

# Latex Certificate Course Instructions

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## 1 Adding Spaces

L<sup>A</sup>T<sub>E</sub>X has a few commands for adding horizontal and vertical spaces into your document. Also there are different mechanisms for adjusting space before and after tables, figures, paragraphs, . . . .

### 1.1 hspace Command

The `\hspace` command is used for adding horizontal space. For example, `Begin \hspace{1in} End` gives `Begin` `End`.

### 1.2 vspace Command

The `\vspace` command is used for adding vertical space.

Begin

```
1 Begin
2
3 \vspace{1in}
4
5 End
```

End

Figure 1: Adding vertical space

## 2 Phantom Space

L<sup>A</sup>T<sub>E</sub>X has commands for creating blank spaces by adding invisible content. There are three commands — `\phantom`, `\hphantom` and `\vphantom`.

`\hphantom` creates blank space of same width

`\vphantom` creates blank space of same height

```

1  Let  $x \in X$  and
2   $\hphantom{C}(x,3,1) =$ 
3   $C(x,3,1)$ .
4  \begin{equation}
5  \psi(ad) = \phantom{ad = } \psi(a)\psi(d) \quad (1)
6  \psi(a)\psi(d)
7  \end{equation}

```

Figure 2: Adding Phantom Text

`\phantom` creates blank space of of same height and width.

In Figure 2 at line 2, `\hphantom` command is used add a subscript on the left of  $x$ . And at line 5, `\phantom` command is used to leave a space which is sufficient to fit  $ad =$ . These commands are quite useful for aligning system of equations as well as tabular data.

### 3 Bibliography

L<sup>A</sup>T<sub>E</sub>X uses `thebibliography` environment for Bibliography. The `\bibitem` command is used to add references and to assign names. And `\cite` command is used for references using the names assigned.

For example, `\cite{hoffman}` gives [2] if you add the following lines before `\end{document}`.

```

1  \begin{document}
2  ...
3  \begin{thebibliography}{1}
4  \bibitem{joshi}
5  K. D. Joshi, General Topology
6  \bibitem{hoffman}
7  Kenneth Hoffman & Ray Kunze,
8  Linear Algebra, PHI
9  \end{thebibliography}
10 ...

```

**Reference**

1. K. D. Joshi, General Topology
2. Kenneth Hoffman & Ray Kunze, Linear Algebra, PHI

Figure 3: thebibliography Environment

The second argument, 1 of the `\begin{thebibliography}{1}` indicates that the document has at most 9 references. L<sup>A</sup>T<sub>E</sub>X only considers the numbers of digits of the second argument. For example, `\thebibliography{12}` indicates that the document has references, the count of which is in two digits. ie, in between 10 and 99.

## References

- [1] K. D. Joshi, General Topology
- [2] Kenneth Hoffman & Ray Kunuze, Linear Algebra, PHI

## 4 Bibliography Styles

The way  $\text{\LaTeX}$  prints the bibliography references can be changed using the `\bibliographystyle` command. This command takes arguments `plain`, `acm`, `ieeeter`, `alpha`, `abbrv`, and `siam`.

And `natbib` package is famous for a variety of `cite` commands and bibliography styles. The current version of this package is 8.31b and is maintained by Patrick W. Daly and Arthur Ogawa. The documentation is available at CTAN.