Latex Certificate Course Instructions

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1 LaTeX Packages

LaTeX packages provides different mechanisms to ease the documentation process. There are hundreds of LaTeX package written for different purposes. There is an online repository for LaTeX packages and documentation called CTAN (Comprehensive TeX Archive Network) where you could find most of the LaTeX packages. The following are a few popular packages,

fancyhdr provides extensive control of page headers and footers

geometry controls the size of the document and other layout details

graphicx provides extra functionality for adding images

hyperref allows easier inclusion of hyperlinks

multicol allows multiple columns of text and

tikz allows to draw vector graphics

You may download packages from CTAN or from other websites. The `\usepackage` command allows us to use packages that are installed on your computer. The \usepackage commands for required packages are to be included in the preamble of your document. The lines before \begin{document} are collectively known as the **preamble**. And any lines after \end{document} are ignored.

```
1 \documentclass{book}
2 \usepackage{geometry}
3 ...
4 \begin{document}
5 ...
```

Figure 1: Adding Packages

1.1 geometry Package

The `geometry` package is used for controlling the page dimensions and other layout parameters like margins. The current version of this package is 5.9 and is maintained by Davide Carlisle and Hideo Umeki. The documentation is available at CTAN and Github.

1.1.1 Setting Margins

The margins can be specified using the optional arguments `top`, `bottom`, `left` and `right` of the `\usepackage` command with `geometry` argument.

```
1 \documentclass{book}
2 \usepackage[top=1in,bottom=1.25in,left=1.25in,right=1.25in]{geometry}
3 ...
4 \begin{document}
5 ...
```

Figure 2: Setting Margins

1.1.2 Arguments and Optional Arguments

LaTeX commands may take arguments/optional arguments. `\begin` are commands that take name of an environment as argument. In the same fashion, `\usepackage` commands takes package names as arguments and for some packages it also accepts optional arguments as shown in figure 2 for `geometry` package.

In figure 2, `\usepackage{geometry}` has four optional arguments : top, bottom, left and right. They represent margins on top, bottom, left and right of the document. And `1.25in` stands for 1.25 inches. Other than inches, you may use mm, cm, pt, em, or ex.

1.2 fancyhdr Package

The `fancyhdr` package is popular for setting page header and footers. The current version of this package is 4.0.1 and is maintained by Pieter van Oostrum. The documentation is available at CTAN and Github.

1.2.1 `\fancyhead` and `\fancyfoot` commands

The recent version uses `\fancyhead` and `\fancyfoot` commands for page headers and footers. `fancyhdr` has the following selectors for the page locators,

For example, `fancyfoot[LE]{Lie Algebra}` applies the footer 'Lie Algebra' on the bottom-left of almost[1] every even-numbered pages.

[1] Page headers and footers are not added to opening pages of chapters.

L Left,

R Right,

C Center,

O Odd-numbered page, and

E Even-numbered page

Table 1: Page Locators for `fancyhdr`

```
\documentclass{book}
\usepackage{graphicx}
\usepackage{fancyhdr}
...
\pagestyle{fancy}
\fancyhead[LE,RO]{\rightmark}
\fancyhead[RE,LO]{\leftmark}
\fancyfoot[CE,CO]{\thepage}
\fancyfoot[RE,LO]{\includegraphics{logo.png}}
\begin{document}
```

Figure 3: fancyhdr Package

1.2.2 Macros for fancyhdr

The following are the macros used in figure 3,

\thepage gives the page number

\leftmark gives the number and name of the current top-level structure. The number and name of the current section/subsection and

\rightmark gives the number and name of the next top-level structure. The number and name of the current chapter/section.

1.2.3 Short Titles

The \chapter, \section, \subsection and \subsubsection commands supports **short titles** as an optional argument if the titles are too long for a page header/footer.

For example, \chapter[Introduction]{Introduction to Tritopological Spaces} will show up on page header/footer as 1. INTRODUCTION instead of 1. INTRODUCTION TO TRITOPOLOGICAL SPACES.

1.2.4 Package Documentation

Our objective is only to introduce these package. And for more details and examples you should refer to the documentation available at CTAN. Also there are many websites/forums demonstrating different applications of popular packages.