Course : B.Sc (Hons) IV Physics

Subject : Computational Physics Skills

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Topic : Introduction to Latex

Latex : A high-quality typesetting system, for the production of technical and scientific documentation

Advantages of Latex:

1. Standard for Scientific document and produce beautiful output.

2. Control : User can concentrate on the content and they can define how different elements of the documents should like.

3. Maths and Symbols : Latex is Specially designed for mathematical equations and symbols. Latex produce beautifully typeset mathematics

4. Customizable : Latex has various package to extend its potential and one can easily create macros to simplify complex task.

5. Stability : Latex files are quite stable. There is no risk of file crashing or losing original file.

6. Cost : Latex is free and open source.

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Disadvantages of Latex:

1. Bit tough for biginners to get familiar with the syntax.

2. Collaborators unfamiliar with latex will have diffiulty to review a latex document

3. Many features require libraries and packages.

4. Layout changes are difficult and takes time to implement.

Structure of Basic latex file:

```
\documentclass{article}
\usepackage{graphicx}      → Package for graph
\usepackage{amssymb}       "   "   Symbols
\usepackage{amsmath}       "   "   Maths

\begin{document}

Text
Symbols
Equations
Figures
Table

\end{document}
```

Main document

Symbols: Symbols are inserted between texts by using two dollar signs

Eg:

Symbol		Latex command
ϕ	→	ϕ
α	→	α
β	→	β
λ	→	λ

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Equations: I) $\alpha = \sqrt{\beta}$

Latex commands:

```
\begin{equation}
\alpha = \sqrt{\beta}
\end{equation}
```

II) $y = \sin(2\pi\lambda)$

```
\begin{equation}
y = \sin(2\pi\lambda)
\end{equation}
```

III) $\Phi_0 = \int_0^{\infty} \tan\left(\frac{\Phi}{3}\right) d\Phi$

$\Phi_0 \rightarrow$ `\Phi_0`

Subscript

$\int_0^{\infty} \rightarrow$ `\int_0^{\infty}`

Superscript

Subscript

$d\Phi \rightarrow$ `d\phi`

$\tan \rightarrow$ `\tan`

$\frac{\Phi}{3} \rightarrow$ `\frac{\phi}{3}`

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* Figures :

```
\usepackage{graphicx}

\begin{figure}
\begin{center}
\includegraphics[width=3.0in]{Fig.ps}

\caption{Simulation Results}
\end{center}
\end{figure}
```

Figure file

Name	Marks
John	40
Mike	50

* Table :

```
\documentclass{article}
\begin{document}
\begin{tabular}{l|c}
Name & Marks \\
\hline
John & 40 \\
Mike & 50 \\
\end{tabular}

\end{document}
```

Name	Marks
John	40
Mike	50

1. {l|c} : no. of columns & justifications
   - l : left justified
   - c : center
   - r : right

2. Ampersand symbol &:

Horizontal cell delination

3. \hline : Draw horizontal line

4. \\ : Start from next row

5. Symbols should be put between Dollar signs
$ $

\begin{tabular} {l l l}

& & \\

& & \\

\end{tabular}

2 rows

3 columns