# ENT-2038-1
# Problem Solving using Microsoft Excel

## Introduction

Microsoft Excel is the most widely used spreadsheet software and is used by people across industries & organizations irrespective of their type and level. In today's world where data is the new oil, data from multiple data sources ultimately lands up in an MS Excel file. The challenge of the professionals of tomorrow will be the ease with which they can solve business problems/questions that come their way.

Welcome to the comprehensive course – 'Problem Solving using Microsoft Excel'. In today's digitally driven world, proficiency in Excel is an indispensable asset, whether you're a student, a professional, an entrepreneur, or someone eager to enhance their data management capabilities. This course is designed to equip you with the knowledge and practical expertise required to navigate Excel with confidence, efficiency, and finesse.

Why Excel Skills Matter?
Microsoft Excel stands tall as one of the most powerful and versatile spreadsheet applications available, and its impact spans across various industries and domains. From finance to marketing, from engineering to data analysis, Excel empowers users to organize, analyze, and visualize data in ways that drive informed decision-making. Regardless of your background or profession, Excel proficiency is a gateway to unlocking numerous opportunities and streamlining your daily tasks. It allows you to handle large datasets, automate repetitive tasks, create visually compelling charts and graphs, perform complex calculations, and more. Whether you're managing personal finances, conducting business analyses, or preparing academic reports, Excel is the go-to tool for data analysis and presentation.

## Course Takeaway

At the end of the source, students will be:

1. Equipped with the functions of the application which come handy in solving problems/creating reports
2. Build problem solving skills and think of multiple ways of solving realistic problems using MS Excel

## Learning Objectives

**Master the Basics**: You'll become familiar with Excel's interface, understand the anatomy of a spreadsheet, and learn essential functions and formulas to perform day-to-day tasks efficiently.

**Data Manipulation**: You'll delve into data entry techniques, sorting, filtering, and advanced data manipulation operations, ensuring you can handle datasets of varying sizes and complexities.

**Data Analysis**: Discover powerful data analysis tools, like pivot tables to glean valuable insights and make data-driven decisions.

**Visual Representation**: Learn how to create compelling charts, graphs, and dashboards that effectively communicate your data, making presentations and reports more engaging and impactful.

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## Session Details

### Session 1: Foundation

1. Introduction to the “must know” functions/functionalities
    a. Absolute and relative referencing
    b. IF(), AND(), OR() functions
    c. The proper way to centre headings across columns
    d. The power of custom formatting
    e. Splitting data into multiple columns
        i. Without formulas
        ii. With formulas
        iii. With a button in the ribbon
    f. The lesser known “split data into rows” feature
    g. Standardizing number formats in single and multiple columns
    h. Filtering and sorting data
        i. Using the static toolbar button; and
        ii. Via formulas
        iii. Custom sorting
        iv. Sorting by rows
        v. Using Wildcard in Filters
    i. Removing non-printing characters from ranges
    j. Padding up number with digits to standardize the length of the number

k. “Flattening out” multi-columnar ranges
l. Benefit of working with tables when filtering
m. Conditional formatting

**Session 2: Lookup techniques**

1. Introduction to various lookup and ancillary functions/functionalities

    a. VLOOKUP()
    b. LOOKUP()
    c. INDEX() and MATCH()
    d. XLOOKUP()
    e. FILTER()
    f. VSTACK()
    g. Data Validation

2. Case examples
    a. Fetching multiple columns in the result range where the order of the lookup variables in the result table **is the same** as that of the lookup table
    b. Fetching multiple columns in the result range where the order of the lookup variables in the result table **is different from** that of the lookup table
    c. Benefits of working with Tables rather than ranges when writing formulas
    d. Looking up a variable between a range of values and fetching data from a certain column
    e. Looking up variables in multiple columns of the lookup table and fetching the result from a certain column
    f. What does the XLOOKUP() function really return?

3. Class Exercise (Individual)
    a. For a certain lookup value, fetch all entries from a lookup table
        i. In one row and multiple columns *[Hint: TOROW() and FILTER()]*
        ii. In one column and multiple rows *[Hint: TOCOLUMN() and FILTER()]*
        iii. In a single cell, separated by commas *[Hint: ARRAYTOTEXT()]*
        iv. In a single cell, separate by a semi colon *[Hint: TEXTJOIN() and FILTER()]*
    b. Stack data into multiple columns from a single column where data appears in a pattern
        i. Write formulas in columns individually

ii. Write a single formula which should spill over to the required rows and columns
*[Hint: WRAP() functions]*

c. Return the last entry of a look variable from a Table which
   i. Has a Date column
   ii. Does not have a Date column (Assume that the latest entry of a variable will always be appended at the bottom of the Table) *[Hint: XLOOKUP()]*
d. Lookup for a variable which is in tables lying in multiple worksheets *[Hint: VSTACK() and FILTER()]*
e. Calculate the YTD sales where the user selects a month from an in-cell drop down

**Session 3: Summarization functions**

1. Introduction to various aggregation functions
   a. SUMIF()/SUMIFS()
   b. COUNTIF()/COUNTIFS()
   c. AVERAGEIF()/AVERAGEIF()
   d. SUBTOTAL()
   e. SUMPRODUCT()
   f. MAXIFS()/MINIFS()

2. Case Examples
   a. Calculate the total sales per salesperson with traditional formula drag and drop
   b. Comparison of the SUBTOTAL() and SUMIF() functions
   c. Incorporating comparison operators in the aggregation functions
   d. Creating single cell formulas which aggregate and spill over (taking away the need of dragging formulas)
   e. Calculating Total sale given Quantity sold and price per unit
      i. The tradition SUMPRODUCT() way; and
      ii. The more recent dynamic formula way
   f. Supplying multiple conditions before aggregating
      i. Using the easier SUMIFS() function; and
      ii. The more versatile SUMPRODUCT() function
   g. Aggregating data from another workbook with a single condition
      i. Using the easier SUMIF() function; and
      ii. Using the easier COUNTIF() function; and
      iii. The more versatile SUMPRODUCT() function
   h. Incorporating OR() conditions before performing aggregate calculations

i. Aggregate data from one/multiple columns which have errors
    i. Using spare columns; and
    ii. Without using spare columns
j. Generating subtotals and a grand total
    i. For each subcategory, generate individual subtotals; and
    ii. For all subcategories, generate subtotals at once

3. Class Exercise (Individual)
    a. Aggregate data from two tables
        i. Using a spare column; and
        ii. Without using a spare column
    b. Aggregate data from multiple columns based on a single condition
        i. Using a spare column; and
        ii. Without using a spare column

**Session 4: Pivot Tables**

1. Introduction to
    a. The basic usage of Pivot Tables
    b. Formula writing in Pivot Tables
    c. Pivot charts

2. Case Examples
    a. Analyse Sales data of an Organisation
        i. Preparing the dataset to ensure that Pivot Tables can be seamlessly created
    b. Calculating weighted averages within a Pivot Tables
    c. Grouping dates and numbers in Pivot Tables
    d. Calculating %'s within Pivot Tables
    e. Creating Pivot charts
    f. Working with slicers in Pivot Tables
        i. Linking multiple Pivot Tables to a slicers
    g. Creating a Pivot Table from multiple worksheets/workbooks

3. Class Exercise (Individual)
    a. Data clean-up of
        i. Numeric columns
        ii. Date columns
        iii. Headings
    b. Grouping by numbers in the Pivot Table
    c. % calculations in Pivot Tables
    d. Linking multiple Pivot Tables to slicers

## Session 5: Dealing with Dates and Graphical Representation of Data

### Session 5.1 – Dealing with Dates

1. Introduction to date specific functions such as
    a. EDATE()/EOMONTH()
    b. WORKDAY()/WEEKDAY()

2. Case Examples
    a. Convert running numbers into Dates where format cells do not work
    b. Determine beginning/ending dates considering standard weekend days
    c. Determine renewal date given warranty term in months
    d. Standardise inconsistent date formats
    e. Cleaning up date entries with wildcards

3. Class Exercise (Individual)
    a. Determine beginning/ending dates considering customized weekend days
    b. Generate a list of dates showing the first date of each month
    c. Combine text entries with Dates without disturbing the Date format

### Session 5.2 – Graphical Representation of Data

1. Introduction to various chart types:
    a. “Standard” - Bar/Column/Pie
    b. “Offbeat” – Tree map/Sunburst/Pareto/Waterfall

2. Case Examples
    a. Moving specific values to the “bar” of a “Bar of pie chart”
    b. “Make prominent” the very small columns which get over-shadowed by other taller columns
    c. Plotting two y-axis charts
    d. Accommodating unusually large data labels on a pie chart to avoid overlapping
    e. Showing the individual factor which impact profit/loss from one year to another

3. Class Exercise (individual)
    a. Flatten a dataset and create charts
    b. Control charts with slicers

**Session 6 – Q & A/Presentations**

Please note that students will be required to have a Windows laptop with Office 365.

**Teaching Methodology**

Throughout this course, you'll engage in a series of interactive exercises, real-world examples, and practical projects that mimic scenarios you might encounter in your personal or professional life. This experiential learning style (hands-on and practical approach to learning) shall solidify your understanding and provide you with the confidence to apply Excel skills effectively.

**Grading Rubric**

The following is a tentative grading rubric for the course:
Attendance & Class Participation: 20%
Assignments/Quizzes: 50%
Final Presentation/Submission: 30%

**About the Faculty – Ashish Mathur**

Ashish is an MS Excel Enthusiast. His interest in this software has been recognised by Microsoft by way of the Most Valued Professional (MVP) Award from April 2003 to March 2014. He has been an Excel MVP since 2003 and is the first MS Excel MVP in India. He manages a website dedicated to his interest in MS Excel where he responds to Excel questions received through his website. Additionally,he also conducts MS Excel sessions for corporates.