

§ Template Documentation §

Section 1: Basic Information of This Template Class

Despite this *SEU-ML-Assign* class is dedicated to Southeast University as the Machine Learning assignment \LaTeX template both for teachers and students, it can also be used for other schools. In the near future, it will eventually become an elegant template for all assignment requirements.

Package Class Name	seu-ml-assign
Version	1.1 (2022/03/21)
Description	\LaTeX Template for Southeast University Machine Learning Assignment
Author	Teddy van Jerry (Wuqiong Zhao)
Maintainer	Teddy van Jerry (Wuqiong Zhao)
GitHub Repository	https://tvj.one/ml-tex
Issues	https://tvj.one/ml-tex/issues
CTAN Package	https://www.ctan.org/pkg/seu-ml-assign
Open Source License	MIT License (https://tvj.one/ml-tex/blob/master/LICENSE)

You can contact me at me@tvj.one for support.

Section 2: Class Options

To use this template, put `seu-ml-assign.cls` file under the same directory with your main `tex` file.

```
\documentclass{seu-ml-assign} % SEU Machine Learning Assignment Template
```

There are 8 supported options:

Option	Description	Default
<code>solution</code>	Write solutions (for students).	•
<code>problem</code>	Write problem sets (for instructors).	
<code>oneside</code>	One-sided document.	•
<code>twoside</code>	Two-sided document.	
<code>9pt</code>	Set font size as 9 points.	
<code>10pt</code>	Set font size as 10 points.	•
<code>11pt</code>	Set font size as 11 points.	
<code>12pt</code>	Set font size as 12 points.	

For example, a 10pt, two-sided document for instructors to create an assignment consisting of problem sets should use

```
\documentclass[10pt,twoside,problem]{seu-ml-assign} % The 10pt option can be omitted.
```

With the `twoside` option, the header will switch style every page, as is the case in this documentation. In contrast, the sample file uses the `oneside` option.

There are several differences between the `solution` mode and `problem` mode, including the preset texts on the document (for example the student name is not shown in the `problem` mode) and some properties can only be used with the `problem` mode which will be elaborated on in §3.2.

Section 3: Document Properties

(1) Fields There are several fields to set. The main problem can be left empty. Consider the following example used in the sample file:

<code>\title{Assignment}</code>	<code>% Document Type: assignment, quiz, etc.</code>
<code>\author{Teddy van Jerry}</code>	<code>% Your Name</code>
<code>\studentID{61520522}</code>	<code>% Your Student ID</code>
<code>\instructor{TeX - LaTeX Stack Exchange}</code>	<code>% The Name of Your Instructor</code>
<code>\date{\today}</code>	<code>% The Submission or Release Date</code>
<code>\duedate{20:00 March 21, 2022}</code>	<code>% The Time the Assignment is Due</code>
<code>\assignno{1}</code>	<code>% Assignment Number</code>
<code>\semester{SEU --- 2022 Spring}</code>	<code>% Semester</code>
<code>\mainproblem{Linear Algebra}</code>	<code>% The Main Problem or Topic</code>

With these fields set, you can use the command `\maketitle` to print the title. At the same time, the metadata for the PDF document is automatically set.

(2) Problem Mode Only Properties One of the fields `\author{}` and `\instructor{}` can be omitted or set as empty provided that they are the same.

Section 4: Section Title (Problem) Settings

(1) Normal Title The title of a problem can be set as `\section{This is a Section Title}` or uses a higher level command `\problem{This is a Section Title}`.

(2) Problem with Points The points of a problem can be set using command `\problempts{xxx}` before calling the `\section{}` command. These two commands can be simplified to `\problem[xxx]{}`. For example, using the command `\problem[15]{This is a Problem Worth 15 Points}` will have:

Problem 1: This is a Problem Worth 15 Points (15 points)

Note that if the point is an empty string, the point information will not be shown.

(3) Long Title Compatibility There is also no problem if the section title is too long.

Problem 2: I Don't Think that Anyone Will Enjoy Themselves Seeing a Very Very Long Problem That is Worth Twenty Points in this Machine Learning Course (20 points)

(4) Section Title Name The name of the section (default name as `problem`) can be changed by using `\renewcommand{\sectionheadname}{Name}`.

(5) Section Number The number of the section can be changed, for example `\texttt{\setproblem{4}}` will make the next section number be 5. For experienced L^AT_EX users to understand, this command actually change the section counter.

(6) Solution Declaration You can use `\startsolution` to declare you start writing the solution. This will reset the section number and it is especially useful when your document contains problems and solutions as two separate parts. There is an option `print` and if you use `\startsolution[print]` you will get:

SOLUTION

and the word `SOLUTION` can be changed using command `\renewcommand{\solutionname}{Other Name}`.

Section 5: Subsection Title (Sub Problem) Settings

(1) Normal Title This is a normal title using command `\subproblem{Normal Title}` or its equivalent command `\subsection{Normal Title}`.

(2) Use `\subproblem{}` or `\subsection{}` if only the sub problem number is required (like this line).

(3) Subsection Number Similar to `\setproblem{}`, there is also `\setsubproblem{}`.

Section 6: Other Tools

(1) Equation Numbering The equation number is within the section (problem), for example

$$\det(\mathbf{A}) = 1 \times \begin{vmatrix} -5 & 3 \\ -6 & 4 \end{vmatrix} - (-3) \times \begin{vmatrix} 3 & 3 \\ 6 & 4 \end{vmatrix} + 3 \times \begin{vmatrix} 3 & -5 \\ 6 & -6 \end{vmatrix} = 1 \times (-2) + 3 \times (-6) + 3 \times 12 = 16. \quad (6.1)$$

(2) Maths Packages Maths Package `mathtools`, `amssymb`, `amsthm`, `bm` and `nicematrix` are automatically loaded. The `nicematrix` package is especially powerful in terms of writing a matrix. You can find its documentation at <https://ctan.org/pkg/nicematrix>.

(3) Fancy Box A fancy box has been defined.

This is a Title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin viverra massa rutrum felis vulputate, ac faucibus velit accumsan. Vivamus aliquet felis nec interdum sollicitudin. Nullam ornare eu velit id cursus. Maecenas a sodales velit, vel cursus magna. Cras lobortis venenatis.

You can use the following code to generate it.

```
\begin{fancybox}{This is a Title}
  Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin viverra massa
  → rutrum felis vulputate, ac faucibus velit accumsan. Vivamus aliquet felis nec
  → interdum sollicitudin. Nullam ornare eu velit id cursus. Maecenas a sodales
  → velit, vel cursus magna. Cras lobortis venenatis.
\end{fancybox}
```

Appendix A: Known Issues

- Book tabs are empty when using `\subproblem{}` command;
- `\section*{}` still shows the section number except for it does not increment the section counter by one;
- The section title background height may not be accurate;

- The style of the footnote line has not been adapted to the current colorful theme.

Appendix B: Change Log

v1.1 2022/03/21 – Bug Fix and Enhancement

1. Add `\mainproblem{}` command;
2. Add the `twoside` option.

v1.0 2022/03/19 – Initial Version

1. Initial `cls` file in addition to a sample file and documentation;
2. Publish at GitHub and CTAN.

Appendix C: Source Code

The source code of `seu-ml-assign.cls` is listed below.

```

15 \NeedsTeXFormat{LaTeX2e}
16 \ProvidesClass{seu-ml-assign}[2022/02/21 SEU Machine Learning Assignment Template]
17
18 %% Class and Options
19 \def\@@ptsize{10pt} % font size
20 \DeclareOption{9pt}{\def\@@ptsize{9pt}}
21 \DeclareOption{10pt}{\def\@@ptsize{10pt}}
22 \DeclareOption{11pt}{\def\@@ptsize{11pt}}
23 \DeclareOption{12pt}{\def\@@ptsize{12pt}}
24 \def\@@solutionmode{1} % default as the solution mode
25 \DeclareOption{solution}{\def\@@solutionmode{1}} % solution mode
26 \DeclareOption{problem}{\def\@@solutionmode{0}} % problem mode
27 \def\@twoside{0} % default as oneside
28 \DeclareOption{oneside}{\def\@twoside{0}} % one-side document
29 \DeclareOption{twoside}{\def\@twoside{1}} % two-side document
30 \ProcessOptions\relax
31 \LoadClass[a4paper, onecolumn, \@@ptsize]{article}
32
33 %% Page Settings
34 \RequirePackage[inner=2.0cm, outer=2.0cm, top=1.2cm, bottom=3.5cm]{geometry}
35 \newcommand{\firstfooteradditionalheight}{2em} % additional height for footer on the
    ↪ first page
36 \hfuzz=.5em % disable false positive of overfull \hbox
37
38 %% Document Properties
39 \global\let\@assignno\@empty
40 \global\let\@semester\@empty
41 \global\let\@studentID\@empty
42 \global\let\@instructor\@empty
43 \global\let\@duedate\@empty
44 \global\let\@author\@empty
45 \global\let\@mainproblem\@empty
46 \newcommand{\assignno}[1]{\gdef\@assignno{#1}} % Assignment Number
47 \newcommand{\semester}[1]{\gdef\@semester{#1}} % Semester
48 \newcommand{\studentID}[1]{\gdef\@studentID{#1}} % Student ID
49 \newcommand{\instructor}[1]{\gdef\@instructor{#1}} % Instructor
50 \newcommand{\duedate}[1]{\gdef\@duedate{#1}} % Due Date of the Assignment
51 \newcommand{\mainproblem}[1]{\gdef\@mainproblem{#1}} % The main problem of the
    ↪ assignment
52
53 %% Fonts and Colors

```

```

54 \RequirePackage[T1]{fontenc}
55 \RequirePackage[usenames,dvipsnames]{xcolor}
56
57 %% TikZ Rule
58 \RequirePackage{tikz}
59 \usetikzlibrary{fadings,calc}
60 \newcommand{\tikzrule}[3][\tikz{\fill[#1](0,0)rectangle(#2,#3);}]
61
62 %% Sections Settings
63 \RequirePackage[explicit]{titlesec} % explained in
64   ↪ https://tex.stackexchange.com/a/292307/234654
65 % http://mirrors.ctan.org/macros/latex/contrib/titlesec/titlesec.pdf
66 \pgfdeclarelayer{background}
67 \pgfsetlayers{background,main}
68 \global\let\@problempts\@empty
69 \newcommand{\problempts}[1]{\gdef\@problempts{#1}} % Points of the Problem
70 \newcommand{\problemptsprint}{\ifx\@problempts\@empty\else(\@problempts~points)\fi}
71 \newcommand{\sectionheadname}{Problem} % Name for the Section (default as 'Problem')
72 % Reference: https://tex.stackexchange.com/a/12269/234654
73 \newcommand{\boxedsection}[3][blue!20]{%
74   \begin{tikzpicture}[inner sep=0pt, inner ysep=0.3ex]
75     \node[anchor=base west] at (0,0) (counter) {#2};
76     \path let \p1 = (counter.base east) in node[anchor=base west, text
77       ↪ width={\textwidth-\x1-0.33em}] (content)
78       at ($(counter.base east)+(0.33em,0)$) {#3};
79     \begin{pgfonlayer}{background}
80       \shade[left color=#1,right color=white] let \p1=(counter.north),
81         ↪ \p2=(content.north) in
82       (0,{max(\y1,\y2)}) rectangle (content.south east);
83     \end{pgfonlayer}
84   \end{tikzpicture}
85 }
86 % \titleformat{<command>
87 %   [<shape>]{<format>}{<label>}{<sep>}{<before-code>}[<after-code>]
88 \titleformat{\section}%
89   {\Large\bfseries}%
90   {}%
91   {0pt}%
92   {\boxedsection{\sectionheadname{} \thesection:}{#1}}%
93   [%
94     \vspace{-2.1\baselineskip}\hfill{\normalfont\small\problemptsprint}%
95     \problempts{}% clear the problem points
96   ]%
97 \newcommand{\setproblem}[1]{\ifx#1\@empty\else\setcounter{section}{#1}\fi} % force
98   ↪ the number of problem
99 \newcommand{\setsubproblem}[1]{\ifx#1\@empty\else\setcounter{subsection}{#1}\fi} %
100   ↪ force the number of subproblem
101 \newcommand{\problem}[2][\problempts{#1}\section{#2}]%
102 \newcommand{\solutionname}{Solution}
103 \newcommand{\startsolution}[1][print]{%
104   \setproblem{0}% reset the section counter
105   \def\startsolutionprintoption{print}
106   \def\startsolutionprintuseroption{#1}
107   \ifx\startsolutionprintuseroption\startsolutionprintoption{%
108     {%
109       \fontfamily{LinuxLibertineT-OsF}\selectfont% select font as Linux
110       ↪ Libertine
111       \centering\LARGE\scshape%
112       \solutionname{}\[\[-0.2em]%
113     }%
114     \noindent%
115     \tikzrule[WildStrawberry, path fading=west]{.5\textwidth}{.2em}% <-- Do not
116     ↪ remove this
117     \tikzrule[WildStrawberry, path fading=east]{.5\textwidth}{.2em}

```

```

111   }\fi%
112 }
113 \titlespacing*{\section}{0em}{2.5\baselineskip}{1\baselineskip}
114 \titleformat{\subsection}[runin]{\large\bfseries}{\0pt}{(\arabic{subsection}) #1}%
115 \newcommand{\subproblem}[2][\subsection{#1}{#2}]
116 \titleformat{\subsubsection}[runin]{\0pt}{(\arabic{subsubsection}. #1}
117
118 %% Maths Settings
119 \RequirePackage{mathtools}
120 \RequirePackage{amssymb}
121 \RequirePackage{amsthm} % proof environment and others
122 \RequirePackage{bm} % \bm command
123 \RequirePackage{nicematrix}
124 \numberwithin{equation}{section}
125
126 %% Code Block Settings
127 \RequirePackage{listings}
128 \definecolor{dkgreen}{rgb}{0,0.5,0}
129 \definecolor{gray}{rgb}{0.5,0.5,0.5}
130 \definecolor{mauve}{rgb}{0.58,0,0.82}
131 \lstset{
132     numbers=left,
133     frame=tb,
134     aboveskip=3mm,
135     belowskip=3mm,
136     showstringspaces=false,
137     columns=fixed,
138     framerule=1pt,
139     rulecolor=\color{gray!35},
140     backgroundcolor=\color{gray!5},
141     basicstyle=\ttfamily\small,
142     numberstyle=\footnotesize\color{gray},
143     keywordstyle=\bfseries\color{blue},
144     commentstyle=\color{dkgreen},
145     stringstyle=\color{mauve},
146     breaklines=true,
147     breakatwhitespace=true,
148     tabsize=2,
149     extendedchars=false,
150     postbreak=\mbox{\hspace{-1.4em}\textcolor{purple}{$\hookrightarrow$}\space}
151 }
152
153 %% Captions Settings
154 \RequirePackage[font=footnotesize,labelfont=bf]{caption}
155
156 %% Color Boxes
157 \RequirePackage[many]{tcolorbox}
158 \RequirePackage{varwidth}
159 \newtcolorbox{fancybox}[2][{enhanced,skin=enhancedlast jigsaw,
160     attach boxed title to top left={xshift=-4mm,yshift=-0.5mm},
161     fonttitle=\bfseries\sffamily,varwidth boxed title=0.7\linewidth,
162     colbacktitle=blue!45!white,colframe=red!50!black,
163     interior style={top color=blue!10!white,bottom color=red!10!white},
164     boxed title style={empty,arc=0pt,outer arc=0pt,boxrule=0pt},
165     underlay boxed title={
166         \fill[blue!45!white] (title.north west) -- (title.north east)
167         -- +(\tcboxedtitleheight-1mm,-\tcboxedtitleheight+1mm)
168         -- ([xshift=4mm,yshift=0.5mm]frame.north east) -- +(0mm,-1mm)
169         -- (title.south west) -- cycle;
170         \fill[blue!45!white!50!black] ([yshift=-0.5mm]frame.north west)
171         -- +(-0.4,0) -- +(0,-0.3) -- cycle;
172         \fill[blue!45!white!50!black] ([yshift=-0.5mm]frame.north east)
173         -- +(0,-0.3) -- +(0.4,0) -- cycle; },
174     title={#2},#1

```

```

175 }
176 \newtcolorbox{notice}[2][]{enhanced,
177   colframe=blue!50!black,colback=blue!10!white,colbacktitle=blue!5!yellow!10!white,
178   fonttitle=\bfseries,coltitle=black,attach boxed title to top center=
179   {yshift=-0.25mm-\tcboxedtitleheight/2,yshifttext=2mm-\tcboxedtitleheight/2},
180   boxed title style={boxrule=0.5mm,
181   frame code={ \path[tcb fill frame] ([xshift=-4mm]frame.west)
182   -- (frame.north west) -- (frame.north east) -- ([xshift=4mm]frame.east)
183   -- (frame.south east) -- (frame.south west) -- cycle; },
184   interior code={ \path[tcb fill interior] ([xshift=-2mm]interior.west)
185   -- (interior.north west) -- (interior.north east)
186   -- ([xshift=2mm]interior.east) -- (interior.south east) -- (interior.south west)
187   -- cycle; } },
188   title={#2},#1
189 }
190
191 %% Header and Footer
192 \RequirePackage{fancyhdr}
193 \RequirePackage[colorlinks=true,urlcolor=blue,linkcolor=purple,citecolor=red]{hyperref}
194 \setlength{\headheight}{52pt}
195 \setlength{\marginparwidth}{2cm}
196 \pagestyle{fancy}
197 \if\@twoside0
198   \lhead{
199     \fontfamily{LinuxLibertineT-OfF}\selectfont
200     \if\@@solutionmode1
201       \textsc{\@title~\@assignno} -- \@studentID~\@author
202     \else
203       \textsc{Machine Learning \@title~\@assignno}
204     \fi
205   }
206   \rhead{\thepage}
207   \renewcommand\headrule{\vspace{-0.7em}\tikzrule[BrickRed, path
208     ↪ fading=east]{.5\textwidth}{0.3mm}}
209 \else
210   \fancyhf{}
211   \renewcommand\headrule{%
212     \ifodd\thepage
213       \vspace{-0.7em}\tikzrule[BrickRed, path fading=east]{.5\textwidth}{0.3mm}
214     \else
215       \vspace{-0.7em}\hfill\tikzrule[BrickRed, path
216         ↪ fading=west]{.5\textwidth}{0.3mm}
217     \fi
218   }
219   \fancyhead[L0]{
220     \fontfamily{LinuxLibertineT-OfF}\selectfont
221     \if\@@solutionmode1
222       \textsc{\@title~\@assignno} -- \@studentID~\@author
223     \else
224       \textsc{Machine Learning \@title~\@assignno}
225     \fi
226   }
227   \renewcommand\headrule{\vspace{-0.7em}\tikzrule[BrickRed, path
228     ↪ fading=east]{.5\textwidth}{0.3mm}}
229   }
230   \fancyhead[RE]{
231     \fontfamily{LinuxLibertineT-OfF}\selectfont
232     \textsc{Machine Learning \@title~\@assignno}
233   }
234   \fancyhead[LE,RO]{\thepage}
235 \fi
236
237 \cfoot{}
238 % header and footer style for the first page
239 \fancypagestyle{firstpage}{

```



```

236 \renewcommand\headrule{}
237 \lhead{}
238 \rhead{}
239 \cfoot{
240     \fontfamily{LinuxLibertineT-0sF}\selectfont
241     \vspace*{-\firstfooteradditionalheight}
242     \vspace{-1.5em}
243     \tikzrule[purple, path fading=west]{.5\textwidth}{.15em}% <-- Do not remove
244     ↪ this
245     \tikzrule[purple, path fading=east]{.5\textwidth}{.15em}
246
247     \footnotesize\centering
248     \if\@@solutionmode1
249         This \MakeLowercase{\@title{}} is due \@duedate{} and the date of
250         ↪ submission is \@date.
251     \else
252         This \MakeLowercase{\@title{}} is due \textbf{\@duedate{}} and the
253         ↪ version of the problem set is \@date.
254     \fi
255
256     % LaTeX template information
257     \LaTeX{} template for this \MakeLowercase{\@title{}} is
258     ↪ \textit{SEU-ML-Assign}
259     open source at \href{https://tvj.one/ml-tex}{tvj.one/ml-tex} under the MIT
260     ↪ License.
261     E-mail \href{mailto:me@tvj.one}{me@tvj.one} for support.
262 }
263 }
264
265 %% Title Settings
266 \RequirePackage{tabularx}
267 \RequirePackage{afterpage}
268 \newcommand{\pdftitleadditionalname}{Solution}
269 \makeatletter
270 \renewcommand\maketitle{
271
272     \if\@@solutionmode0
273         \ifx\@instructor\@empty
274             \let\@instructor\@author % author is the instructor (if not specified)
275         \else
276             \ifx\@author\@empty
277                 \let\@author\@instructor % instructor is the author (if not
278                 ↪ specified)
279             \fi
280         \fi
281     \fi
282
283     \fi
284
285     \thispagestyle{firstpage}
286     \fontfamily{LinuxLibertineT-0sF}\selectfont % set font as Linux Libertine
287     \enlargethispage{-\firstfooteradditionalheight} % make room for the footer
288     \begin{minipage}{10.5cm}
289         \centering
290         {
291             \fontsize{36}{48}\selectfont
292             \textcolor{Plum}{\scshape Machine Learning}
293         }\\[.5em]
294         {
295             \if\@@solutionmode1
296                 \@studentID~\@author
297             \quad
298             \fi
299             \textit{Instructor:~\@instructor}
300         }
301     \end{minipage}

```



```

294 \begin{minipage}{5cm}
295     \vspace{0.7em}
296     \centering
297     {
298         \large
299         \textcolor{BrickRed}{\sffamily \@semester}
300         \vspace{2mm}
301     }
302     \LARGE\@title~{\fontfamily{bch}\selectfont\@assignno}
303 \end{minipage}
304 \[.3em]
305 \tikzrule[cyan, path fading=east]{\textwidth}{.4em}
306
307 \ifx\@mainproblem\@empty
308     \vspace{2mm}
309 \else
310     \begin{center}
311         \vspace{-1\baselineskip}\color{RoyalPurple!50!black}
312         \LARGE\textcolor{blue}{S}~\@mainproblem~\textcolor{blue}{S}
313     \end{center}
314 \fi
315
316 \fontfamily{cmr}\selectfont % Computer Modern
317
318 % Set up document meta data
319 % Note that it should be placed here because
320 % by now \@author and \@title have been set.
321 \hypersetup{
322     pdfauthor={\@author},
323     pdftitle={%
324         \@title~\@assignno~
325         \if\@solutionmode1
326             \pdftitleadditionalname{}
327         \fi
328         - Machine Learning
329     },
330     pdfsubject={Machine Learning},
331     pdfkeywords={%
332         Machine Learning, \@title%
333         \ifx\@mainproblem\@empty\else%
334             , \@mainproblem
335         \fi
336     },
337     pdfcreator={LaTeX with SEU-ML-Assign class},
338     pdfproducer={LaTeX}
339 }
340 }
341 \makeatother

```