Scheme and Syllabus – B Com (Data Analytics) - Model III

B Com with Data Analytics as Optional/ Elective stream is offered as a Model III Programme wef Academic Year 2022-23. The scheme, curriculum and other requirements for the programme will be the same as that of all other B Com Programme which are presently offered.

The summary of the programme is as under:

Total credits: **120**
Semesters- 6
Working Days per Semester: **90**
Working Hours per Semester: **450**
Examination- External Evaluation: 80% and Internal evaluation- 20%

Course Structure

Common Courses

Sl No	Course Name	Credit	Hours per week
1	Language- English-I	4	5
2	Language- English-II	4	5
	TOTAL	**8**	

Complementary Courses

Sl No	Course Name	Credit	Hours per week
1	Business Communication and MIS	4	4
2	Banking and Insurance	3	4
3	Business Environment	4	4
4	Principles of Business Decisions	3	4

5	Business Ethics and Corporate Social Responsibility	3	3
6	Logistics and Supply Chain Management	3	3
7	Data Analytics stream– E- Commerce	**4**	**5**
8	Data Analytics stream - Fundamental of Financial Analytics	**4**	**5**
	TOTAL	**28**	

Core Courses

Sl No	Course Name	Credit	Hours per week
1	Dimensions and Methodology of Business Studies	**2**	**3**
2	Financial Accounting I	**4**	**5**
3	Corporate Regulations and Administration	**3**	**4**
4	Financial Accounting II	**4**	**5**
5	Business Regulatory Framework	**3**	**4**
6	Business Management	**3**	**3**
7	Corporate Accounting I	**4**	**5**
8	Quantitative Techniques for Business- 1	**4**	**5**
9	Financial Markets and Operations	**3**	**4**
10	Marketing Management	**3**	**3**
11	Optional - 1	**4**	**5**
12	Corporate Accounting II	**4**	**6**

13	Quantitative Techniques for Business- II	**4**	**6**
14	Entrepreneurship Development and Project Management	**4**	**5**
15	Optional - 2 -	**4**	**5**
16	Cost Accounting - 1	**4**	**6**
17	Environment Management and Human Rights	**4**	**5**
18	Optional - 3	**4**	**5**
19	Cost Accounting - 2	**4**	**6**
20	Advertisement and Sales Management	**3**	**4**
21	Management Accounting	**4**	**5**
22	Optional - 4	**4**	**5**
23	**Project and Viva**	1	**-**
	TOTAL	**81**	

Details of Optional Courses

Sl No	Course Name	Credit	Hours per week
	DATA ANALYTICS		
1	Data Analytics for Commerce	4	5
2	Programming Languages in Data Analytics	4	5
3	Data Analytics with SPSS	4	5
4	Data Analytics with Python	4	5

OPEN COURSES OFFERED

Sl No	Course Name	Credit	Hours per week
1	**CO5OPT01-** Fundamentals of Banking and Insurance	3	4
2	**CO5OPT02-** Capital Market and Investment Management	3	4
3	**CO5OPT03-** Fundamentals of Accounting	3	4
	TOTAL	**3**	

Semester-wise details

Semester- 1

Sl No	Course Code	Course Name	Credit	Hours per week
1		Language- English-I	4	5
2	CO1CMT03	Business Communication and MIS	4	4
3	CO1CRT01	Dimensions and Methodology of Business Studies	**2**	**3**
4	CO1CRT02	Financial Accounting I	**4**	**5**
5	CO1CRT03	Corporate Regulations and Administration	**3**	**4**
6	CO1CMT01	Banking and Insurance	3	4
		TOTAL	**20**	**25**

Semester- 2

Sl No	Course Code	Course Name	Credit	Hours per week

1		Language- English-II	4	5
2	CO2CMT04	Business Environment	4	4
3	CO2CRT04	Financial Accounting II	**4**	**5**
4	CO2CRT05	Business Regulatory Framework	**3**	**4**
5	CO2CRT21	Business Management	**3**	**3**
6	CO2CMT02	Principles of Business Decisions	3	4
		TOTAL	**21**	**25**

Semester 3

Sl No	Course Code	Course Name	Credit	Hours per week
1	CO3CMT05	Business Ethics and Corporate Social Responsibility	3	3
2	CO3CRT07	Corporate Accounting I	**4**	**5**
3	CO3CRT08	Quantitative Techniques for Business- 1	**4**	**5**
4	CO3CRT09	Financial Markets and Operations	**3**	**4**
5	CO3CRT10	Marketing Management	**3**	**3**
6		Optional - 1		
	CO3OCT08	For Data analytics Stream - Data Analytics for Commerce (Theory)	**3**	**3**
		Data Analytics for Commerce (Practical)- ***Exam in semester 4 only***	-	**2**
		TOTAL for streams Data Analytics	**20**	**25**

Semester- 4

Sl No	Course Code	Course Name	Credit	Hours per week
1	CO4CMT06	Logistics and Supply Chain Management	3	3
2	CO4CRT11	Corporate Accounting II	**4**	**6**
3	CO4CRT12	Quantitative Techniques for Business- II	**4**	**6**
4	CO4CRT13	Entrepreneurship Development and Project Management	**4**	**5**
5		Optional - 2 -		
	CO4OCT08	For Data Analytics Stream- Programming Languages in Data Analytics (Theory)	**3**	**3**
		Programming Languages in Data Analytics (Practical)	**-**	**2**
	CO4OCP04	***For Data Analytics Stream*** ***Practical Examination*** for Data Analytics for Commerce and Programming Languages in Data Analytics	**2**	**NA**
		TOTAL for stream data Analytics	**20**	**25**

Semester- 5

Sl No	Course Code	Course Name	Credit	Hours per week
1	CO5CRT14	Cost Accounting - 1	**4**	**6**

2	CO5CRT15	Environment Management and Human Rights	**4**	**5**
3	CO5CMT07	Complementary Course For Data analytics Stream- E- Commerce	**4**	**5**
4		Optional - 3		
	CO5OCT08	For Data Analytics Stream Data Analytics with SPSS (Theory)	**3**	**3**
		Data Analytics with SPSS (Practical)- **Examination in 6th Semester only**	**-**	**2**
5		Open Course	**3**	**4**
		TOTAL for Data Analytics stream	**18**	**25**

Semester- 6

Sl No	Course Code	Course Name	Credit	Hours per week
1	CO6CRT17	Cost Accounting - 2	**4**	**6**
2	CO6CRT18	Advertisement and Sales Management	**3**	**4**
3	CO6CMT13	Complementary Course For Data Analytics Stream Fundamentals of Financial Analytics	**4**	**5**
4	CO6CRT20	Management Accounting	**4**	**5**
5		Optional - 4		**5**
	CO6OCT08	For Data Analytics Stream Data Analytics with Python (Theory)	**3**	**3**

		For Data Analytics Stream Data Analytics with Python (Practical)	-	**2**
	CO6OCP02	**For Data analytics Stream** Practical Examination – Data Analytics with SPSS and Data Analytics with Python	**2**	**NA**
6	CO6PRT01	Project and Viva	1	-
		TOTAL for Data Analytics Stream	**21**	**25**

Note:

Syllabus for Core and Complementary Courses other than those specific for the elective stream will be the same as that of other Model III Programmes.

Syllabus of Core Elective and Complementary Courses for Data Analytics Stream

Semester 3

Elective Course: 1 DATA ANALYTICS FOR COMMERCE

Instructional Hours: 90 (Theory 54 hrs and Practical 36 Hrs)

Credit: 4 (*3 theory + 1 practical-Combined Practical Exam in Semester 4)*

Module I –Introduction to Data Analytics- Applications of Data Analysis- Types of Jobs in Data Analytics- Data Science - Meaning-Areas of Study in Data Science- Basic Measurement Scales-Nominal- Ordinal-Interval-Ratio Scales; Types and Forms of Data- Quantitative and Qualitative-Big Data and Small Data- Types of Data Structures- File Formats- and Sources of Data- Data Quality- Data Pre -Processing- Introduction- Various Data Pre -Processing Operations (Hours - 25)

Module 2 Data vs Information- Data and Decision Making- Kinds of Analytics-Descriptive Analytics Predictive Analytics-Prescriptive.- Process-Traditional Analytics-Big Data Analytics-Application of Data Analytics in Commerce (Hours - 15)

Module 3 Getting started with Power Query - Know the Environment tabs and toolbars - Access new or existing reports - Importing and combining data from databases, web, files - Splitting and aggregating data - Query data from SQL - Working in the Select Part of an SQL Query - Managing SQL commands - Managing Tables (Hours - 15)

Module 4 . Data Mining- Building an Analytics Framework- Data Analytics Lifecycle- Data Analytics Process- Data Visualization- Data Dictionary- Machine Learning (ML)- SQL-Clustering- Text analysis- Data Analytics Tools and Techniques

(Hours - 15)

Module 5 -Introduction to Data Analytics Softwares; Coding- Role-Importance-Features; Coding Languages -HTML-Java-Python-C Language-PHP-SQL; (Hours- 20)

Suggested Readings

1. Joao, Mendes.Andre de, Carvalho.and Thomas, Horvath(2018).*A General Introduction to Data Analytics.*Wiley Interscience,First Edition.
2. Maheswary, Anil.(2014). Data analytics,McGraw Hill Education, First Edition

3. Prasad,R N. and Acharya,Seema.(2011). Fundamentals of Business Analytics.
4. John Wiley &Sons. Kumar,U, Dinesh.(2017). Business Analytics.
5. Wiley Cielen,Davy. Meysman,Arno D B. and Ali, Muhamed.(2016).Introducing Data Science.Dreamtech Press

Sample Lab Exercise

1. Create a spreadsheet using excel, Google, and SPSS
2. Store/prepare data in array and string formats. Prepare Stacks and Queues
3. Prepare a Google form with all types of scales
4. Code items from a questionnaire and input into a spreadsheet
5. Identify the missing entries in from a data set
6. Save files in different formats
7. Given a data set, use Power Query to transform the data. Apply the Power Query function to improve the data
8. Build a report on the best practices of Data handling and data presentation
9. Queue implementation
10. Create a Data dictionary which contains salary details of an employee

Semester 4

Elective Course: 2 PROGRAMMING LANGUAGES IN DATA ANALYTICS

Instructional Hours: 90 (54 Hours Theory 36 Hours Practical)

Credit: 4 *(3 Theory + 1 practical- Combined Practical exam in Semester 4)*

Module1-Introduction to Programming Languages –Python-JavaScript-Java-C/C++-SQL-MATLAB-Scala-Julia -SAS- Pandas -Numpy - Matplotlib -Scikit Learn -nltk -Other Tools (Hours - 10)

Module 2-R Programming Language- --Basic Language Elements and Data Structures R+Knitr+Markdown+GitHub -Data Input/Output -Data Storage Formats -Subsetting Objects -Vectorization -Control Structures -Functions -Scoping Rules -Loop Functions -Graphics and visualization -Grammar of Data Manipulation (dplyr and related tools) (Hours - 20)

Module 3-Introduction to Python -The Application Areas of Python - Execute Python Program From Command Prompt and Using IDLE -Save Programs With .Py Extension and Execute It From Prompt -Python Basics -Data Types and Variables- Operators and Operator Precedence -Data Type Conversions -Command Line Argument- Data Input -Comments -Import Modules-File Handling-Reading –Writing-File Manipulations –Directories

(Hours - 25)

Module 4-Introduction to Java-Java Evaluation-Characteristics-Overview of Java –Data Type in Java-Variables in Java-Constant, Operators, Decision Making and Looping in Java-MATLAB Overview-Variables –Data Type

(Hours - 15)

Module 5-SQL Concepts- Basics of SQL, DDL,DML,DCL, Structure – Creation, Alteration, Defining Constraints – Primary Key, Foreign Key, Unique, Not Null, Check, IN Operator, Functions - Aggregate Functions, Built-In Functions – Numeric, Date, String Functions, Set Operations, Subqueries, Correlated Subqueries,

(Hours - 20)

Suggested Readings

1. Schildt,Herbert.(2017). *The Complete Reference Java.*McGrew Hill Education
2. Groff, James,R. Weinberg, Paul N. and Oppel, AndrewJ. (2017).*The Complete Reference SQL.* McGrew Hill Education
3. Brown, Martin, C.(2018).*The Complete Reference Python*, McGrew Hill Education
4. Murray, D. (2014) Knowledge Machines: Language and Information in a Technological Society. Oxon: Routledge
5. Walter Shields (2019) SQL QuickStart Guide: The Simplified Beginner's Guide to Managing, Analyzing, and Manipulating Data: ClydeBank Media LLC
6. Andriy Burkov (2019) The Hundred-Page Machine Learning Book
7. Barry Devlin(2014) Business unIntelligence: Insight and Innovation beyond Analytics and Big Data: Technics Publications, LLC
8. Anil Maheshwari (2015) Data Analytics Made Access

Sample Lab Exercises

1. Install Python
2. Addition, subtraction, division, and multiplication in Python
3. SQL subqueries on HR database
4. SQL retrieve data from tables
5. Write a java program to print the sum of two numbers
6. Write a java program to divide two number and print on the screen
7. Write a program to check whether a number is prime or not
8. Write a query to get the total salaries payable to employees

Semester 5

Elective Course: 3 DATA ANALYTICS WITH SPSS

Instructional Hours: 90 (56 Hours Theory 36 Hours Practical)

Credit: 4 *(3 Theory + 1 practical- Combined practical exam in Semester 6)*

Module 1- An introduction to SPSS- SPSS Meaning-Application and Uses of SPSS-SPSS Features and Limitations.-Comparison of SPSS with others Statistical Tools-Download and Install SPSS: Step-By-Step Guide- Mouse and Keyboard Processing, Frequently –Used Dialog Boxes,- Editing Output- Printing Results- Creating and Editing a Data File- Merits of SPSS

(Hours 15)

Module 2- Inferential Statistics-Hypothesis Analysis with SPSS-Null/Alternative Hypothesis Formulation- Chi Square Test- Correlation Analysis- T- Test Procedure- One Sample T Test-Paired Sample T Test- Two Sample (Independent) T Test-ANOVA Procedure- One Way Analysis of Variance-Two Way Analysis of Variance

(Hours - 20)

Module 3- Predictive Modeling -Importance of Predictive Modeling- Types of Business Problems- Mapping of Techniques- Different Phases of Predictive Modeling (Hours - 10)

Module 4- Data Preparation- Need of Data Preparation- Outlier Treatment Missing Values-Variable Reduction Techniques (Factor Analysis)- Introduction to Factor Analysis – PCA- Factor Rotation And Extraction- Result Interpretation-Decision Tree- Introduction Of Decision Trees-Types Of Decision Tree Algorithms CHAID Vs. CART- Decision Trees – Validation- Overfitting

(Hours - 20)

Module 5- Linear Regression-Introduction of Linear Regression-Applications and Assumptions of Linear Regression- Building Linear Regression Model- Understanding Standard Metrics (Variable Significance, R- Square/Adjusted R-Square, Global Hypothesis ,etc)- Validation of Models - Training-Validation Approach- Standard Business Outputs (Decile Analysis, Error Distribution (Histogram), Model Equation, Drivers etc.)- Interpretation of Results - Business Validation - Implementation on New Data- Interpretation of Model Parameters (Hours - 25)

Suggested Readings:

1. Asthana Hari, Shankar. and Bhushan, Braj.(2016).*Statistics for Social Sciences*.PHI Learning Private Limited Second Edition.
2. Field, Andy.(2019). *Discovering Statistics Using IBM SPSS Statistics,SAGE Publications India Pvt.Ltd Fourth Edition.*
3. Jasrai, Lokesh.(2020).*Data Analysis Using SPSS*.SAGE Publications India Pvt Ltd First Edition.
4. George, Darren. and Mallery, Paul.(2018*)IBM SPSS Statistics 23 Step By Step,*T and F India.
5. Basel,M. and Eideh, Al.92016).*Statistical Methods for Business Data Analysis Usin*g *SPSS,*Scholars Press.

Sample Lab Exercises

1. Download and install SPSS
2. Creating and Editing a data file
3. Entering and saving data in SPSS
4. Determine correlation between two variables
5. Testing paired data
6. Computation of Chi-square using SPSS
7. Conduct one way ANOVA test in SPSS
8. Conduct Two Way ANOVA test in SPSS
9. Programme for finding sample T test
10. Compute a regression line to investigate if a players height can predict their weight

Semester 6

Elective: 4 DATA ANALYTICS WITH PYTHON

Instructional Hours: 90 (54 Hours Theory 36 Hours Practical)

Credit: 4 *(3 Theory + 1 practical- Combined Practical Exam in Semester 6)*

Module 1 – Introduction: Features of Python, Variables and Assignments, Output, Input in Python, Operators, Control Flow Statements: Decision Making Structures, Loops, Identifiers, Objects, Numeric types: Floating-point, Arithmetic expressions, Python expressions, Division and modulo", Module basics, Math module, Representing text, String basics, List and Set basics, Common data types summary, Type conversions, Binary numbers, String formatting (Hours - 25)

Module 2: -Data Structures - List- Tuples- Dictionary- In-Built Modules and User Defined Modules-Numpy Library for Arrays- One-Dimensional and Multi-Dimensional (Hours - 15)

Module 3: -Pandas Library for Data Processing- Basics for Data Frame- Import of Data Functions of Data Frame- Data Extraction- Group by Functionality- Creating Charts for Data Frame- Missing Values. (Hours - 20)

Module 4 -Mat Plot Lib Library FD or Visualization- Seaborne Library for Visualization- Visualization for Categorical Variable- Visualization of Continuous Variable. (Hours - 15)

Module 5- Importing Data Set- Understanding The Domain-Understanding The Dataset- Python Package for Data Science - Importing and Exporting Data in Python- Basic Insights From Datasets. (Hours - 15)

Suggested Readings

1. Rohan, Chopra. Aaron, England. and Mohamed, Noordeen, Alaudeen.(2019).*Data Science with Python*,Packt.
2. Jeeva, Jose.(2016). Taming Python by Programming.New Delhi, Khanna Publishers.
3. John Paul Mueller. Python for Data Science for Dummies; Luca Massaron; ISBN: 9788126557394
4. Dr.R. Nageswara Rao. Core Python Programming, 2ed;; ISBN: 9789386052308

5. U Dinesh Kumar. Machine Learning using Python; Manaranjan Pradhan,; ISBN: 9788126579907

Sample Lab Exercises

1. Read and write data from/to files in Python.
2. Create a python program to draw a Histogram, Column Chart, Box plot chart, Pie Chart, and Scatter plot using pandas and mat plot lib.
3. Performing Descriptive statistics in Python-central tendency measure, graphical measures, hypothesis testing
4. Create a python program to export data (store Data Frame in CSV Format) 8. Create a python program to handle the missing data from a dataset using numpy and pandas.
5. Create a python program to import data from any .csv file and analyze using the statistical functions of pandas tools

Semester: 6

Complementary Course : FUNDAMENTALS OF FINANCIAL ANALYTICS

Instructional Hours: 72	**Credit: 3**

Module 1-Need for data driven decision making - Solving the business problem using Analytics - Overview of Analytical cycle and Hierarchy of information user - The Complete BA professional - Understand BA roles and Responsibilities - Identify the Popular BA Tools. Business Intelligence - Definitions - Evolution of Business Intelligence and Role of DSS-EIS- MIS and Digital dashboards, Business Intelligence Applications-technology solutions and business solutions (Hours - 20)

Module 2- Essentials of Business Analytics Introduction-Decision Making- Business Analytics Definition-Business Analytics meaning - categorization of Analytical methods and models Descriptive -Predictive -Prescriptive–Big data- Business Analytics in practice-Financial- Human Resource- Marketing- Supply chain Analytics- Analytics for government and Nonprofits- sports and web Analytics. (Hours - 20)

Module 3- Business Analytics for Managers Business analytics model- Overview of Business-driven environment & technically oriented environment-types of Reporting and Analytical process-case study. (Hours - 10)

Module 4- Financial Analytics Introduction: Meaning-Importance of Financial Analytics uses-Features-Documents used in Financial Analytics- Balance Sheet- Income Statement- Cash flow statement-Elements of Financial Health- Liquidity- Leverage-Profitability. (Hours - 10)

Module-5 - Introduction to analytics methodology - Preparing objectives and identifying data requirements- Data collection - Understanding data- Data preparing - Data cleaning - Normalization- Data blending -Data modeling - Evaluation and Feedback- Role and Responsibilities. Information and Knowledge-Methodology-Data-Required Competencies for the Analyst-Hypothesis- Driven methods-Data Mining with Target variables-Explorative methods-Business requirements. (Hours - 12)

Suggested Readings

1. Geat H.N.Laursen Jesper Thorlund, *Business Analytics for Managers , P.No: 1-16-Unitiii, P.No:93-136-Unit V*
2. R N Prasad,. Seema Achavya,*Fundamentals of Business Analytics -Wiley India PVT Ltd, New Delhi, P.No: 87-100, P.No:115-12*5
3. R N Prasad Seema Achavya,*Fundamentals of Business Analytics* -, Cengage Learning, New Delhi, P.No: 87-100, P.No:115-125
4. Bennett Mark J,Hugen Dirk L,Financial Analytics With R,*Cambridge University Press;First Edition,2016*