



Date :- 01/08/2024

## **NOTIFICATION**

Sub :- CBCS Syllabi of B. Sc. in Data Science (Sem. I & II)

Ref. :- Decision of the Academic Council at its meeting held on 27/07/2024.

The Syllabi of B. Sc. in Data Science (First and Second Semesters) as per **NATIONAL EDUCATION POLICY – 2020 (2024 Pattern)** and approved by the Academic Council as referred above are hereby notified for implementation with effect from the academic year 2024-25.

Copy of the Syllabi Shall be downloaded from the College Website ([www.kcesmjcollege.in](http://www.kcesmjcollege.in))

**Sd/-**  
**Chairman,**  
**Board of Studies**

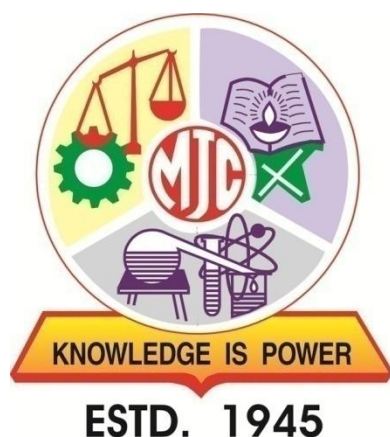
**To :**

- 1) The Head of the Dept., M. J. College, Jalgaon.
- 2) The office of the COE, M. J. College, Jalgaon.
- 3) The office of the Registrar, M. J. College, Jalgaon.

**Knowledge is Power**

Khandesh College Education Society's  
**Moolji Jaitha College, Jalgaon**  
An "Autonomous College"

Affiliated to  
Kavayitri Bahinabai Chaudhari  
North Maharashtra University, Jalgaon 425001



**STRUCTURE AND SYLLABUS**  
**B.Sc. Honors/Honors with Research**  
**(F.Y.B.Sc. Data Science)**

**Under Choice Based Credit System(CBCS)**  
**and**  
**as per NEP-2020 Guidelines**

**[w.e.f.AcademicYear:2024-25]**

## Preface

Skilled human resources is a prerequisite in higher education, and it is necessary to acquire a thorough knowledge of theoretical concepts and hands-on laboratory methods. The Moolji Jaitha College (Autonomous) has adopted a department-specific model as per the guidelines of UGC, NEP-2020 and the Government of Maharashtra. The Board of Studies in Computer Science of the college has prepared the syllabus for the first-year undergraduate of Data Science. The syllabus cultivates theoretical and practical know-how in different fields of Data Science.

Data Science is a vast field comprising many topics of Statistics, Mathematics, and IT. Technology abounds and the tools to practice data science are evolving rapidly. A Data Science course covers basic and advanced concepts of data analytics, machine learning, statistics, and programming languages like Python or R. It also teaches students how to interpret large datasets and identify patterns to create predictive models. Course focuses on core, fundamental principles as well as new technologies in data science. Data science can be a rewarding field with many opportunities for growth and impact. Data science professionals can use data to solve real-world problems, make decisions, and improve performance across many industries. The curriculum strongly emphasises imparting hands-on skills, with more experiments that run hand-in-hand with theory. The detailed syllabus of each paper is appended with a list of suggested readings.

### Program Outcomes (PO) for B.Sc. Program:

Program outcomes associated with a B.Sc. degree are as follows:

1. Graduates should have a comprehensive knowledge and understanding of the fundamental principles, theories, and concepts in their chosen field of study.
2. Graduates should possess the necessary technical skills and competencies related to their discipline, including laboratory techniques and data analysis.
3. Graduates should be able to identify, analyze, and solve complex problems using logical and critical thinking skills. They should be able to apply scientific methods and principles to investigate and find solutions.
4. Graduates should be proficient in effectively communicating scientific information, both orally and in writing.
5. Graduates should have a basic foundation in research methods and be capable of designing and conducting scientific investigations.
6. Graduates should be able to work effectively as part of a team, demonstrating the ability to collaborate with others, respect diverse perspectives, and contribute to group projects.
7. Graduates should recognize the importance of ongoing learning and professional development. They should be equipped with the skills and motivation to continuously learn, adapt to new technologies and advancements in their field, and stay updated with current research.

### Program Specific Outcome PSO (B.Sc. Data Science):

After completion of this course, students are expected to learn/understand the following:

|   |                                                                                                                                                  |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | demonstrate proficiency with statistical <b>analysis of data</b> and Data Visualization Techniques.                                              |
| 2 | apply data science concepts and methods to <b>solve</b> problems in real-world contexts and will <b>communicate</b> these solutions effectively. |
| 3 | learn Core concepts in computer and data science                                                                                                 |
| 4 | have hands on different front end framework tools                                                                                                |
| 5 | learn latest technologies such as PowerBI etc.                                                                                                   |

## Multiple Entry and Multiple Exit options:

The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured;

| Levels | Qualification Title                                                      | Credit Requirements |         | Semester | Year |
|--------|--------------------------------------------------------------------------|---------------------|---------|----------|------|
|        |                                                                          | Minimum             | Maximum |          |      |
| 4.5    | UG Certificate                                                           | 40                  | 44      | 2        | 1    |
| 5.0    | UG Diploma                                                               | 80                  | 88      | 4        | 2    |
| 5.5    | Three Year Bachelor's Degree                                             | 120                 | 132     | 6        | 3    |
| 6.0    | Bachelor's Degree- HonoursOr<br>Bachelor's Degree- Honours with Research | 160                 | 176     | 8        | 4    |

## Credit distribution structure for Three/ Four year Honors/ Honors with Research Degree Programme with Multiple Entry and Exit

### F.Y. B.Sc.

| PART - BSC.                                                                                                                                     |          |                        |                        |                        |                      |                 |                                              |                      |                        |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------|------------------------|------------------------|----------------------|-----------------|----------------------------------------------|----------------------|------------------------|---------------------------|
| Year (Level)                                                                                                                                    | Sem      | Subject-I (M-1)        | Subject-II (M-2)       | Subject-III (M-3)      | Open Elective (OE)   | VSC, SEC (VSEC) | AEC, VEC, IKS                                | CC, FP, CEP, OJT, RP | Cumulative Credits/Sem | Degree/ Cumulative Credit |
| I (4.5)                                                                                                                                         | I        | DSC-1(2T)<br>DSC-2(2P) | DSC-1(2T)<br>DSC-2(2P) | DSC-1(2T)<br>DSC-2(2P) | OE-1(2T)             | ---             | AEC-1(2T) (Eng)<br>VEC-1(2T) (ES)<br>IKS(2T) | CC-1(2T)             | 22                     | UG Certificate            |
|                                                                                                                                                 | II       | DSC-3(2T)<br>DSC-4(2P) | DSC-3(2T)<br>DSC-4(2P) | DSC-3(2T)<br>DSC-4(2P) | OE-2(2T)<br>OE-3(2P) | ---             | AEC-2(2T) (Eng)<br>VEC-2(2T) (CI)            | CC-2(2T)             | 22                     |                           |
|                                                                                                                                                 | Cum. Cr. | 8                      | 8                      | 8                      | 6                    | ---             | 10                                           | 4                    | 44                     |                           |
| Exit option: Award of UG Certificate with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor. |          |                        |                        |                        |                      |                 |                                              |                      |                        |                           |

### S.Y. B.Sc.

| Year<br>(Level)                                                                                                                                              | Sem          | Subject-I<br>(M-1)<br>Major*         |                   | Subject-II<br>(M-2)<br>Minor #      | Subject-III<br>(M-3) | Open<br>Elective<br>(OE) | VSC,<br>SEC<br>(VSEC)  | AEC, VEC,<br>IKS   | CC, FP,<br>CEP,<br>OJT/Int/RP | Cumulative<br>Credits/Sem | Degree/<br>Cumulative<br>Credit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|-------------------|-------------------------------------|----------------------|--------------------------|------------------------|--------------------|-------------------------------|---------------------------|---------------------------------|
|                                                                                                                                                              |              | Mandatory<br>(DSC)                   | Elective<br>(DSE) | (MIN)                               |                      |                          |                        |                    |                               |                           |                                 |
| 2<br>(5.0)                                                                                                                                                   | III          | DSC-5(2T)<br>DSC-6(2T)<br>DSC-7(2P)  | ---               | MIN-1(2T)<br>MIN-2(2T)<br>MIN-3(2P) | ---                  | OE-4(2T)                 | SEC-1(2T)              | AEC-3(2T)<br>(MIL) | CC-3(2T)<br>CEP(2)            | 22                        | UG<br>Diploma                   |
|                                                                                                                                                              | IV           | DSC-8(2T)<br>DSC-9(2T)<br>DSC-10(2P) | ---               | MIN-4(2T)<br>MIN-5(2P)              | ---                  | OE-5(2T)                 | SEC-2(2T)<br>SEC-2(2P) | AEC-4(2T)<br>(MIL) | CC-4(2T)<br>⊕ FP(2)           | 22                        |                                 |
|                                                                                                                                                              | Cum<br>. Cr. | 12                                   | ---               | 10                                  | ---                  | 4                        | 6                      | 4                  | 8                             | 44                        |                                 |
| Exit option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major & Minor. |              |                                      |                   |                                     |                      |                          |                        |                    |                               |                           |                                 |

\* Student must choose one subject as a Major subject out of M-1, M-2 and M-3 that he/she has chosen at First year

#Student must choose one subject as a Minor subject out of M-1, M-2 and M-3 that he/she has chosen at First year (Minor must be other than Major)

⊕ OJT/Internship/CEP should be completed in the summer vacation after 4<sup>th</sup> semester

### T.Y. B.Sc.

| Year<br>(Level) | Sem          | Subject-I<br>(M-1)<br>Major                                                                           |                                      | Subject-II<br>(M-2)<br>Minor | Subject-III<br>(M-3) | Open<br>Elective<br>(OE) | VSC,<br>SEC<br>(VSEC)  | AEC,<br>VEC,<br>IKS | CC, FP, CEP,<br>OJT/Int/RP | Cumulative<br>Credits/Sem | Degree/<br>Cumulative<br>Credit |
|-----------------|--------------|-------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------|----------------------|--------------------------|------------------------|---------------------|----------------------------|---------------------------|---------------------------------|
|                 |              | Mandatory<br>(DSC)                                                                                    | Elective<br>(DSE)                    | (MIN)                        |                      |                          |                        |                     |                            |                           |                                 |
| 3<br>(5.5)      | V            | DSC-11(2T)<br>DSC-12(2T)<br>DSC-13(2T)<br>DSC-14(2P)<br>DSC-15(2P)                                    | DSE-1A/B<br>(2T)<br>DSE-2A/B<br>(2P) | ---                          | ---                  | ---                      | VSC-1(2T)<br>VSC-2(2P) | ---                 | OJT/Int (4)                | 22                        | UG<br>Degree                    |
|                 | VI           | DSC-16(2T)<br>DSC-17(2T)<br>DSC-18(2T)<br>DSC-19(2T)<br>DSC-20(2T)<br>IKS<br>DSC-21(2P)<br>DSC-22(2P) | DSE-3A/B<br>(2T)<br>DSE-4A/B<br>(2P) | ---                          | ---                  | ---                      | VSC-3(2T)<br>VSC-4(2P) | ---                 | ---                        | 22                        |                                 |
|                 | Cum<br>. Cr. | 24                                                                                                    | 8                                    | ---                          | ---                  | ---                      | 8                      | ---                 | 4                          | 44                        |                                 |
|                 |              | Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor            |                                      |                              |                      |                          |                        |                     |                            |                           |                                 |

### Fourth Year B.Sc. (Honours)

| Year (Level)                                                   | Sem      | Major Core Subjects                                  |                                | Research Methodology (RM) | VSC, SEC (VSEC) | OE  | AEC, VEC, IKS | CC, FP, CEP, OJT/Int/RP | Cumulative Credits/Sem | Degree/ Cumulative Credit |
|----------------------------------------------------------------|----------|------------------------------------------------------|--------------------------------|---------------------------|-----------------|-----|---------------|-------------------------|------------------------|---------------------------|
| IV (6.0)                                                       | VII      | DSC-23(4T)<br>DSC-24(4T)<br>DSC-25(4T)<br>DSC-26(2P) | DSE-5A/B (2T)<br>DSE-6A/B (2P) | RM(4T)                    | ---             | --- | ---           | ---                     | 22                     | UG Honours Degree         |
|                                                                | VIII     | DSC-27(4T)<br>DSC-28(4T)<br>DSC-29(4T)<br>DSC-30(2P) | DSE-7A/B (2T)<br>DSE-8A/B (2P) | ---                       | ---             | --- | ---           | OJT/Int (4)             | 22                     |                           |
|                                                                | Cum. Cr. | 28                                                   | 8                              | 4                         | ---             | --- | ---           | 4                       | 44                     |                           |
| Four Year UG Honors Degree in Major and Minor with 176 credits |          |                                                      |                                |                           |                 |     |               |                         |                        |                           |

### Fourth Year B.Sc. (Honours with Research)

| Year (Level)                                                                  | Sem      | Major Core Subjects                    |                                | Research Methodology (RM) | VSC, SEC (VSEC) | OE  | AEC, VEC, IKS | CC, FP, CEP, OJT/Int/RP | Cumulative Credits/Sem | Degree/ Cumulative Credit       |
|-------------------------------------------------------------------------------|----------|----------------------------------------|--------------------------------|---------------------------|-----------------|-----|---------------|-------------------------|------------------------|---------------------------------|
| IV (6.0)                                                                      | VII      | DSC-23(4T)<br>DSC-24(4T)<br>DSC-26(2P) | DSE-5A/B (2T)<br>DSE-6A/B (2P) | RM(4T)                    | ---             | --- | ---           | RP(4)                   | 22                     | UG Honours with Research Degree |
|                                                                               | VIII     | DSC-27(4T)<br>DSC-28(4T)<br>DSC-30(2P) | DSE-7A/B (2T)<br>DSE-8A/B (2P) | ---                       | ---             | --- | ---           | RP(8)                   | 22                     |                                 |
|                                                                               | Cum. Cr. | 20                                     | 8                              | 4                         | ---             | --- | ---           | 12                      | 44                     |                                 |
| Four Year UG Honours with Research Degree in Major and Minor with 176 credits |          |                                        |                                |                           |                 |     |               |                         |                        |                                 |

**Sem-** Semester, **DSC-** Department Specific Course, **DSE-** Department Specific Elective, **OE/GE-** Open/Generic elective, **VSC-** Vocational Skill Course, **SEC-** Skill Enhancement Course, **VSEC-** Vocation and Skill Enhancement Course, **AEC-** Ability Enhancement Course, **IKS-** Indian Knowledge System, **VEC-** Value Education Course, **T-** Theory, **P-** Practical, **CC-** Co-curricular **RM-** Research Methodology, **OJT-** On Job Training, **FP-** Field Project, **Int-** Internship, **RP-** Research Project, **CEP-** Community Extension Programme, **ENG-** English, **CI-** Constitution of India, **MIL-** Modern Indian Language

- Number in bracket indicate credit
- The courses which do not have practical 'P' will be treated as theory 'T'
- If student select subject other than faculty in the subjects M-1, M-2 and M-3, then that subject will be treated as Minor subject, and cannot be selected as Major at second year.

### Details of F.Y. B.Sc. (Data Science)

| Course                   | Course Type | Course Code | Course Title                                       | Credits | Teaching Hours/ Week |     |       | Marks    |     |          |     |
|--------------------------|-------------|-------------|----------------------------------------------------|---------|----------------------|-----|-------|----------|-----|----------|-----|
|                          |             |             |                                                    |         | T                    | P   | Total | Internal |     | External |     |
|                          |             |             |                                                    |         |                      |     |       | T        | P   | T        | P   |
| Semester I, Level – 4.5  |             |             |                                                    |         |                      |     |       |          |     |          |     |
| DSC-1                    | DSC         | CSD-DSC-111 | Introduction to Data Science                       | 2       | 2                    | --- | 2     | 20       | --- | 30       | --- |
| DSC-2                    | DSC         | CSD-DSC-112 | Practical on Data Science using Excel              | 2       | ---                  | 4   | 4     | ---      | 20  | ---      | 30  |
| OE-1                     | OE          | CSD-OE-111  | Word Processing Tools                              | 2       | 2                    | --- | 2     | 20       | --- | 30       | --- |
| Semester II, Level – 4.5 |             |             |                                                    |         |                      |     |       |          |     |          |     |
| DSC-3                    | DSC         | CSD-DSC-121 | Advanced Excel                                     | 2       | 2                    | --- | 2     | 20       | --- | 30       | --- |
| DSC-4                    | DSC         | CSD-DSC-122 | Practical on Advanced Excel                        | 2       | ---                  | 4   | 4     | ---      | 20  | ---      | 30  |
| OE-2                     | OE          | CSD-OE-121  | Data Visualization and Analysis Tools              | 2       | 2                    | --- | 2     | 20       | --- | 30       | --- |
| OE-3                     | OE          | CSD-OE-122  | Practical on Data Visualization and Analysis Tools | 2       | ---                  | 4   | 4     | ---      | 20  | ---      | 30  |

## Examination Pattern

### Theory Question Paper Pattern:

- 30 (External) +20 (Internal) for 2 credits
  - External examination will be of 1½ hours duration
  - There shall be 3 questions Q1 carrying 6 marks and Q2, Q3 carrying 12 marks each. while the tentative pattern of question papers shall be as follows;
  - Q1 Attempt any 2 out of 3 sub-questions; each 3 marks
  - Q 2 and Q3 Attempt any 3 out of 4 sub-question; each 4 marks.

### Rules of Continuous Internal Evaluation:

The Continuous Internal Evaluation for theory papers shall consist of two methods:

**1. Continuous & Comprehensive Evaluation (CCE):** CCE will carry a maximum of 30% weightage (30/15 marks) of the total marks for a course. Before the start of the academic session in each semester, the subject teacher should choose any three assessment methods from the following list, with each method carrying 10/5 marks:

- i. Individual Assignments
- ii. Seminars/Classroom Presentations/Quizzes
- iii. Group Discussions/Class Discussion/Group Assignments
- iv. Case studies/Case lets
- v. Participatory & Industry-Integrated Learning/Field visits
- vi. Practical activities/Problem Solving Exercises
- vii. Participation in Seminars/Academic Events/Symposia, etc.
- viii. Mini Projects/Capstone Projects
- ix. Book review/Article review/Article preparation
- x. Any other academic activity
- xi. Each chosen CCE method shall be based on a particular unit of the syllabus, ensuring that three units of the syllabus are mapped to the CCEs.

**2. Internal Assessment Tests (IAT):** IAT will carry a maximum of 10% weightage (10/5 marks) of the total marks for a course. IAT shall be conducted at the end of the semester and will assess the remaining unit of the syllabus that was not covered by the CCEs. The subject teacher is at liberty to decide which units are to be assessed using CCEs and which unit is to be assessed on the basis of IAT.

The overall weightage of Continuous Internal Evaluation (CCE + IAT) shall be 40% of the total marks for the course. The remaining 60% of the marks shall be allocated to the semester-end examinations.

The subject teachers must communicate the chosen CCE methods and the corresponding syllabus units to the students at the beginning of the semester to ensure clarity and proper preparation.

### Practical Examination Credit 2: Pattern (30+20)

#### External Practical Examination (30 marks):

- Practical examination shall be conducted by the respective department at the end of the semester.
- Practical examination will be of 3 hours duration and shall be conducted as per schedule.
- Where an incubation condition is required, a practical examination shall be conducted for 2 consecutive days for 2 hours/day.
- There shall be 05 marks for journal and viva voce. A certified journal is compulsory to appear for practical examination.
- The external practical examination of SEC will be of 25 marks, and there will be no internal exam for SEC practical.

**Internal Practical Examination (20 marks):**

- Internal practical examination of 10 marks will be conducted by the department as per the schedule given.
- For internal practical examination, students must produce the laboratory journal of practicals completed along with the completion certificate signed by the concerned teacher and the Head of the department.
- There shall be continuous assessment of 30 marks based on student performance throughout the semester. This assessment can include quizzes, group discussions, presentations and other activities assigned by the faculty during regular practicals. For details, refer to internal theory examination guidelines.
- Finally, 40 (10+30) marks of performance of the student will be converted into 20 marks.

**F.Y.B.Sc.  
(Data Science)  
Semester I**

**F.Y. B.Sc. (Data Science)**  
**SEMESTER-I**  
**CSD-DSC-111: Introduction to Data Science**

**Total Hours: 30**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Course objectives</b> | <ul style="list-style-type: none"><li>• To understand basic data science concepts.</li><li>• To Learn to detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization.</li><li>• Making aware of how to address advanced statistical situations, Modeling and Machine Learning.</li></ul>                                                                                                                                                                                               |              |
| <b>Course outcomes</b>   | After successful completion of this course, students are expected to: <ul style="list-style-type: none"><li>• Understand about the collection of the data, condensation and summarization into a compact form.</li><li>• Understand about the representation of data in a neat, compact and clear form.</li><li>• Understand the concepts of Sample space and events, theory of Permutation and Combinations.</li><li>• Understand the concept of Probability, Conditional probability of an event, Independence of events.</li></ul>                  |              |
| <b>Unit</b>              | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Hours</b> |
| <b>Unit I</b>            | <b>Introduction</b> <ul style="list-style-type: none"><li>○ Data Science : Introduction and History</li><li>○ Data Science Process: Discovery, Preparation, Model Planning, Model Building,</li><li>○ Operationalize and Communicate Results</li><li>○ Data Science tools</li><li>○ Uses of Data Science</li><li>○ Challenges of Data Science</li><li>○ Applications of Data Science</li><li>○ Data Science versus Business Intelligence</li><li>○ Data Analyst, Data Engineer and Data Scientist</li></ul>                                            | <b>7</b>     |
| <b>Unit II</b>           | <b>Data Collection and Data Sampling</b> <ul style="list-style-type: none"><li>○ Concept of Data, Information, Knowledge and Wisdom</li><li>○ Effect of data influence on human lives</li><li>○ Types of Data: Primary Data and Secondary Data, Quantitative (Discrete data and Continuous data [Interval data and Ratio data]) and Qualitative Data (Nominal data and Ordinal data)</li><li>○ Structured, Unstructured Data and Semi-structured</li><li>○ Methods of Primary Data Collection</li><li>○ Methods of Secondary Data Collection</li></ul> | <b>8</b>     |
| <b>Unit III</b>          | <b>Data Sampling</b> <ul style="list-style-type: none"><li>○ Concept of Population, Census, Sample, Sampling, Sampling Frame and Sample Size</li><li>○ Importance of Sampling</li><li>○ Types of Sampling -Probability Sampling - Simple Random, Systematic, Stratified and Cluster, Non-probability Sampling -</li></ul>                                                                                                                                                                                                                              | <b>7</b>     |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                        | Convenience sampling, Purposive sampling, Snowball sampling and Quota sampling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |
| <b>Unit IV</b>         | <b>Data Analytics, Data Quality and Ethics</b> <ul style="list-style-type: none"> <li>○ Data Governance: Introduction, Benefits and Challenges</li> <li>○ Data Quality: Introduction and Importance</li> <li>○ Data Quality Dimensions - Accuracy, Completeness, Consistency, Timeliness, Uniqueness and Validity</li> <li>○ Concept of Data accuracy and Data Precision</li> <li>○ Benefits of Quality Data, Data quality best practices</li> <li>○ Ethics in Data Science</li> <li>○ Need for ethical guidelines</li> <li>○ Data Science Ethics Examples</li> </ul>                    | <b>8</b> |
| <b>Study Resources</b> | <ul style="list-style-type: none"> <li>• Doing Data Science, Rachel Schutt and Cathy O’Neil, O’Reilly, 2013</li> <li>• Introducing Data Science Big Data, Machine Learning And More, Using Python</li> <li>• Tools, Davy Cielen, Arno D. B. Meysman, Mohamed Ali ISBN: 9781633430037</li> <li>• Mastering Machine Learning with R, Cory Lesmeister, PACKT Publication, 2015</li> <li>• Hands-On Programming with R, Garrett Golemund, 1st Edition, 2014</li> <li>• An Introduction to Statistical Learning, James, G., Witten, D., Hastie, T., Tibshirani, R., Springer, 2015</li> </ul> |          |

**F.Y. B.Sc. (Data Science)**  
**SEMESTER-I**  
**CSD-DSC-112:Practical on Data Science using Excel**

**Total Hours:60**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |       |          |   |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------|----------|---|
| <b>Course objectives</b> | <ul style="list-style-type: none"> <li>Understanding the scope and applications of advanced Excel functions.</li> <li>Creating and applying custom data formats for numbers, dates, and times.</li> <li>Utilizing advanced fill options such as fill series, flash fill, and custom fill sequences.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |       |          |   |
| <b>Course Outcomes</b>   | <ul style="list-style-type: none"> <li>Manipulate data efficiently using advanced Excel functions and features.</li> <li>Customize data formats according to specific requirements.</li> <li>Implement advanced conditional formatting techniques to highlight important data points.</li> <li>Utilize form controls to create interactive and user-friendly Excel applications.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |       |          |   |
| <b>Sr. No.</b>           | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Hours</b> |       |          |   |
| 1                        | Demonstrate Data Manipulation in Excel using Data Names and Ranges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4            |       |          |   |
| 2                        | Create Tabular sheet in Excel. Apply different page formats and orientation for the same.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4            |       |          |   |
| 3                        | Opening Data from External Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4            |       |          |   |
| 4                        | Demonstrate the use of data validation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4            |       |          |   |
| 5                        | Convert given text into number of columns.<br>e.g Patil Sagar Samadhan must be converted as<br><table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>Patil</td> <td>Sagar</td> <td>Samadhan</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Patil        | Sagar | Samadhan | 4 |
| Patil                    | Sagar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Samadhan     |       |          |   |
| 6                        | Demonstrate the use of header and footer to the document.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4            |       |          |   |
| 7                        | Create a simple database and apply filter on different column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4            |       |          |   |
| 8                        | Create a simple database and sort it using different consitions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |       |          |   |
| 9                        | Apply Basic Formulas and Use Functions in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |       |          |   |
| 10                       | Apply different worksheet features in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4            |       |          |   |
| 11                       | Demonstare different bar/ line charts in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4            |       |          |   |
| 12                       | Demonstare different pie/histogram charts in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4            |       |          |   |
| 13                       | Calculate Measure of central tendency: Mean, median, mode for height coloumn of student data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4            |       |          |   |
| 14                       | Measure of dispersion: variance, standard deviation, Coefficient of variation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4            |       |          |   |
| 15                       | Demonstate the use of freeze pane option in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4            |       |          |   |
| <b>Study Resources</b>   | <ul style="list-style-type: none"> <li>Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon</li> <li>Curtis F.(2007), Microsoft Office Excel 2007 Step by Step</li> <li><a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li><a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li><a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccclibreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccclibreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |              |       |          |   |

**Note: At least 12 experiments should be performed**

**F.Y. B.Sc. (Data Science)**  
**SEMESTER-I**  
**CSD-OE-111:Word Processing Tools**

**Total Hours: 30**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Course objectives</b> | <ul style="list-style-type: none"> <li>• To create new document and save the data</li> <li>• To format the text in the document using different formatting tools</li> <li>• To arrange the text into columns and insert different objects into the text document.</li> <li>• To use mail merge on common document.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |
| <b>Course outcomes</b>   | After successful completion of this course, students are expected to: <ul style="list-style-type: none"> <li>• Aware different word processing tools and have hands on one of them.</li> <li>• Learn different formatting options for text and document.</li> <li>• Embed the object into text document</li> <li>• Create document with effective graphics and formatting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                            |              |
| <b>Unit</b>              | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Hours</b> |
| <b>Unit I</b>            | <b>Launch any Word processing tool and navigate the editing screen.</b> <ul style="list-style-type: none"> <li>○ Launch Word.</li> <li>○ Identify the components of the Word window.</li> <li>○ Edit a document.</li> <li>○ Save a document.</li> <li>○ Preview and print a document.</li> <li>○ Close a document.</li> <li>○ Locate and open an existing document.</li> <li>○ Create a new document.</li> <li>○ Close the Word application.</li> <li>○ Use Print Preview.</li> <li>○ Print a document</li> </ul>                                                                                                                                                                                                                                                               | <b>7</b>     |
| <b>Unit II</b>           | <b>Create, edit a Text document and Apply formatting</b> <ul style="list-style-type: none"> <li>○ Create a letter.</li> <li>○ Select text.</li> <li>○ Cut, copy, and paste text.</li> <li>○ Find and replace text.</li> <li>○ Change fonts and font sizes.</li> <li>○ Apply font styles, character styles, and special character effects.</li> <li>○ Change the case of text.</li> <li>○ Highlight text in a document.</li> <li>○ Insert symbols and special characters.</li> <li>○ Add bullets, numbering, borders, and shading.</li> <li>○ Set line and paragraph spacing.</li> <li>○ Align and indent paragraphs.</li> <li>○ Insert page breaks.</li> <li>○ Create and modify headers and footers.</li> <li>○ Apply paragraph styles.</li> <li>○ Create outlines.</li> </ul> | <b>8</b>     |
| <b>Unit III</b>          | <b>Work with columns, pictures, diagrams, and charts and tables.</b> <ul style="list-style-type: none"> <li>○ Create and use newspaper columns.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>8</b>     |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                        | <ul style="list-style-type: none"> <li>○ Insert pictures.</li> <li>○ Create diagrams.</li> <li>○ Create and modify a data chart</li> <li>○ Create basic tables.</li> <li>○ Create and format tables.</li> <li>○ Modify tables.</li> <li>○ Customize tables.</li> <li>○ Use special table features.</li> <li>○ Use table styles.</li> <li>○ Use tab stops in a table.</li> <li>○ Convert text to a table.</li> <li>○ Merge and split table cells.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        |          |
| <b>Unit IV</b>         | <b>Use the mail merge wizard, Work with drawing objects and graphics</b> <ul style="list-style-type: none"> <li>○ Explain the steps of the mail merge process.</li> <li>○ Define the main document. Select the data source. Merge the main document and data source.</li> <li>○ Create drawing objects.</li> <li>○ Add decorative page borders.</li> <li>○ Use WordArt special text effects.</li> <li>○ Insert, position, and delete pictures.</li> <li>○ Insert and edit text boxes.</li> <li>○ Create and edit an organization chart.</li> <li>○ Create an equation.</li> </ul>                                                                                                                                                                                                                                                                  | <b>8</b> |
| <b>Study Resources</b> | <ul style="list-style-type: none"> <li>● Frandsen T., (2010), Microsoft Office Word 2007, BookBoon</li> <li>● Curtis F.(2007), Microsoft Office Word 2007 Step by Step</li> <li>● <a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li>● <a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li>● <a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |          |

**F.Y.B.Sc.  
(Data Science)  
Semester II**

**F.Y.B.Sc. (Data Science)**  
**SEMESTER-II**  
**CSD-DSC-121 : Advanced Excel**

**Total Hours: 30**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Course objectives</b> | <ul style="list-style-type: none"> <li>Implementing advanced conditional formatting techniques including data bars, color scales, and icon sets.</li> <li>Creating and using custom styles and templates for efficient workbook management.</li> <li>Understanding and utilizing form controls such as list boxes, combo boxes, spin buttons, scroll bars, and check boxes.</li> <li>Preparing workbooks for internationalization by working in different languages, proofing, translating, and using international symbols.</li> </ul>                                                                                     |              |
| <b>Course outcomes</b>   | After successful completion of this course, students are expected to: <ul style="list-style-type: none"> <li>Apply advanced Excel functions and formulas to manipulate and analyze data effectively.</li> <li>Utilize mathematical functions for statistical analysis and calculations.</li> <li>Perform financial analysis and calculations using financial functions.</li> <li>Manipulate and extract data efficiently using data functions.</li> <li>Implement error checking and dynamic formula creation using useful functions.</li> <li>Conduct lookup operations to retrieve data from different sources</li> </ul> |              |
| <b>Unit</b>              | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Hours</b> |
| <b>Unit I</b>            | <b>What If Analysis</b> <ul style="list-style-type: none"> <li>Goal Seek</li> <li>Scenario Analysis</li> <li>Data Tables (PMT Function)</li> <li>Solver Tool</li> </ul> <b>Logical Functions</b> <ul style="list-style-type: none"> <li>If Function</li> <li>How to Fix Errors – if error</li> <li>Nested If</li> <li>Complex if and or functions</li> </ul>                                                                                                                                                                                                                                                                | <b>7</b>     |
| <b>Unit II</b>           | <b>Data Validation and Lookup Functions</b> <ul style="list-style-type: none"> <li>Number, Date &amp; Time Validation</li> <li>Text and List Validation</li> <li>Custom validations based on formula for a cell</li> <li>Dynamic Dropdown List Creation using Data Validation – Dependency List</li> <li>Vlookup / HLookup</li> <li>Index and Match</li> <li>Creating Smooth User Interface Using Lookup</li> <li>Nested VLookup</li> <li>Reverse Lookup using Choose Function</li> <li>Worksheet linking using Indirect</li> <li>Vlookup with Helper Column</li> </ul>                                                     | <b>8</b>     |
| <b>Unit III</b>          | <b>Pivot Tables and Various Charts</b> <ul style="list-style-type: none"> <li>Creating Simple Pivot Tables</li> <li>Basic and Advanced Value Field Setting</li> <li>Classic Pivot table</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>7</b>     |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                        | <ul style="list-style-type: none"> <li>○ Choosing Field</li> <li>○ Filtering PivotTables</li> <li>○ Modifying PivotTable Data</li> <li>○ Grouping based on numbers and Dates</li> <li>○ Calculated Field &amp; Calculated Items</li> <li>○ Arrays Functions -What are the Array Formulas, Use of the Array Formulas? Basic Examples of Arrays (Using ctrl+shift+enter).</li> <li>○ Array with if, len and mid functions formulas. • Array with Lookup functions</li> <li>○ Advanced Use of formulas with Array. Charts and slicers</li> <li>○ Various Charts i.e. Bar Charts / Pie Charts / Line Charts</li> <li>○ Using SLICERS, Filter data with Slicers</li> <li>○ Manage Primary and Secondary Axis</li> </ul>                                                                                                                                   |          |
| <b>Unit IV</b>         | <b>VBA Macro</b> <ul style="list-style-type: none"> <li>○ Introduction to VBA</li> <li>○ What Is VBA?, What Can You Do with VBA?</li> <li>○ Recording a Macro, Procedure and functions in VBA</li> <li>○ Variables in VBA</li> <li>○ What is Variables? Using Non-Declared Variables</li> <li>○ Variable Data Types, Using Const variables Message Box and Input box Functions, Customizing Msgboxes and Inputbox</li> <li>○ Reading Cell Values into Messages</li> <li>○ Various Button Groups in VBA</li> <li>○ If and select statements - Simple If Statements, The Elseif Statements, Defining select case statements</li> <li>○ Looping in VBA, Introduction to Loops and its Types, The Basic Do and For Loop, Exiting from a Loop •</li> <li>○ Advanced Loop Examples Mail Functions – VBA</li> </ul>                                         | <b>8</b> |
| <b>Study Resources</b> | <ul style="list-style-type: none"> <li>● Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon</li> <li>● Curtis F.(2007), Microsoft Office Excel 2007 Step by Step</li> <li>● <a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li>● <a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li>● <a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |          |

**F.Y.B.Sc. (Data Science)**  
**SEMESTER-II**  
**CSD-DSC-122 : Practical on Advanced Excel**

**Total Hours: 60**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Course objectives</b> | <ul style="list-style-type: none"> <li>Utilize form controls to create interactive and user-friendly Excel applications.</li> <li>Prepare workbooks for internationalization, enabling collaboration and communication in different languages and regions.</li> <li>Apply their knowledge to practical scenarios and real-world projects, enhancing their productivity and efficiency in Excel-based tasks and projects.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |              |
| <b>Course Outcomes</b>   | After successful completion of this course, students are expected to: <ul style="list-style-type: none"> <li>apply different advanced excel tools.</li> <li>create relationships between pivot tables.</li> <li>expertise in different LOOKUP functions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |
| <b>Sr. No.</b>           | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Hours</b> |
| 1                        | Demonstrate the Scenarios using the What-If Analysis Tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4            |
| 2                        | Demonstrate use of IF Function and Analysing the IF Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4            |
| 3                        | Demonstrate the use of OR Function and AND Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4            |
| 4                        | Demonstrate the use of OR Operator Function using Nesting the IF Statement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4            |
| 5                        | Design Excel Sheet as an Input Form for saving customers information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4            |
| 6                        | Demonstrate Enhancing VBA Code to save data in next available row                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4            |
| 7                        | Create User Forms for Personal Cash Manager and <ul style="list-style-type: none"> <li>a. Code for adding cash in database</li> <li>b. Code for adding expenses in database</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4            |
| 8                        | Perform Data Analysis using Pivot tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4            |
| 9                        | Create Relationships in Power Pivot using Excel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4            |
| 10                       | Create Reports and demonstrate different Chart Types                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4            |
| 11                       | Demonstrate the LOOKUP Function in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4            |
| 12                       | Demonstrate the VLOOKUP Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |
| 13                       | Demonstrate the HLOOKUP Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |
| 14                       | Apply different tools on PivotTables: Data Slicer, Timeline Filter and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4            |
| 15                       | Demonstrate different PivotTable Styles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4            |
| <b>Study Resources</b>   | <ul style="list-style-type: none"> <li>Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon</li> <li>Curtis F.(2007), Microsoft Office Excel 2007 Step by Step</li> <li><a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li><a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li><a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccclibreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccclibreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |              |

**F.Y. B.Sc. (Data Science)**  
**SEMESTER-II**  
**CSD-OE-121: Data Visualization and Analysis Tools**

**Total Hours: 30**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Course objectives</b> | <b>Student will be able to:</b> <ul style="list-style-type: none"> <li>• customise the formatting of charts.</li> <li>• create and use labels and names in a workbook.</li> <li>• protect data in worksheets and workbooks.</li> <li>• create and edit a PivotChart.</li> </ul>                                                                                                                                                           |              |
| <b>Course outcomes</b>   | <b>After successful completion of this course students are expected to :</b> <ul style="list-style-type: none"> <li>• demonstrating the basic mechanics and navigation of an spreadsheet.</li> <li>• learning the use and utility of functions and formulas on spreadsheet.</li> <li>• using clip art to enhance ideas and information in worksheets.</li> <li>• analyzing data using Pivot Tables and Pivot Charts.</li> </ul>           |              |
| <b>Unit</b>              | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Hours</b> |
| <b>Unit I</b>            | <b>Excel Basics</b> <ul style="list-style-type: none"> <li>○ Getting Started with Excel,</li> <li>○ Understanding OneDrive</li> <li>○ Creating and opening workbooks,</li> <li>○ Saving and sharing workbooks,</li> <li>○ Cell basics, modifying Columns, Rows, and Cells, Formatting Cells.</li> </ul>                                                                                                                                   | <b>8</b>     |
| <b>Unit II</b>           | <b>Working with Sheets</b> <ul style="list-style-type: none"> <li>○ Understanding Number Formats</li> <li>○ Working with Multiple Worksheets,</li> <li>○ Hide or unhide worksheets,</li> <li>○ Hide or unhide columns and rows,</li> <li>○ Customize the quick access toolbar,</li> <li>○ Modify document properties,</li> <li>○ Using find &amp; replace,</li> <li>○ Checking spelling,</li> <li>○ Page layout and printing</li> </ul>   | <b>7</b>     |
| <b>Unit III</b>          | <b>Formulas and Functions</b> <ul style="list-style-type: none"> <li>○ Introduction to formulas,</li> <li>○ Creating more complex formulas,</li> <li>○ Relative and absolute cell study resources,</li> <li>○ Functions: mathematical, statistical, logical, date and time, etc.</li> </ul>                                                                                                                                               | <b>8</b>     |
| <b>Unit IV</b>           | <b>Working with Data</b> <ul style="list-style-type: none"> <li>○ Freezing panes and view options,</li> <li>○ Sorting data, filtering data,</li> <li>○ Groups and subtotals,</li> <li>○ Tables,</li> <li>○ Charts,</li> <li>○ Conditional formatting,</li> <li>○ Track changes and comments,</li> <li>○ Inspecting and protecting workbooks,</li> <li>○ Introduction to pivot tables,</li> <li>○ Doing more with pivot tables.</li> </ul> | <b>8</b>     |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Study Resources</b> | <ul style="list-style-type: none"> <li>• Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon</li> <li>• Curtis F.(2007), Microsoft Office Word Excel Step by Step</li> <li>• <a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li>• <a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li>• <a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |
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**F.Y. B.Sc. (Data Science)**  
**SEMESTER-II**  
**CSD-OE-122 :Practical on Data Visualization and Analysis Tools**

**Total Hours: 60**

**Credits: 2**

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |       |          |   |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------|----------|---|
| <b>Course objectives</b> | <ul style="list-style-type: none"> <li>Understanding the scope and applications of advanced Excel functions.</li> <li>Creating and applying custom data formats for numbers, dates, and times.</li> <li>Utilizing advanced fill options such as fill series, flash fill, and custom fill sequences.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |       |          |   |
| <b>Course Outcomes</b>   | <ul style="list-style-type: none"> <li>Manipulate data efficiently using advanced Excel functions and features.</li> <li>Customize data formats according to specific requirements.</li> <li>Implement advanced conditional formatting techniques to highlight important data points.</li> <li>Utilize form controls to create interactive and user-friendly Excel applications.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |       |          |   |
| <b>Sr. No.</b>           | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Hours</b> |       |          |   |
| 1                        | Demonstrate Data Manipulation in Excel using Data Names and Ranges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4            |       |          |   |
| 2                        | Create Tabular sheet in Excel. Apply different page formats and orientation for the same.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4            |       |          |   |
| 3                        | Opening Data from External Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |       |          |   |
| 4                        | Demonstrate the use of data validation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4            |       |          |   |
| 5                        | Convert given text into number of columns.<br>e.g Patil Sagar Samadhan must be converted as<br><table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>Patil</td> <td>Sagar</td> <td>Samadhan</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Patil        | Sagar | Samadhan | 4 |
| Patil                    | Sagar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Samadhan     |       |          |   |
| 6                        | Demonstrate the use of header and footer to the document.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4            |       |          |   |
| 7                        | Create a simple database and apply filter on different column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4            |       |          |   |
| 8                        | Create a simple database and sort it using different consitions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4            |       |          |   |
| 9                        | Apply Basic Formulas and Use Functions in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4            |       |          |   |
| 10                       | Demonstarte different charts in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4            |       |          |   |
| 11                       | Calculate Measure of central tendency: Mean, median, mode for height coloumn of student data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4            |       |          |   |
| 12                       | Measure of dispersion: variance, standard deviation, Coefficient of variation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4            |       |          |   |
| 13                       | Demonstate the use of freeze pane option in Excel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4            |       |          |   |
| 14                       | Apply different tools on PivotTables: Data Slicer, Timeline Filter and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4            |       |          |   |
| 15                       | Demonstrate different PivotTable Styles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4            |       |          |   |
| <b>Study Resources</b>   | <ul style="list-style-type: none"> <li>Frandsen T., (2010), Microsoft Office Excel 2007, BookBoon</li> <li>Curtis F.(2007), Microsoft Office Excel 2007 Step by Step</li> <li><a href="https://testbook.com/computer-awareness/microsoft-office">https://testbook.com/computer-awareness/microsoft-office</a></li> <li><a href="https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf">https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS5.0/PDF/GS5001-IntroducingLibreOffice.pdf</a></li> <li><a href="https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10">https://www.teachmint.com/tfile/studymaterial/b-com/ccc/libreofficecalcpdf/e66b485b-3992-44c9-8972-209158129d10</a></li> </ul> |              |       |          |   |