ST. JOSEPH'S COLLEGE OF COMMERCE
(Autonomous)

163, Brigade Road, Bangalore – 560 025

Accredited with 'A++' Grade (4th Cycle) by the
National Assessment and Accreditation Council (NAAC)

Recognized by the UGC as
"COLLEGE WITH POTENTIAL FOR EXCELLENCE"

**Post Graduate Diploma in Enterprise Resource Planning
(Data Science)**

Semester I & II

Academic year 2023-24

ST. JOSEPH'S COLLEGE OF COMMERCE
(Autonomous)
Affiliated to Bengaluru City University

St. Joseph's College of Commerce (SJCC) was formerly a part of St. Joseph's College, established in the year 1882. The Commerce Department was established in the year 1949 and it became an independent college with its own building in Brigade Road in the year 1972.

The college has in its Vision a model for higher education which encourages individuals to dream of a socially just world and in its Mission a strategy to empower individuals in realizing that dream.

With an objective of imparting quality education in the field of Commerce and Management the college has been innovating in all aspects of higher education over a long period of time. These innovations were further bolstered with the granting of autonomous status to the college by UGC in September 2005. From then on, the college has taken a lead in reforming curriculum and syllabus, examination and evaluation pattern and teaching and learning methods through the Board of Studies, the Academic Council and the Governing Council comprising of eminent academicians, industry representatives and notable alumni.

The college has undergone four cycles of NAAC accreditation starting from the year 2000 in which it secured 'five stars', next in the year 2007 an 'A' grade, in the year 2012 again an 'A' grade and recently in February 2021 an 'A++'. It is one of the very few institutions in the country to have secured A++ grade in the fourth cycle under the Revised Accreditation Framework (RAF) and the first college in Karnataka to do so. The college was declared as a 'College with Potential for Excellence' in the year 2010. In 2011 SJCC was recognized as a Research Centre by Bangalore University. The college has been ranked 93rd in the National Institutional Ranking Framework (NIRF) ratings of Ministry of Education, Government of India, in 2022 and it has been the only institution from Karnataka to make it consistently to the top 100 in the country.

OBJECTIVES
- Designed to expose learners with knowledge, skills and integrated perception of various functions of management to sustain the growing momentum of the industry and help achieve higher levels
- To provide an opportunity to students, wishing to change disciplines
- To upgrade knowledge within a discipline.
- Preparation for entry to a Master's course.

I. ELIGIBILITY FOR ADMISSION:
Candidates who have completed Graduate Programme of any recognized university and have secured passed with at least 50% of mark in the aggregate of all core papers/courses studied in the qualifying examinations are eligible for admission into this programme.
Admission will be based at the discretion of the Admission Committee.

II. DURATION OF THE PROGRAMME:
The programme of the study is One (1) year of Two (2) semesters. A candidate shall complete his/her degree within Two (2) academic years from the date of his/her admission to the first semester.

III. MEDIUM OF INSTRUCTION:
The medium of instruction shall be English.

IV. ATTENDANCE:
A student shall be considered to have satisfied the requirement of attendance for the semester, if he/she has attended not less than 75% in aggregate of the number of working periods in each of the courses compulsorily. A student who fails to complete the PROGRAMME in the manner stated above shall not be permitted to take the end semester examination.

V. TEACHING AND EVALUATION:
M.Com/MBA/MFA/MBS/Ph.D graduates with B.Com/BBA/BBS as basic degree from a recognized university with a relevant industry experience are only eligible to teach and evaluate the courses.

VI. EVALUATION SYSTEM:
Evaluation for PG programme consists of two components, viz. Continuous Internal Assessment (CIA) and End Semester Examination (ESE) with the weightage of 50% and 50% respectively.

Continuous Internal Assessment (CIA) includes 10 Marks from attendance and 40 Marks from the exercises administered by the teacher such as Surprise test / quiz / business case analysis/ Assignment / Presentation/ Research Project/ Research article/ Seminar etc. The 10 Marks for Attendance will be calculated in the following manner - 90 – 100% = 10 Marks; 81–89% = 8 Marks; 75–80% = 5 Marks; 65-74% = 3 Marks. Each teaching faculty is required to maintain a record of the Continuous Internal Assessment (CIA). Under the PGD programme, a student must score a minimum of 40% (i.e., 20 Marks out of 50 Marks), in the CIA, besides 75% attendance, to be eligible for End Semester Examination12 marks through CIA.

The End Semester Examination will be conducted at the end of each semester. The duration and maximum marks for the End Semester Examination is 3 hours and for 100 marks.

VII. MINIMUM FOR A PASS:
A PGD student has to get a minimum of 40% marks in the ESE (40 on 100) and 50% aggregate in CIA & ESE (50 on 100) for a pass in each course.

VIII. PATTERN OF QUESTION PAPER:
Question Paper Pattern: (3 Hours duration, Max. Marks: 100)

Section A	Analytical questions	5 Marks x 7 Questions	35 Marks
Section B	Essay questions	15 Marks x 3 Questions	45 Marks
Section C	Compulsory questions / Case Study	20 Marks x 1 Question	20 Marks
Total Marks			**100 Marks**

PROGRAMME STRUCTURE – PGD ERP (Data Science)

I SEMESTER

Paper No.	Title of the Paper	Marks		Total Marks	Credits	Hours
		CIA	ESE			
P3 23 DS101	Introduction to Data Science	50	50	100	4	30
P3 23 DS102	Python for Data Science	50	50	100	4	30
P3 23 DS103	Statistics for Business	50	50	100	4	30
P3 23 DS104	Excel for Data Science	50	50	100	4	30

P3 23 DS101: INTRODUCTION TO DATA SCIENCE

COURSE OBJECTIVES:
The students should be able to
1. *Explain What Data science is and its various disciplines*
2. *Articulate Types of data generated in organizations and how they are used for decision making*
3. *Understand various tools & techniques used in data science*
4. *Appreciate how a data driven organization is structured and driven*

Module 1: Introduction & Definition to Data Science   3 Hrs

What is data science – Data Science Discipline and Components – Data science process – Difference between data science & BI – Popularity, Market size and Growth – Data science communities.

Module 2: Overview of ERP and EDP   5 Hrs

Overview of ERP and EDP, Benefits of ERP and EDP, Framework, Integration with functional modules (HR/Finance/Marketing/SCM/Production), Risks and Benefits of ERP and EDP.

Module 3: Data Science application   6 Hrs

Types of data generated – Popular use cases in functions – Popular use cases in Industry – Data Science in the Government & Public sector – Data Science in Social sector.

Module 4: Popular Data Science tools and techniques – Tools   4 Hrs

Data collection – Data storage – Data extraction – Data cleaning – Data analysis – Visualization; Techniques: Classification – Regression – Clustering & Association - Scientific methods – Processes – Algorithms.

Module 5: ERP Architecture and Enterprise Data Platform   5 Hrs

R2 and R3 Architecture of the ERP (Application Server, Presentation Server, Database Server), Integration Framework, Methodology, Implementation of ERP, Support, Software Upgrades, Modules and Integration – ERP and its integration with EDP.

Module 6: Introduction to AI & ML   7 Hrs

Definition & Details – Types of ML – AI&ML application – Recent AI Uprising – How the world is changing due to AI & ML? – Building Blocks of AI and ML – Ethics & Compliance.

BOOKS FOR REFERENCE:
1. An Introduction to DATA SCIENCE, Jeffrey S Saltz and Jeffrey M Stanton, SAGE Publications Inc.
2. Introduction to Data Science - Practical Approach with R and Python, B. Uma Maheswari, R. Sujatha, Wiley.

3. Introduction to Data Science (English, Paperback, Dr. A. Kovalan, Ms. K. Sumathi, Mr. V. Veerakumaran, Notion Press.
4. Introduction to Data Science, Dr Dheva Rajan S, T.Kumaravel, Prof. Valli Madhavi Koti, Notion Press
5. Introduction to Data Science for Social and Policy Research, Magallanes Reyes Jose Manuel, Cambridge University Press.
6. Introduction to Data Science, Igual Laura, Springer International Publishing AG
7. A Hands-On Introduction to Data Science, Chirag Shah, Cambridge University Press.
8. Simple Introduction to Data Science Lars Nielsen.

P3 23 DS102: PYTHON FOR DATA SCIENCE

COURSE OBJECTIVES:
The students should be able to
1. *Explain the Role of Python in Data Science.*
2. *Importing data into Python and provide output*
3. *Ability to work with data in Python.*
4. *Calculate descriptive Statistics on a data set.*
5. *Examine a data set through visualization and provide insights.*

Module 1: Introduction to Python **3 Hrs**

Basics of Programming – Meaning of Python – Install Anaconda and Python – Launching a Jupyter notebook – Important Python Libraries.

Module 2: Data Types & Data Structures **6 Hrs**

Numeric – Strings – Sequence: Lists – Tuples – Sets – Mapping: Dictionaries – Arrays – Boolean

Module 3: Python Programming **6 Hrs**

Python Programming Fundamentals: Conditions and Branching – Loops – Functions – Objects – Classes

Module 4: Working with Data in Python **6 Hrs**

Understanding Data Processing – Python: Operations on Numpy Arrays – Overview of Data Cleaning – Slicing, Indexing, Manipulating and Cleaning Pandas Dataframe – Working with Missing Data in Pandas – Python Relational Database – Pandas Groupby: Summarizing, Aggregating, and Grouping data

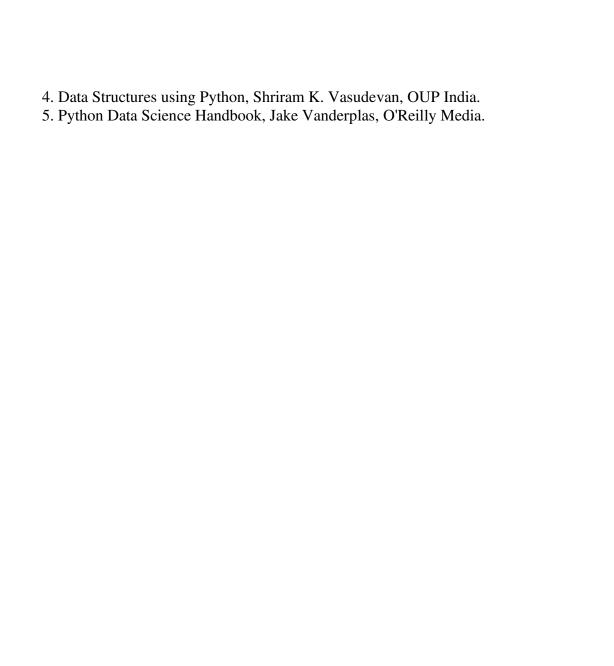**Module 5: Exploratory Data Analysis** **6 Hrs**

Understanding Characteristics of the dataset – Basic Statistics in Python using pandas and matplotlib – Measure of central tendency (Mean, Median, Mode) – Measure of spread (Range, Quartile, Percentiles, absolute deviation, variance and standard deviation) – Measure of symmetry (Skewness) – Measure of Peakedness (Kurtosis)

Module 6: Visualization **3 Hrs**

Data Visualization using Matplotlib – Data Visualization using Seaborn – Style Plots – Line Chart – Bar plots – Scatter plots – Box plots – Heat maps – Geospatial data

BOOKS FOR REFERENCE:
1. Hands-On Data Science and Python Machine Learning, Kane Frank, Packt Publishing Limited
2. Data Science and Machine Learning Interview Questions Using Python a Complete Question Bank to Crack Your Interview, Vishwanathan Narayanan, BPB Publications.
3. Python for data science, Tony F Charles.

4. Data Structures using Python, Shriram K. Vasudevan, OUP India.
5. Python Data Science Handbook, Jake Vanderplas, O'Reilly Media.

P3 23 DS103: STATISTICS FOR BUSINESS

COURSE OBJECTIVES:
The students should be able to
1. *To demonstrate the use statistical tools for diagrammatic and graphical representation of data and also computation of various measures of central tendency and dispersion*
2. *To analyze probability and probability distributions and moments of random variables*
3. *Prepare Control Charts for variables and attributes using data from economics*
4. *Apply Statistical techniques and solve various Business problems used in Economics and Business*
5. *Apply Statistical methods and Decision Analysis tools to analyze data arising in the Business.*

Module 1: Measures of Central Tendency   5 Hrs

Arithmetic Mean, Median, Mode, Geometric mean and Harmonic mean Merits and demerits – Relationship between mean, median and mode – Relationship AM, GM and HM – Computation of the measures for grouped and ungrouped data

Module 2: Measures of dispersion   6 Hrs

Range, mean deviation and standard deviation – coefficient of variation and its use – Quartiles and Inter quartile range – Quintiles, Deciles and Percentiles – Moving averages – Skewness and Kurtosis and their uses.

Module 3: Sampling   5 Hrs

Population and sample – Sampling and its need – Sampling vs complete enumeration – parameter and statistics – Probability sampling – Random sampling, Simple random sampling and stratified random sampling – Sampling distribution and standard error of a statistic.

Module 4: Testing of Hypothesis   5 Hrs

Derivation of sampling distribution of mean and S^2 – t-distribution and F-distribution – Central limit theorems – Test of significance – Basic concepts – null hypothesis – alternative hypothesis – level of significance – Standard error and its importance – One and two tailed tests – The use of p-values for Decision making – Large sample tests and Small sample tests

Module 5: Probability   6 Hrs

Deterministic and random experiments – Definition of sample space and events – Classical and axiomatic definitions – Properties of probability - addition theorem - conditional probability and multiplication theorem of probability – Definition of independent events – Random variables and their probability distributions – Discrete and continuous random variables

Module 6: Statistical Quality Control   3 Hrs

Nature of Control Limits – Purpose of Control Charts – Control Charts for Variables – Control Charts for Attributes – Cusum Control Charts.

BOOKS FOR REFERENCE:

1. S.C. Gupta, "Fundamentals of Statistics", 7th and Enlarged Edition, Himalaya publishing, Delhi.

2. D M Levine T C Krehbiel, M L Berensen, "Business Statistics: A First Course", Pearson Education, New Delhi, India.

3. R.P.Hooda, "Statistics for Business and Economics", 5th Edition, Vikas Publishing House Pvt. Ltd., Noida.

4. D M Levine, M L Berensen, T C Krehbiel and P.K.Viswanathan, "Business Statistics: A First Course", 5th Edition, Pearson Education, Delhi, India.

5. Richard I. Levin, David S. Rubin, "Statistics for Management", 7th Edition,Pearson Education.

P3 23 DS104: EXCEL FOR DATA SCIENCE

COURSE OBJECTIVES:
The students should be able to
1. Explain the Role of Spreadsheets in any business.
2. Design a Dashboard for the business to measure business goals
3. Calculate various metrics using formulas & functions
4. Evaluate data provided using data handling tools and analysis packages
5. Examine the data using charts & graphs

Module 1: Introduction to Spreadsheets   **3 Hrs**

Spreadsheet tools Excel and Google Sheets – fundamentals of spreadsheet applications – Data entry – Data gathering – Working with Microsoft Excel

Module 2: Excel Formulas   **6 Hrs**

Excel Formulas – basic & advanced: Mathematical Formulas – Logical – Text – Date & Time– Look-up

Module 3: Data handling in Excel   **5 Hrs**

Data types, Data structures, Data handling in Excel: Data Tools – Filtering – Sorting – Group & Ungroup – Conditional Formatting – Data Validation

Module 4: Working with Pivot tables   **5 Hrs**

Working with Pivot tables: Meaning of Pivot table – Create a Pivot table – Data Source & Layouts – Calculation & Formatting – Sort, Filter & Extract – Data Visualization

Module 5: Exploratory data Analysis in Excel   **7 Hrs**

Understand Characteristics of the dataset – Basic Statistics in Excel using Analysis Toolpak Add-in – Measure of central tendency (Mean, Median, Mode) – Measure of spread (Range, Quartile, Percentiles, absolute deviation, variance and standard deviation) – Measure of symmetry (Skewness) – Measure of Peakedness (Kurtosis)

Module 6: Visualization & Dashboards in Excel   **4 Hrs**

Charts in Excel: Show the data – Formatting – Creating Simple Dashboards in Excel – Static & Dynamic dashboards

BOOKS FOR REFERENCE:
1. Excel Data Analysis, Hector Guerrero, Springer - Verlag Berlin and Heidelberg GmbH & Co. KG.
2. How to Excel In Data Science Interview, Ken J Stevens, Createspace Independent Publishing Platform.
3. Data, Statistics, and Decision Models with Excel, Donald L. Harnett and James F. Horrell, John Wiley & Sons Inc.

4. EXCEL FOR DATA SCIENCE, Dr Bienbenue Maula
5. Automated Data Analysis Using Excel, Brian D. Bissett, Apple Academic Press Inc.

PROGRAMME STRUCTURE – PGD ERP (Data Science)

II SEMESTER

Paper No.	Title of the Paper	Marks		Total Marks	Credits	Hours
		CIA	ESE			
P3 23 DS201	Advanced Statistical Methods - I	50	50	100	4	30
P3 23 DS202	Advanced Statistical Methods - II	50	50	100	4	30
P3 23 DSMM203	Data Science Applications – Sales & Marketing	50	50	100	4	30
P3 23 DSHR204	Data Science Applications – Human Resource Management	50	50	100	4	30

P3 23 DS201: ADVANCED STATISTICAL METHODS - I

COURSE OBJECTIVES:
The students should be able to
1. Explain the Role of Financial Manager in the present state of Affairs.
2. Design an optimum Capital structure that minimises the overall Cost of Capital
3. Calculate Risk and Return of portfolio by using CAPM.
4. Evaluate Investment Decision by using Capital Budgeting Technique under Risk and Uncertainty.
5. Examine the extent to which Capital Markets are efficient and its implications on the role of Capital Market in Merchant Banking.

Module 1: Linear Regression   4 Hrs

Linear Regression – the theory: What is simple linear regression and its uses – Types of variables – Assumptions of simple linear regression – Perform a simple linear regression involving test & training data sets – Interpreting the results – Presenting the results.

Module 2: Linear Regression using Python   6 Hrs

Carry out Simple Linear regression analysis in Python and interpreting the results using pandas, numpy, maplotlib, seaborn, sklearn.

Module 3: Multi Linear Regression   4 Hrs

Multi Linear Regression – the theory: What is Multi linear regression and its uses – Types of variables – Assumptions of Multi linear regression – Perform a Multi linear regression – Interpreting the results – Presenting the results

Module 4: Multi Linear Regression using Python   6 Hrs

Carry out Multi-Linear regression analysis in Python and interpreting the results using pandas, numpy, maplotlib, seaborn, sklearn

Module 5: Logistic Regression   4 Hrs

Logistic Regression – the theory: What is Logistic regression and its uses – Linear regression vs logistic regression – Types of variables – Assumptions of Logistic regression – Types of Logistic regression models – Perform a Logistic regression – Interpreting the results – Presenting the results

Module 6: Logistic Regression using Python   6 Hrs

Carry out Binary Logistic regression analysis in Python and interpreting the results using pandas, numpy, maplotlib, seaborn, sklearn

BOOKS FOR REFERENCE:

1. Statistical Methods by SP GUPTA 48TH EDITION 2022, Sultan Chand & Sons.
2. Advanced Statistical Methods in Data Science, Xuewen Lu, Ding-Geng Chen, Jiahua Chen, Hao Yu , Grace Y. Yi, Springer

3. Advanced Statistical Methods for the Analysis of Large Data-Sets, Agostino Di Ciaccio, Mauro Coli, Jose Miguel Angulo Ibanez, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG
4. Advanced and Multivariate Statistical Methods, Rachel A. Vannatta, Craig a Mertler, Craig A. (Arizona State University, USA) Mertler, Kristina N Lavenia, Rachel A Vannatta, Taylor and Francis.
5. Understanding Advanced Statistical Methods, Peter Westfall, Kevin S. S. Henning, Peter (Texas Tech University, Lubbock, USA) Westfall, Kevin S. S. (Sam Houston State University, Huntsville, Texas, USA) Henning, Kevin S S Henning, CRC Press.

P3 23 DS202: ADVANCED STATISTICAL METHODS - II

COURSE OBJECTIVES:
The students should be able to
1. Explain briefly unsupervised learning problems and algorithms used to solve them.
2. Design a Time series, Market basket and Clustering analysis to solve business problems using Python
3. Calculate various metrics involved in the Time series, Market basket and Clustering analysis
4. Evaluate business problems and suggest the right unsupervised learning technique to solve it.
5. Examine application of these techniques in different industries.

Module 1: Time Series Analysis   **4 Hrs**

Introduction to Time Series Analysis – Components – Types of data – Terminology – Visualize the Time Series – Patterns in a Time Series – Additive and Multiplicative Time Series – Difference between white noise and a stationary series

Module 2: Time Series Analysis using Python   **6 Hrs**

Carry out time-series analysis in Python and interpreting the results using pandas, numpy, maplotlib, seaborn

Module 3: Clustering Analysis   **4 Hrs**

Introduction to Unsupervised learning problems – Introduction to Clustering – Types of Clustering & Clustering Algorithms – K means clustering – Applications of Clustering

Module 4: K means clustering using Python   **6 Hrs**

Carry out K Means Algorithm in Python using scikit-learn library

Module 5: Association Rule mining   **4 Hrs**

Meaning of Association rules – Algorithms used in Market Basket analysis – Advantages of Market basket analysis – Market basket analysis from Customer and Retailer perspectives

Module 6: Market Basket Analysis using Python   **6 Hrs**

Carry out Market Basket Analysis from scratch in Python

BOOKS FOR REFERENCE:

1. Statistical Methods by SP GUPTA 48TH EDITION 2022, Sultan Chand & Sons.
2. Advanced Statistical Methods in Data Science, Xuewen Lu, Ding-Geng Chen, Jiahua Chen, Hao Yu , Grace Y. Yi, Springer
3. Advanced Statistical Methods for the Analysis of Large Data-Sets, Agostino Di Ciaccio, Mauro Coli, Jose Miguel Angulo Ibanez, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG

4. Advanced and Multivariate Statistical Methods, Rachel A. Vannatta, Craig a Mertler, Craig A. (Arizona State University, USA) Mertler, Kristina N Lavenia, Rachel A Vannatta, Taylor and Francis.

5. Understanding Advanced Statistical Methods, Peter Westfall, Kevin S. S. Henning, Peter (Texas Tech University, Lubbock, USA) Westfall, Kevin S. S. (Sam Houston State University, Huntsville, Texas, USA) Henning, Kevin S S Henning, CRC Press.

P3 23 DSMM203: DATA SCIENCE APPLICATIONS – SALES & MARKETING

COURSE OBJECTIVES:
The students should be able to
1. Explain the Role of Data science in Sales & Marketing.
2. Design data analytics in Sales, Retail, Web & social media
3. Calculate various metrics used in Sales & Marketing functions.
4. Evaluate how effectively businesses use data in driving decisions in Sales & marketing.
5. Examine the extent to which data science is efficient and its application in Sales & Marketing function.

Module 1: Data Science Application in Sales & Marketing   3 Hrs
Need for Sales & Marketing Analytics – Types of Analytics used in Sales & Marketing

Module 2: Data Types generated in Sales & Marketing   3 Hrs

Understand the various data generated by Sales & Marketing departments in the business – Sales & marketing data used by business to make decisions – Primary data & Secondary data in Sales & Marketing

Module 3: Sales Analytics   6 Hrs

Sales trends & growth – Sales target & achievement – Sales opportunities – Lead to conversion analysis – Pipeline analysis – Quote to Cash – Average Sales Value – Segmentation – Route to Market – Sales Cycle – Sales Productivity – Analyzing Sales data using Python

Module 4: Retail Analytics   6 Hrs

POS Analysis & dashboards using Python – Assortment Optimization – Shopping basket analysis – Frequent shopper programs – Retail vs Customer Panel analysis – Analysis driving store design

Module 5: Customer Analytics   6 Hrs

Customer Segmentation – RFM analysis using Excel – Customer churn – Understanding Customer loyalty using CLI model

Module 6: Web, Social Media, Digital Analytics   6 Hrs

Web analytics – Click stream analytics – Social Media analytics

BOOKS FOR REFERENCE:
1. Marketing Data Science: Modeling Techniques in Predictive Analytics with R and Python (FT Press Analytics) Thomas W. Miller, Pearson.
2. Practical Text Analytics: Interpreting Text and Unstructured Data for Business Intelligence (Marketing Science), Dr. Steven Struhl, Kogan Page.
3. Data Science for Marketing Analytics, Mirza Rahim Baig, Gururajan Govindan, Packt Publishing Limited.
4. Data Science for Marketing Analytics, Tommy Blanchard, Packt Publishing Limited

5. *Computing Application of Classifiers for Marketing Data Mine, Sant Sharan Mishra, LAP Lambert Academic Publishing.*

6. *Handbook of Research on Applied AI for International Business and Marketing Applications, Bryan Christensen, IGI Global.*

7. *Artificial Intelligence for Marketing - Practical Applications, Jim Sterne, John Wiley & Sons Inc.*

8. *Handbook of Research on Intelligent Techniques and Modeling Applications in Marketing Analytics, Anil Kumar, IGI Global.*

P3 23 DSHR204: DATA SCIENCE APPLICATIONS – HUMAN RESOURCE MANAGEMENT

COURSE OBJECTIVES:
The students should be able to
1. Explain the Role of Data science in HR.
2. Design data analytics in HR
3. Calculate various metrics used in HR as a function.
4. Evaluate how effectively businesses use data in driving decisions in HR.
5. Examine the extent to which data science is efficient and its application in HR function.

Module 1: Data Science Application in HR   **3 Hrs**

Need for Data Science in HR - Analytics – Types of Analytics used in HR – Measuring benefit of data driven HR initiatives

Module 2: Data Types generated in HR   **3 Hrs**

Understand the various data generated by various departments in HR – HR data used by business to make decisions – Primary data & Secondary data in HR

Module 3: Types of HR Metrics   **6 Hrs**

Understand the strategic KPI used in HR – HR metrics: Recruitment – Learning & Development – Operations – Compensation & Benefits – Employee Engagement – Time tracking – Employee Performance & Rewards

Module 4: Attrition Analytics   **6 Hrs**

Understand the who, why when of Employee turnover – Voluntary attrition – Talent attrition – Retention rate

Module 5: Employee Engagement Analytics   **6 Hrs**

Measuring Employee engagement & satisfaction – Visualization using Python – Key drivers of Employee engagement – Diversity KPIs

Module 6: Workforce Analytics   **6 Hrs**

What are workforce analytics – Benefits of Workforce analytics – Implementing workforce analytics – Challenges of Workforce analytics – Elaborating on Skill-Gap Analysis.

BOOKS FOR REFERENCE:
1. Big Data Impacts on Human Resource Management. Using Multinational Enterprises as Example, Yi-Chuan Chen, Grin Publishing.
2. Big Data in Organizations and the Role of Human Resource Management, Tobias M. Scholz, Peter Lang AG.
3. Application of fuzzy techniques to Human Resources Management, Trinidad Casasus Estelles, LAP Lambert Academic Publishing.

4. Excel 2019 for Human Resource Management Statistics, Thomas J. Quirk, Springer Nature Switzerland AG.

5. Human Resource Information Systems: Basics, Applications, And Future Directions, Michael J Kavanagh, Mohan Thite, SAGE publications.

6. Predictive Analytics in Human Resource Management, Shivinder Nijjer, Taylor & Francis Ltd.

7. Human Resource Analytics Theory and Application Techniques First Edition, Swati Dhir, Cengage Learning India.