Introduction
Charts are a graphics representation of worksheet data. They are visually appealing and make it easy for users to see comparisons, patterns, and trends in data. In this shortcourse, you will learn the basics of chart creation.

Course Objectives
After completing this shortcourse, you should be able to:

- Create a chart from a worksheet;
- Create Column charts, Bar charts, Pie charts, XY (Scatter) charts, Trend lines, Bubble charts, and Area charts;
- Add a title and legend to a chart.
- Change how a chart looks.
- Resize and reposition a chart.

Charting Terminology

- **Data series** - Data series are the bars, pie wedges, lines, or other elements that represent plotted values in a chart (often corresponds to rows of data in your worksheet).
- **Categories** - Categories reflect the number of elements in a series (for example, compare sales of two territories over 4 quarters (categories).
- **Axis** - Axis is one side of a chart (X-axis is horizontal and Y-axis is vertical axis).
- **Legend** - Legend defines the separate series of a chart.
- **Gridlines** - Gridlines typically appear along the Y-axis.

To Create a Chart
You can create a chart on its own sheet or as an embedded object on a worksheet. You can also publish a chart on a Web page. To create a chart, you must first enter
the data for the chart on the worksheet. Then select that data and use the Chart Wizard to step through the process of choosing the chart type and the various chart options, or use the Chart toolbar to create a basic chart that you can format later.

**Embedded Charts**
An embedded chart is considered a graphic object and is saved as part of the worksheet on which it is created. Use embedded charts when you want to display or print one or more charts with your worksheet data.

**Chart Sheet**
A chart sheet is a separate sheet within your workbook that has its own sheet name. Use a chart sheet when you want to view or edit large or complex charts separately from the worksheet data or when you want to preserve screen space as you work on the worksheet.

**Categories Names**
Excel uses column or row headings in the worksheet data for category axis names. Excel also uses column or row headings in the worksheet data for series names.

**Series Names**
Series names appear in the chart legend. In the example above, the row headings Projected and Actual appear as series names.

**Chart Tips**
When you rest your pointer over a chart item, a chart tip containing the name of the item appears. For example, when you rest the pointer over a legend, a chart tip that contains the word Legend appears.

**Column Charts**
A column chart shows data changes over a period of time or illustrates comparisons among items.

- Categories are organized horizontally,
- Values are organized vertically to emphasize variation over time.
- Each column represents an item in a data series.
Bar Charts
A bar chart illustrates comparisons among individual items.
- Categories are organized vertically.
- Values are organized horizontally to focus on comparing values and to place less emphasis on time.
- Use this type when you have a large number of data values and you want to show them.

![Bar Chart Example]

Pie Charts
A pie chart shows each value proportional to the whole. It is useful for showing the relationship of parts to a whole.

![Pie Chart Example]

XY (scatter) Charts
When your data has pairs or grouped sets of values, you can display it in the XY (scatter) chart type. This chart type is commonly used for displaying scientific and engineering data. It can show relationship between 2 different numerical data and compare trends across uneven time periods. A scatter chart has two value axes instead of one value axis and one category axis like most chart types. Data used as x values should always be in the first row or column. Data for y values should always be placed in the row or column following the x values.

![XY Scatter Chart Example]
<table>
<thead>
<tr>
<th>Time (x)</th>
<th>Temperature (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>53</td>
<td>98</td>
</tr>
<tr>
<td>65</td>
<td>88</td>
</tr>
</tbody>
</table>

**Line Charts**

A line chart shows trends (or change) in data at equal intervals. A line chart displays categories of data evenly along the x-axis, with values of data along the y-axis.

**Trend Lines**

Trend line is a graphical representation of the trend or direction of data in a series. It describes the general tendency of a data series. A trend line is a best-fit line for a series of data. Trend lines are usually used for the study of problems of prediction,
also called regression analysis. You can add trend lines only to data series in unstacked 2-D area, bar, column, line, XY (scatter), and bubble charts.

**Note:** However, you cannot add trend line to data series in 3-D, stacked, radar, pie, surface, or doughnut charts.

### Chart with Trendline

![Chart with Trendline](image)

### Bubble charts

A Bubble chart is just an XY (scatter) with additional data series, where each data point provides three pieces of information instead of two.
Area Charts
An area chart emphasizes the magnitude of change over time. By displaying the sum of the plotted values, an area chart also shows the relationship of parts to a whole.

Creating a New Chart
- Click the ChartWizard button on the Standard toolbar. You can also choose Chart from the Insert menu.
- Select a chart type.
- Click Press, and Hold to View Sample Data.
- Follow the steps.
- Step 3 of the Chart Wizard presents numerous options ranging from Chart Titles to Legends and Gridlines.
- In Step 4, the Chart Wizard prompts you for a chart location.
- In the Place Chart area, make sure that As Object In is selected.
- Click Finish.
Formatting Chart Area
When the chart is selected, the Selected Chart Area command on the Format menu lets you place a border around the chart or shade it with different colors and patterns.

- Select the chart.
- Select Chart from the standard menu toolbar.
- Format Chart Area... Pattern, border, fill effects, gradients, shadow, texture, pattern, picture, etc.

Editing a Chart
- To modify any component of an Excel chart, double-click it. For example, to change the font of the chart title, double-click the title to activate a font dialog box.
- Double-click the y-axis to activate the Format Axis dialog box.

Formatting Chart Background
- Select the Gallup Poll chart.
- Choose Format from the standard toolbar.
- Select Chart Area...
- Patterns tab...
- Borders
- Fill Effects...
- Gradients
- Colors
- Shading style...
- Texture tab...
- Double-click the texture you want...
- Click OK.

Adding Titles and labels
- Select the Gallup Poll chart.
- Choose Chart Options from the Chart menu. The Chart menu is only visible when the chart is selected.
- Click the Title tab in the Chart Options dialog box and type the chart title and axis labels in the appropriate boxes.
• Click OK.

**To add Trend Lines:**
• Create a Column chart for Revenue in Millions example below.
• Select the chart.
• From the Chart menu, choose the Add Trend lines.
• Choose the Linear Option for a best-fit regression line (under the type tab).
• Under the Options tab, choose Forward 4 periods for the Forecast.

**Example:**
To forecast ahead four quarters, to show clearly a trend toward rising revenue:

<table>
<thead>
<tr>
<th>Revenue in millions for 4 quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
</tr>
<tr>
<td>Q2</td>
</tr>
<tr>
<td>Q3</td>
</tr>
<tr>
<td>Q4</td>
</tr>
</tbody>
</table>

**Printing a Chart**
You can print a chart on a worksheet by itself, or print the chart along with its accompanying data from a worksheet. To print a chart by itself, select the chart and choose **File > Print**. Make sure Selected Chart is chosen in the **Print** dialog box.
You might also want to print your chart with its accompanying data. You can include any worksheet object (chart, text field, clip art) in your printed report by simply selecting the cells underneath the worksheet object. When you choose **Print**, click **Selection** to print the selected cells, which will include the chart.

**Where to Get Help**
If you need help with your project, you may contact Help Central Office at 742-HELP. If you need help from your instructor, you may e-mail heide.mansouri@ttu.edu.
Exercises

1- Using the Gallup Poll data create a column chart.

<table>
<thead>
<tr>
<th>Year</th>
<th>Winner</th>
<th>Gallup Poll Prediction</th>
<th>Election Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>Kennedy</td>
<td>51%</td>
<td>50%</td>
</tr>
<tr>
<td>1964</td>
<td>Johnson</td>
<td>64%</td>
<td>61%</td>
</tr>
<tr>
<td>1968</td>
<td>Nixon</td>
<td>43%</td>
<td>44%</td>
</tr>
<tr>
<td>1972</td>
<td>Nixon</td>
<td>62%</td>
<td>62%</td>
</tr>
<tr>
<td>1976</td>
<td>Carter</td>
<td>50%</td>
<td>51%</td>
</tr>
<tr>
<td>1980</td>
<td>Reagan</td>
<td>47%</td>
<td>51%</td>
</tr>
<tr>
<td>1984</td>
<td>Reagan</td>
<td>59%</td>
<td>59%</td>
</tr>
</tbody>
</table>

2- Create a pie chart using the following data:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandwiches</td>
<td>40%</td>
</tr>
<tr>
<td>Salads</td>
<td>21%</td>
</tr>
<tr>
<td>Soup</td>
<td>15%</td>
</tr>
<tr>
<td>Beverages</td>
<td>15%</td>
</tr>
<tr>
<td>Desserts</td>
<td>9%</td>
</tr>
</tbody>
</table>

3- Create a Bubble chart using the following data:

<table>
<thead>
<tr>
<th>No of Products</th>
<th>Sales</th>
<th>Market Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>11,300</td>
<td>12</td>
</tr>
<tr>
<td>21</td>
<td>50,000</td>
<td>24</td>
</tr>
<tr>
<td>19</td>
<td>15,400</td>
<td>6</td>
</tr>
</tbody>
</table>

4- Using the Nominal Gross Domestic product data create an Area Chart with a 3-D visual effect.

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal GNP</th>
<th>Expenditures</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>2732</td>
<td>1732</td>
<td>437</td>
</tr>
<tr>
<td>1981</td>
<td>3052</td>
<td>1915</td>
<td>515</td>
</tr>
<tr>
<td>1982</td>
<td>3166</td>
<td>2050</td>
<td>447</td>
</tr>
<tr>
<td>1983</td>
<td>3405</td>
<td>2234</td>
<td>502</td>
</tr>
<tr>
<td>1984</td>
<td>3772</td>
<td>2430</td>
<td>664</td>
</tr>
<tr>
<td>1985</td>
<td>4014</td>
<td>2629</td>
<td>643</td>
</tr>
<tr>
<td>1986</td>
<td>4231</td>
<td>2797</td>
<td>659</td>
</tr>
<tr>
<td>1987</td>
<td>4524</td>
<td>3010</td>
<td>699</td>
</tr>
<tr>
<td>1988</td>
<td>4880</td>
<td>3235</td>
<td>750</td>
</tr>
<tr>
<td>1989</td>
<td>5233</td>
<td>3470</td>
<td>777</td>
</tr>
</tbody>
</table>
• Type a title for the chart.
• Type a title for categories.
• Type a title for value axis.
• Move the legend underneath the plot area.
• Increase the width of the legend until all items are in horizontal alignment.
• Change its font to 14 and bold.
• Increase the height of the border around the legend.
• Change the font size of the title to 14.
• Select the plot area. Increase the width of the plot area so that it is as wide as the chart area.
• Select the category axis and change the font style to bold.
• Select the value axis and change the font style to bold.
• Select the value axis title, and rotate it 90 degrees.
• Select the series axis and change the font to bold.

Please e-mail your comments or suggestions to: heide.mansouri@ttu.edu