A Complete Guide to Installing LaTeX on Windows for a Social Network Course

September 30, 2025

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Preparing reports and papers for a course like Social Network using LaTeX gives you a clean and highly professional result, especially when you need to use mathematical formulas or draw graphs. This guide provides a complete, step-by-step tutorial for installing and setting up LaTeX on Windows using MiKTeX and TeXstudio.

1 Required Tools

To get started with LaTeX, you need two main components:

1. **The TeX Distribution:** This is the core engine, a collection of compilers and packages that transforms your code into a beautiful PDF file. We will use **MiKTeX**, which is very popular and efficient for Windows.

2. **The LaTeX Editor:** This is the software where you will write your code. These editors provide features like syntax highlighting, command suggestions, and a built-in PDF viewer. We will use **TeXstudio**, which is free, powerful, and user-friendly.

2 Step 1: Installing the Core Engine (MiKTeX)

This is the most critical part. The editor will not work without this engine.

2.1 Download MiKTeX

- Go to the official MiKTeX website: MiKTeX Project Page
- In the Windows section, click the "Download" button to get the installer.

2.2 Install MiKTeX

1. Run the downloaded setup file and accept the license agreement.

2. Choose the option "Install MiKTeX for me only". This is generally simpler and doesn't require administrator privileges.

3. Confirm the installation path and click "Next".

4. **Most Important Setting:** On the "Settings" page, for the option "Install missing packages on-the-fly", select **"Yes"**. This fantastic feature automatically downloads and installs any package you use in your document that isn't already on your system.

5. Click "Start" and wait for the installation to complete.

3 Step 2: Installing the Editor (TeXstudio)

Now, let's install the software where you'll write your documents.

3.1 Download TeXstudio

- Go to the official TeXstudio website: TeXstudio Website
- Click the large "Download" button. The website usually autodetects your operating system.

3.2 Install TeXstudio

The installation is straightforward. Simply run the installer and click "Next" through the prompts. TeXstudio will automatically detect your MiKTeX installation.

4 Step 3: Creating Your First Project (Hello World!)

Let's test if everything works.

1. Open TeXstudio and create a new file from the menu (‘File ¿ New‘).

2. Copy and paste the following code into the editor:

```
\documentclass{article}

\title{My First Social Network Report}
\author{Your Name}
\date{\today}

\begin{document}
```

```
\maketitle

Hello, world! This is my first LaTeX document for the
Social Network course.

I can easily write mathematical formulas like node centrality:
$C(x) = \frac{1}{\sum_{y} d(x,y)}$.

\end{document}
```

3. Save the file with a name like ‘test.tex‘.
4. To compile the code into a PDF, click the **green button with two arrows** (Compile & View) on the toolbar, or simply press the **F5** key.

If everything is set up correctly, you will see a beautifully formatted PDF appear in the viewer panel on the right side of the window. Congratulations!

5 Step 4: Useful Packages for a Social Network Course

For analyzing and visualizing social networks, the ‘tikz‘ package is incredibly powerful. The code below provides an example of how to draw a simple graph.

```
\documentclass{article}
\usepackage{tikz}
\usetikzlibrary{arrows.meta}

\title{Simple Social Network Graph}
\author{Your Name}

\begin{document}
 \maketitle

 \section{A Simple Network Example}

 \begin{center}
```

```
  \begin{tikzpicture}[
   node/.style={circle, draw, minimum size=1cm},
   edge/.style={-Latex}
   ]
   % Nodes
   \node[node] (A) at (0,2) {Alice};
   \node[node] (B) at (3,2) {Bob};
   \node[node] (C) at (0,0) {Charlie};
   \node[node] (D) at (3,0) {David};

   % Edges (Relationships)
   \draw[edge] (A) -- (B);
   \draw[edge] (A) -- (C);
   \draw[edge] (B) -- (C);
   \draw[edge] (B) -- (D);
  \end{tikzpicture}
 \end{center}
\end{document}
```

When you compile this code for the first time, MiKTeX will automatically download and install the ‘tikz‘ package and its required libraries for you.

6 Important Links & Further Resources

- **MiKTeX Download Page**
- **TeXstudio Download Page**
- **CTAN (The Comprehensive TeX Archive Network)**: The repository for all LaTeX packages.
- **Overleaf**: An excellent online LaTeX editor that requires no installation. Great for collaboration.
- **Learn LaTeX in 30 minutes**: A fantastic quick-start guide from Overleaf.