

Sri Sathya Sai College for Women, Bhopal

(An Autonomous College affiliated to Barkatullah University, Bhopal)

(NAAC Accredited 'A' Grade)



SYLLABUS

SESSION: 2023-24

Course Type: Certificate Course

Course Title : Data Analysis & Visualization through Spreadsheet

Additional Credit Course for I, II and III Year [N.E.P.]

Certificate Course for P.G. / B.Ed. [Non N.E.P. Course]

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Syllabus

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Course Title	Data Analysis & Visualization through Spreadsheet
Course Details	Additional Credit Course for I, II and III Year [N.E.P.] Certificate Course for P.G. / B.Ed. [Non N.E.P. Course]
Credit Value	2 Credits
Max.Marks: 70 [Th], 30 [Pr]	Min. Marks: 24 [Th], 11 [Pr]

Course Learning Outcomes(CLO) - On completion of this course, learners will be able to:

1. Prepare a spreadsheet file and enter data into the sheet.
2. Illustrate formatting and editing capabilities on the data.
3. Demonstrate basic calculations and save data.
4. Import and export data into the spreadsheet.
5. Demonstrate basic visualizing, analyzing, organizing and sharing techniques

Particular

Unit-I	<p>Introduction to Spreadsheet: What is Spreadsheet, History, Importance, Brands and platforms, Excel, Calc, and Google Sheets, User interface, Ribbon, Quick Access toolbar.</p> <p>Basics of Spreadsheet: Overview of spreadsheet, opening new file and saving spreadsheet (through menu and keyboard shortcut), rows, columns, cells, workbooks and worksheets. Fundamentals of rows, columns and cell and navigation; various modes of selecting cells (shift arrow, ctrl shift arrow, mouse click and drag, mouse click and shift click); merging cells; Selecting rows and columns, Non-contiguous cells; How to enter data (numeric, text, date), Autofit, keyboard navigation, Autocomplete, navigating edges, Navigating first and last used cells. Working with multiple sheet, inserting and deleting sheets, renaming sheets.</p> <p>Number formatting - Introduction, General and text, Number and fraction, Currency, Accounting, Percentage, Date, Time; Inserting and deleting rows, columns and cells.</p> <p>Formatting cells - Introduction, Bold, Italics and Underline, Border, Fill and Font, Alignment, Format painter and clear format, Editing the cell content, entering multiple lines of text using Ctrl+Enter, auto fill, copy and paste, cut and paste, auto fill series, use of fill handle through mouse.</p>
Unit-II	<p>Printing worksheet: Select print area, see print preview, adjusting margin during print preview.</p> <p>Page Formatting: Page layout – Orientation, size, margins; watermark, page colour, page</p>



	<p>borders; inserting headers and footer, inserting page numbers, date, path and filename.</p> <p>Viewing: Easy view using freeze panes (freeze rows and columns), split windows, layout view (normal, page break and Print).</p> <p>Saving and Sharing File: Embed, PDF, share workbooks through OneDrive, Online.</p> <p>Import and Export Data: Import Access Data, Microsoft Query, Import/Export Text Files, XML.</p> <p>Protecting/Securing using file properties: Protect Workbook, Protect Sheet, Lock Cells, Read-only Workbook.</p> <p>Template: Creating worksheet thorough template - Budget, Calendar, Holidays, Meal Planner, Invoice, Automated Invoice, Default Templates, Time Sheet, BMI calculator. Saving worksheet as template.</p> <p>Calculations: Entering formula, editing formula, copying formula, cell references (absolute, relative and mixed), paste formula (using keyboard shortcut and fill handle).</p> <p>Data Validation: Reject Invalid Dates, Budget Limit, Prevent Duplicate Entries, Product Codes, Drop-down List, Dependent Drop-down Lists, Cm to inches, Kg to gm.</p>
Unit-III	<p>Introduction to Functions: What is function, entering functions, types of functions.</p> <p>Count and Sum: Countif, Count Blank/Nonblank Cells, Count Characters, Not Equal To, Count Cells with Text, Sum, Running Total, Sumif, Sumproduct.</p> <p>Date & Time: DateDif, Today's Date, Date and Time Formats, Calculate Age, Time Difference, Weekdays, Days until Birthday, Last Day of the Month, Add or Subtract Time, Quarter, Day of the Year</p> <p>Text: Separate Strings, Count Words, Text to Columns, Find, Search, Change Case, Remove Spaces, Compare Text, Substitute vs Replace, Text, Concatenate, Substring.</p> <p>Lookup & Reference: Vlookup, Tax Rates, Index and Match, Two-way Lookup, Offset, Case-sensitive Lookup, Left Lookup, Locate Maximum Value, Indirect, Two-column Lookup, Closest Match, Compare Two Columns, Xlookup.</p> <p>Financial: PMT, Loans with Different Durations, Investment or Annuity, Compound Interest, CAGR, Loan Amortization Schedule, NPV, IRR, Depreciation, Profit Margin.</p> <p>Statistical: Average, Negative Numbers to Zero, Random Numbers, Rank, Percentiles and Quartiles, Box and Whisker Plot, Averagelf, Forecast, MaxIfs and MinIfs, Weighted Average, Mode, Standard Deviation, Frequency.</p> <p>Round: Chop off Decimals, Nearest Multiple, Even and Odd, Mod.</p>
Unit-IV	<p>Data Visualisation: Introduction to charts, various type of charts (Column, Bar, Pie, Area, XY Scatter, Bubble, Net, Stock, Column & Line); 3-D Shape (Bar, Cylinder, Cone, Pyramid); Chart elements (Title, Subtitle, X-axis, Y-axis, Z-axis, Display grids, Legends, Display data series); Creating a Chart: Selecting data series, select chart type, select chart components - labels, background, axes, format and design.</p> <p>Conditional Formatting: Manage Rules, Formula based, Data Bars, Colour Scales, Icon Sets, Find Duplicates, Shade Alternate Rows, Compare Two Lists, Conflicting Rules, Heat Map</p>
Unit-V	<p>Data Analysis: Sort (Custom Sort Order, Sort by Color, Reverse List, Randomize List, SORT function). Filter (Number and Text Filters, Date Filters, Advanced Filter, Data Form, Remove Duplicates, Outlining Data, Subtotal, Unique Values, FILTER function).</p> <p>Pivot Tables: Creating pivot table, Group pivot table items, pivot table summarization, Multi-level pivot table, Frequency distribution, pivot chart, Slicers, update pivot table, calculated field/item, GetPivotData.</p> <p>Tables: Structured References, Table Styles, Quick Analysis</p> <p>What-If Analysis: Data Tables, Goal Seek, Quadratic Equation</p> <p>Solver: Transportation Problem, Assignment Problem, Capital Investment, Shortest Path Problem, Maximum Flow Problem, Sensitivity Analysis</p> <p>Analysis ToolPak: Histogram, Descriptive Statistics, ANOVA, F-Test, t-Test, Moving Average, Exponential Smoothing, Correlation, Covariance, Regression.</p> <p>Keywords/Tags: Excel, Calc, Formatting, Protecting range, sheet, Functions, Sort, Filter, Freeze, Pivot, Goal, Seek, Analysis, Visualization, Charts, Graphs, Correlation, Regression.</p>

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Suggestive List of Practicals

Note: In the first day of the lab instructor must make the students get familiar with the interface of the Calc/Excel along with the movement of cursor, rows, columns, cells, cell number identification, formula bar, use of fill handle (drag as well double click), setting width of columns and height of rows, selecting rows and columns. Students must entry some data and practice above.

1. Simple data entry in a workbook in different sheet as given below.
 - a. Use the fill series method to fill the name as A-1, A-2 and RollNo. As 501, 502 to 550.
 - b. In Subject S1 Pr, put the marks more than 50 (to be used in next practical).
 - c. Do not enter data in Total S1, Total S2 and Total S3 column.
 - d. Perform the operations:
 - i. inserting column and rows,
 - ii. deleting columns and rows,
 - iii. selecting range of columns,
 - iv. change the width of column and height of rows,
 - v. hiding the rows and columns,
 - vi. show/unhide the rows and columns.
 - e. Rename the worksheet as “UG1-Marks”
 - f. Save the worksheet as “Marks”.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name	Roll No	S1- Th. (Max. 50)	S1 Pr. (Max. 50)	Tot S1 (Max. 100)	S2- Th. (Max. 50)	S2 Pr. (Max. 50)	Tot S2 (Max. 100)	S3- Th. (Max. 50)	S3 Pr. (Max. 50)	Tot S3 (Max. 100)	Totoal Marks (S1+S2+S3)	
2	A-1	501	36	40	=C2+D2	45	46		34	39			
3	A-2	502	27	32		34	38		23	40			
4	A-3	503	44	46		53	40		40	42			
5	A-4	504	24	30		34	39		33	40			
6	A-5	505	43	45		23	29		28	34			
7	.	.	.	.		.	.		.	.
8	.	.	.	.		.	.		.	.
9	.	.	.	.		.	.		.	.
51	A-50	550	39	45		42	40		32	42			
52													

1. Open the Workbook “Marks” as prepared in practical-1.

Perform the following operations in this worksheet named “Marks”.

- a. add the formula in E2 cell as C2+D2 for subject S1 total of theory and practical.
- b. Copy formula from E2 cell and paste the formula to E3...E51 cells using keyboard and using fill handle with the help of mouse (press and drag and double click on fill handle both)
- c. Repeat the process a and b for H2 cell (=F2+G2) cell and H3... H51.
- d. Repeat the process a and b for K2 cell (=I2+J2) cell and K3... K51.
- e. Find the total of P1+P2+P3 for all A-1 to A-51 students using formula and copy copy-paste method.
- f. Save the file with keyboard shortcut CTRL+S.

2. In the sheet prepared in experiment-2, validate that any marks are more than 50 in the or greater than 100 in the S1, S2 and S3 theory or practical column and Total columns. If found correct it and see that totals are automatically calculated. (Hint: Use filter method to find it). Save the file.
3. Use the above file and
 - a. Calculate the percentage of all students in column M by using formula say in M2 (=L2/300%) and copy-paste for rest of the students.
 - b. Find the number of students having percentage more than 60%.
 - c. Find the number of students having percentage between 45% and 60%.
 - d. Find the number of students having percentage less than 45%.
 - e. Save the file
4. Use the above file (as saved in experiment-4).
 - a. Find the name of the student got highest marks in S1.
 - b. Find the name of the student got highest marks in S2.
 - c. Find the name of the student got highest marks in S3.
 - d. Find the name of the student who got highest marks in both Theory and practical in subject S1, S2 and S3.
5. Use the above file (as saved in experiment-4).
 - a. Sort the data on percentage and show only the top 10 highest rank students.
Save the file as "Marks-sorted".
 - b. Hide the marks details and show only the name of the student and percentage column.
 - c. Save/export the file as "Top 10 rank students.pdf" as pdf file.
 - g. Print the worksheet and save as pdf and share it to the instructor.
 - h. Show/unhide all the columns.
 - i. Export the file as "Marks.txt" as CSV file.
2. Open a blank worksheet.
 - a. Import the CSV file "Marks.txt" file into the worksheet.
 - b. Copy the whole content of this worksheet and paste it in the new worksheet in the same file/workbook. Rename this worksheet as "UG2-Marks".
 - c. Change the delete the students having percentage less than 45%. (delete rows)
 - d. Allot the new Roll Nos. to the students from 601 onwards.
 - e. Change the marks of the students. Students will see that the totals automatically change.
 - f. Save the file as template with file name "UG-Marks".
 - g. Save and protect the file with password.
 - h. Save the file
3. Use of various existing template to create the worksheet.
 - a. Modify according to your need
 - b. Get the required result
 - c. Print it with setting of page.
 - d. Save the file
4. Experiment related to the data validation (Use of drop-down list, length conversion etc.)
5. Experiment related to the use of various functions sum, average, count, sumif, countif, autosum etc.

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6. Experiments related to the financial and statistical functions and round of the numbers functions.
 7. Create worksheet related to crop production of various crops in Indian states in last five years (Wheat, Rice, Pulses, Soyabean, Cane-sugar etc.).
 - a. Make a bar graph
 - b. Make the Pie graph
 8. Create worksheet related to sales of a business company having various products in last 4 quarters for 10 sales persons.
 - a. Make a line graph to show the growth/decline of sales
 - b. Show the graph of each sales persons sales
 - c. Find the top 2 sales persons done in last 2 two quarters.
 - d. Find the sales person consistent in all 4 quarters.
 - e. Find the most popular product and the least popular product of the company.
 9. Make all types of graphs available in the Calc/Excel using the required data with proper Title of the chart, X-axis and Y-axis title and legend titles.
 10. Data analysis using Sort and Filters.
 11. Data analysis using Pivot tables.
 12. Use of conditional formatting.
 13. Data analysis and forecasting using what-if-analysis.
 14. Use of solver technique.
 15. Experiment related to use of HLOOKUP and VLOOKUP.
- Working with multiple sheets and linked data.

Keywords/Tags: Excel, Calc, Formatting, Protecting range, sheet, Functions, Formulaes, sum, count, average, min, max, if, sumif(s), countif(s), Hlookup, Vlookup, Linking, Sort, Filter, Freeze, Pivot, Goal, Seek, Analysis, Visualization, Charts, Graphs, Financial functions, Statistical functions, what-if-analysis.

Suggestion Books:-

1	Beginning OpenOfficeCalc: From Setting Up Simple Spreadsheets to Business Forecasting, 2011,	Jacek Artymiak	Apress, ISBN: 9781430231592
2	, OpenOffice.org Calc Functions and Formulas Tips. Essential OpenOffice.org Calc Skills, 1st ed., 2011	Jacek Artymiak	
3	; Microsoft Excel 2019 Bible: The Comprehensive Tutorial Resource; John Wiley & Sons Inc.	Michael Alexander, Richard Kusleika, John Walkenbach	
4	; Microsoft Excel 2016 Bible: The Comprehensive Tutorial Resource; Wiley.	Walkenbach J.	

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5	Excel: Quick Start Guide from Beginner to Expert (Excel, Microsoft Office);	Fischer W.	CreateSpace Independent Publishing Platform.
6	Excel Charts; John Wiley & Sons.	Walkenbach J.	

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