisciplinary perspectives to derive meaningful insights.

CO5: Prepare a professional project report and defend their findings through a structured viva voce examination.

III. PROJECT REQUIREMENTS & STRUCTURE

1. Project Duration

The Real World Capstone Project must be carried out over a minimum of two months. Students may work full-time or part-time, depending on the nature of the project.

2. Choice of Project Area

Students must select a topic related to their area of specialization or a domain where they wish to build career expertise.

Acceptable formats include:

- **Organization-Based Projects:** Working under the supervision of a company executive.
- **Freelance/Consulting Projects:** Independently solving a real-world business problem for any client or organization.
- **Research-Oriented Projects:** Addressing a micro-level functional issue supported by literature and primary/secondary data.

3. Faculty Supervision

Each student will work under the guidance of a Faculty Mentor, who will approve the topic, methodology and tools. Regular interaction with the mentors required to maintain academic quality and progress.

4. Project Registration and Synopsis Submission

Before commencing the project, students must submit:

- **Project Registration Form**
- **A detailed synopsis (250–300 words)** including title, need for the study, problem statement, objectives, data sources, sampling, and analysis plan, following the prescribed format.

The synopsis should be approved by the Faculty Mentor and forwarded to the Evaluation Committee.

5. Progress Monitoring

Students must maintain weekly progress reports and submit them to the Faculty Mentor. These reports should include:

- Work completed in the current week
- Planned work for the following week

This ensures systematic monitoring and timely completion.

6. Final Report Submission

At the end of the project period, the student must submit a hardbound copy and a soft copy of the Capstone Project Report to the faculty mentor.

The report should consist of the following components:

- Title page
- Certificates (student, guide, institution, company)
- Acknowledgements
- Table of Contents
- List of Tables/Figures
- Chapters (as detailed in the next section)
- References
- Appendices
- Plagiarism certificate

A similarity index and AI-generated text of no more than 20% is permitted.

VII. REPORT STRUCTURE

Chapter 1: Introduction

- Industry and organizational context
- Background of the business problem
- Significance of the study

Chapter 2: Review of Literature and Methodology

- Review of relevant studies and identification of research gaps
- Problem statement
- Need for the study
- Scope of the study
- Objectives of the project
- Hypotheses
- Research design, sampling, tools for data collection

- Analytical techniques
- Limitation of the study

Chapter 3: Profile of the Organization / Problem Context

- Organization overview (if applicable)
- Description of the process, system, or functional area addressed
- Project environment and constraints

Chapter 4: Data Analysis and Findings

- Data presentation
- Analytical methods and interpretation
- Insights derived from the analysis

Chapter 5: Recommendations and Conclusion

- Proposed solutions
- Implications for the organization
- Conclusion and future scope

VIII. EVALUATION SCHEME

1. **Internal Evaluation (50 Marks)**
   - Chapter-wise assessment – 10 marks
   - Quality of weekly progress – 10 marks
   - Professionalism, punctuality, discipline – 10 marks
   - Discussion with mentor – 10 marks
   - Overall quality of project work – 10 marks
2. **External Evaluation (50 Marks)**
   - Quality of presentation – 20 marks
   - Viva-voce performance – 10 marks
   - Quality and impact of project outcomes – 10 marks
   - Evaluation of final report – 10 marks

A minimum passing score is required in both internal and external assessments.

IX. GENERAL INSTRUCTIONS

1. Each student must undertake the project individually; group submissions are not permitted.
2. Students may work within Bangalore / Karnataka / anywhere in India.
3. All data and project materials must be retained until final results are declared.
4. Any breach of academic integrity, including plagiarism or unauthorized copying, will result in disciplinary action.
5. Any deviation from these guidelines requires written approval from the faculty mentor and the committee.