LATEX COURSE JOURNAL ID: KUFDPL1277

**Day 1 Outline**

LaTeX on Windows using TeXworks

* Installing MikTeX on Windows
* Writing basic LaTeX document using TeXworks editor
* Syntax color, for execution use ctrl+t or run button, result open in pdf document
* Configuring MikTeX to download missing packages eg beamer

Basic LaTeX syntax:

\documentclass[fontsize,papettype]{name}

\begin{document}

------

------

\end{document}

Report Writing

* Report style having chapter, section and subsection
* Article style having section, subsection and subsubsection
* Automatic generation of table of contents
* Automatic numbering of section numbers
* Appendix; its appearance in report and article style
* Exiting from LaTeX when a compilation error occurs

\documentclass[12pt,a4paper]{article}

\usepackage[hmargin=4.5cm,vmargin=4.5cm]{geometry}

\title{Summary}

\author{KUFDPL1277}

\date{\today}

\setlength\parindent{0pt}

\begin{document}

\maketitle

\section{This is the first section}

Text corresponding to this section goes here. Some preliminary sentences could go first, before the subsections start.

\subsection{First subsection in first section}

Hello world!

\subsubsection{First subsubsection}

Low level text. Some more text.

\end{document}

* Always need to save and compile twice to make sure we get correct output

**Day 2 Outline**

Letter Writing

* Letter document class
* From address
* Automatic generation and format of date
* Starting a new line with double slash
* To address
* Starting a new paragraph with a blank line
* itemize environment for bullet points
* enumerate environment for numbered points
* Closing statement
* Signature
* Carbon copy

For text in bullet points we use itemsize and for numbers we use enumerate command.

\documentclass[12pt]{letter}

\address{abc \\

hyd}

\date{\today}

\signature{abc}

\begin{document}

\begin{letter}

{Mr. N. K. Sinha \\

Director, National mission on education through ICT\\

Joint Secretary (DL/T) \\

MHRD, Shastri Bhavan \\

New Delhi 110 115}

\opening{Dear Mr. Sinha,}

We want to thank you for launching the National Mission on Education through ICT, with an outlay of Rs. 4,600 crore (\$ 1 billion), to improve the levels of education in India. We are

delighted by its excellent features:

\begin{enumerate}

\item Rs. 1,800 crore has been reserved for content generation and the rest to establish good connectivity in all 20,000 colleges and 200 universities.

\item Support for all good proposals, including those from private colleges.

\item All products funded by this mission will be delivered as open source.

\item Web based support through www.sakshat.ac.in.

\end{enumerate}

We pledge our support for popularising this mission and for its success. Regards.

\closing{Yours sincerely,}

\cc{Faculty \\ IIT Bombay}

\end{letter}

\end{document}

Mathematical Typesetting

* $ sign to begin and end mathematical expressions
* Creating alpha, beta, gamma and delta
* Space being used as a terminator of symbols
* Creating spaces in mathematical formulae
* Difference in font of text and formula
* Difference in the minus sign in text and in formula
* frac command to create fractions
* Subscripts and superscripts
* Use of braces {} to demarcate arguments
* Not equal to, greater than or equal to, less than or equal to, much less than
* Right arrow, left arrow, left right arrow, up arrow
* Integral sign, limits of an integral
* Matrices of different rows and columns

\documentclass[12pt,a4paper]{article}

\usepackage[hmargin=4.5cm,

vmargin=3cm]{geometry}

\usepackage{amsmath}

\title{Summary}

\author{KUFDPL1277}

\date{\today}

\setlength\parindent{0pt}

\begin{document}

\maketitle

\frac{2x+3y}{x^2+y^3}& {-4x^2-y^5}\\

x+1 & 8y-4\\

logx & sinx

\end{pmatrix}$

$\alpha \ a$

\end{document}

**Day 3 Outline**

Equations

* Creating an equation
* Writing multiple equations
* Aligning multiple equations
* amsmath package
* $ mode
* align environment
* intertext command
* Unnumbered align\* environment
* Creating matrices in LaTeX
* label command
* Cross referencing with ref command
* % text for comments which do not execute

\documentclass[12pt]{article}

\usepackage

[textwidth=8cm]

{geometry}

\usepackage{amsmath}

\begin{document}

The following proportional, derivative controller has two tuning parameters: $K$ and $\tau\_d$.

%

% First equation

%

\begin{align\*}

u(t) & = K \left[ e(t)+

\tau\_d\frac{de(t)}{dt} \right]

%

% Second equation

%

\intertext{We want to apply the above controller to the following equation:}

%

% LHS

%

\frac d{dt}

\begin{bmatrix} x\_1 \\ x\_2 \\ x\_3 \end{bmatrix} & =

%

% RHS

%

\begin{bmatrix}

0 & 0 & 1 \\

0 & 0 & 0 \\

0 & \alpha & 0 \\

\end{bmatrix}

\begin{bmatrix} x\_1 \\ x\_2 \\ x\_3 \end{bmatrix} +

%

% II Term

%

\begin{bmatrix} 0 \\ 0 \\ \beta \end{bmatrix} \mu

\end{align\*}

The above equation is the model of a plant.

\end{document}

Numbering Equations

* amsmath
* numbering equations
* align environment
* nonumber command
* labelling equations with the label command
* cross referencing equations with the ref command
* case dependence of variables in label command
* taking help from stackexchange
* learning from ltx-primer.pdf

\documentclass[12pt]{article}

\usepackage

[textwidth=8cm]

{geometry}

\usepackage{amsmath}

\begin{document}

The following proportional, derivative controller has two tuning parameters: $K$ and $\tau\_d$.

%

% First equation

%

\begin{align\*}

u(t) & = K \left[ e(t)+

\tau\_d\frac{de(t)}{dt} \right]

%

% Second equation

%

\intertext{We want to apply the above controller to the following equation:}

%

% LHS

%

\frac d{dt}

\begin{bmatrix} x\_1 \\ x\_2 \\ x\_3 \end{bmatrix} & =

%

% RHS

%

\begin{bmatrix}

0 & 0 & 1 \\

0 & 0 & 0 \\

0 & \alpha & 0 \\

\end{bmatrix}

\begin{bmatrix} x\_1 \\ x\_2 \\ x\_3 \end{bmatrix} +

%

% II Term

%

\begin{bmatrix} 0 \\ 0 \\ \beta \end{bmatrix} \mu

\end{align\*}

The above equation is the model of a plant.

\end{document}

**Day 4 Outline**

Tables and Figures

* Creating tables and figures in LaTeX
* Usepackage graphicx
* Usage of tabular and figure and includegraphics
* Listof tables and listoffigures

\documentclass[12pt]{article}

\usepackage{cclicenses}

\title{Summary}

\author{KUFDPL1277}

\date{\today}

\begin{document}

\maketitle

\newpage

\begin{tabular}{||l|c|c|c|r|}\hline

\multicolumn 2 {||c|}{Fruit details} &

\multicolumn 3 {c|}{Cost calculations} \\ \hline

Fruit & Type & No. of units & cost/unit & cost (Rs.) \\ \hline

Mango & Malgoa & 18 & 50 & \\ \cline{2-4}

& Alfonso & 2 & 300 & 1,500 \\ \hline

Jackfruit & Kolli Hills & 10 & 50 & 500 \\ \hline

Banana & Green & 10 & 20 & 200 \\ \hline

\multicolumn 4{||r|}{Total cost (Rs.)} & 2,200 \\ \hline

\end{tabular}

\end{document}

Beamer

* Creating a presentation using Beamer

\documentclass[]{beamer}

\begin{document}

\title

{Spoken Tutorial \\ Presentation using \LaTeX\ and

Beamer}

\author

{Kannan M. Moudgalya \\

Indian Institute of Technology, Bombay \\

kannan@iitb.ac.in}

\begin{frame}

\titlepage

\end{frame}

\begin{frame}

\frametitle{Outline}

\begin{itemize}

\item Title page, author name, colour, logo, etc.

\item Minimal animation

\item Two columns

\item Figures and Tables

\item Equations

\item Verbatim

\item References for further reading

\end{itemize}

\end{frame}

\begin{frame}

\frametitle{Other Spoken Tutorials on \LaTeX}

\begin{itemize}

\item The following spoken tutorials

on \LaTeX\ are available at

{\color{magenta}http://moudgalya.org}:

\begin{itemize}

\item What is compilation?

\item Letter writing

\item Report writing

\item Mathematical typesetting

\item Equations

\item Tables and figures

\item How to create bibliography?

\item Inside story of bibliography

\end{itemize}

\item Installation and use of \LaTeX\ on windows

is explained at

{\color{magenta} \small \tt http://www.che.iitb.ac.in/faculty/km/spoken/LaTeX-Win.wmv}

\item If you are not comfortable in using \LaTeX,

you may consider going through these spoken

tutorials first

\item More permanent links for all of these should

be available in the future at {\color{magenta}

\tt http://fossee.in}

\end{itemize}

\end{frame}

% theme split

\usepackage{beamerthemesplit}

% theme shadow

\usepackage{beamerthemeshadow}

% logo

\logo{\includegraphics[height=1cm]{iitblogo.pdf}}

% sf family, bold font

\sffamily \bfseries

% running title and author information

[Presentation using \LaTeX\ and Beamer

\hspace{0.5cm}

\insertframenumber/\inserttotalframenumber]

\end{document}

**Day 5 Outline**

Bibliography

* Creating a Bibliography in LaTeX
* Usage of cite for references
* Various styles of references using bibliographystyle
* Create a figure with embedded maths equations
* Crop of white spaces in diagram

\documentclass[12pt]{article}

\usepackage{amsmath,cclicenses}

\title{Tutorial on Bibliography}

\author{Kannan Moudgalya \\ kannan@iitb.ac.in \\ \byncsa}

\date{\today}

\bibliographystyle{plain}

\begin{document}

\maketitle

\newpage

\section{Aryabhatta's Identity for Control Design}

Polynomial equations of the form

\begin{align\*}

X(z)D(z) + Y(z)N(z) = C(z)

\end{align\*}

arise frequently in control system design. In the above equation,

$D(z)$, $N(z)$ and $C(z)$ are known polynomials and $X(z)$ and

$Y(z)$ are unknowns, to be determined. This equation is known as

Diophantine equation \cite{vk79,tk80} and Aryabhatta's identity

\cite{mv85}. A solution technique to this identity is presented in

\cite{cp82}. Matlab and Scilab implementations of this solution are

available on the web \cite{kmm1-07}.

The textbook by \cite{kmm07}

illustrates several control design

examples using Aryabhatta's identity. The approach followed in this

book is explained in \cite{ms04,km06}. In addition to handling

control design problems in conventional domains, this approach will

be useful also for naturally discrete time problems that arise in

computing systems, see for example, \cite{mmr03,mrbm04,vs06}.

\bibliography{ref}

\end{document}

Feedback diagram with Maths

* Open the .fig file saved in the feedback control tutorial
* Put $G(z) = \frac z{z-1}$ in the second block diagram
* Choose the special flag
* Save and export it as combined tex and pdf
* Show that if "special" is not chosen, we get only text
* Change /frac into /dfrac
* Show that at the time of compilation, dfrac unknown error
* Include \usepackage{amsmath} in the tex file
* Recompile it and show that the equation is now coming properly
* Use pdfcrop to trim the pdf file, mention Briss

New command in LaTeX

* What is a command?
* Different types of commands with examples
* Defining a new command
* Commands with parameter
* Passing parameters to the commands defined
* Renewcommand

\documentclass{article}

\usepackage{amsfonts}

\newcommand{\bbr}{\mathbb R}

\begin{document}

Let $\bbr$ be a set of Rational numbers.

\end{document}

-------------------------

\documentclass{article}

\usepackage{amsfonts}

\newcommand{\bb}[1]{\mathbb {#1}}

\begin{document}

Let $\bb{R}$ be a set of Rational numbers and $\bb{Z}$ be the set of Complex numbers.

\end{document}

-----------------------

\documentclass{article}

\newcommand{\add}[2]{\left( #1+#2\right)}

\begin{document}

Adding abc and xyz we get $\add{abc}{ xyz}$

\end{document}

-------------------

\usepackage{amsmath}

\renewcommand{\S}{\mathcal {S}}

\begin{document}

Let $\S$ be a set.

\end{document}

---------------------

New Environment in LaTeX

* What is an environment?
* Defining a new environment
* Defining environments with parameters
* Renewenvironment
* Redefining an existing environment to the required output.

\documentclass{article}

\usepackage{color}

\newenvironment{bluetext}

{\begin{center}\color{blue}}

{\end{center}}

\begin{document}

This text is outside the new

environment. This text is

outside the new environment.

This text is outside the new

environment.

\begin{bluetext}

Testing to see whether this

text is in blue colour.

\end{bluetext}

some more text

\end{document}

---------------

\documentclass{article}

\usepackage{color}

\newenvironment{bluetext}[1]

{\begin{center}\color{blue}

\textbf{\textit{#1}}\\[12pt]

}

{\end{center}}

\begin{document}

This text is outside the new

environment. This text is

outside the new environment.

This text is outside the new

environment.

\begin{bluetext}{My text in

blue}

Testing to see whether this

text is in blue colour.

\end{bluetext}

some more text

\end{document}

------------------

\documentclass{article}

\renewenvironment{itemize}{\b

egin{center}\large

}{\end{center}}

\begin{document}

This text is outside the new

environment. This text is

outside the new environment.

This text is outside the new

environment.

\begin{itemize}

Text inside itemize

Lets check the output

\end{itemize}

\end{document}

-----------------

**Day 6 Outline**

Writing Style Files & Indic Language Typesetting in LateX

* About LaTeX Styles files.
* Writing a Style file for LaTeX.
* Importing a Style file in LaTeX.
* Defining a standard Style file for LaTeX.
* RequirePackage command in LaTeX.
* usepackage command in LaTeX.
* Style file identification. The structure of the style file
* Preliminary declarations of a Style file.
* NeedsTeXFormat.
* Typeset a document in Indic language using XeLaTeX.
* Indic language fonts bundle.
* Installing Indic language Fonts.
* Installing Nirmala UI Fonts.XeLaTeX Compiler.
* Using Fontspec package.
* Using Polyglossia package.
* Select language command.
* Set default language in LaTeX.
* Set other language in LaTeX.