The cpecmu document class for LaTeX 2ε

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Abstract

This document class modifies the standard `report` class to conform with the requirements of the Department of Computer Engineering at Chiang Mai University for the layout of senior project reports. It is a modified version of Cornell University's cornell thesis class.

Contents

This file has version number v0.1.0 dated 2020/05/13.

1   Introduction

This document describes the LATEX 2_ε document class cpecmu, suitable[1] for the production of reports at the Department of Computer Engineering, Chiang Mai University. The latest version of this document class should be available at

<div align="center">

https://cpe.eng.cmu.ac.th/2013/download.php

</div>

1.1   Usage

To use this document class, write

    \documentclass{cpecmu}

at the beginning of your LATEX source file.

    This document class can be used with xelatex.

1.2   Options and packages

cpe   The author can specify whether the document is to be typeset as a report for a CPE project
isne with the cpe option, or a report for an ISNE project with the isne option. The default is
cpe.

project   The author can then specify whether the document is to be typeset as a final project
survey report with the project option, or a project survey report with the survey option. The
default is project.

draft   Formally, all style options supported by the report document class are also supported
twoside by the cpecmu class, although support for some options, like twocolumn, may be incom-
11pt plete. The draft option causes the text to be formatted with "single" spacing instead of the
12pt required 1.5-spacing. This may be of use in drafting, or for formatting private copies. For
such purposes, the twoside option may also be of use, as well as 11pt or 12pt (when draft
is used, the 10pt is the default).

final   The final style option (which is the default) will produce the 1.5-spacing 12pt document
semifinal as required for the production of the archival copies of the report. The 10pt and 11pt

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[1]In the authors' opinion, but with no guarantee that other users will agree. The authors shall not be liable for any consequence, good or bad, of other people's use of this software.

options specify font sizes that are too small and will be overridden (and a warning will be issued to inform you of this) if used in conjunction with the final option. The semifinal is identical to final, except that it highlights all horizontal overflows with a black solid rule.

`\ifdraft`   The `\ifdraft` and `\iffinal` macros (which will always be the opposites of one an-
`\iffinal` other) may be used to check whether the draft option or the [semi]final one is in effect.

`tocprelim`   The tocprelim option causes the preliminary sections to be listed in the table of con-
`notocprelim` tents, and the notocprelim prevents the preliminary sections from being listed in the table of contents. By default, preliminary sections are listed in the table of contents.

`smallerheadings`   A new option (now the default) smallerheadings reduces the size of the normally-huge
`normalsizeheadings` LaTeX headings to something more reasonable. normalsizeheadings is used to select the conventional LaTeX chapter and heading sizes.

`glossary`   The glossary option enables the glossary pages following the body of the report.

     The options should be specified as optional arguments to the `\documentclass` command.

1.3   Sample report

A sample thesis document, named `sampleReport.tex`, is included with the distribution of this document class. This is a good starting point for writing the report.

2   Arrangement of contents

A report must contain the following parts, in the order listed. Only parts explicitly designated as optional may be omitted. The current version of this file does not support all of the optional parts.

1. title page (in Thai for CPE, in English for ISNE)

2. title page (in English for CPE, in Thai for ISNE)

3. signature page

4. abstract (in Thai) (full report only)

5. abstract (in English) (full report only)

6. dedication (*optional*)

7. acknowledgments (full report only)

8. table of contents

9. list of figures (or list of illustrations) (full report only)

10. list of tables (full report only)

11. list of abbreviations (*optional*)

12. list of symbols (*optional*)

13. preface (*optional*)

14. text

15. references

16. appendix (or appendices) (full report only)

17. glossary (*optional*)

18. index (*optional*)

19. biographical sketch (full report only)

Some macros and environments are provided to ease the formatting of these parts.

2.1   Title pages

\maketitle
\projectNo
\titleTH
\titleEN
\author
\acadyear

The title pages are produced by the standard LaTeX macro \maketitle, with no arguments. Prior to invoking it, you should declare the project number with the \projectNo macro; the title of the document in Thai with the \titleTH macro and in English with \titleEN macro; your name (exactly as registered with the University) and student identification number with the \author macro; and the academic year of the project with the \acadyear macro. The syntax of \author macro is

\author{⟨*Thai name*⟩}{⟨*English name*⟩}{⟨*student ID*⟩}

The syntax of \acadyear macro is

\acadyear{⟨*year-in-AD (e.g., 2020)*⟩}

For projects done by more than one student, simply repeat the \author macro with different values.

2.2   Signature page

\makesignature
\cpeadvisor
\cpecommittee
\committee

The The signature page is produced by the \makesignature macro, with no arguments. Prior to invoking it, you should declare the project advisor with the \cpeadvisor macro; and the project committee, one member at a time, with the \cpecommittee or \committee macro. The syntax of \cpeadvisor macro is

\cpeadvisor{⟨*advisor's first name in English, all lowercase*⟩}

The syntax of \cpecommitee macro is

\cpecommittee{⟨*committee member's first name in English, all lowercase*⟩}

The syntax of \acadyear macro, used for external committee members, is

\committee{⟨*Thai name*⟩}{⟨*English name*⟩}

The order of the committee members is the order of names given in the document.

2.3 Abstract page(s)

abstractTH   The abstractTH and abstract environments are to be filled with the abstract of the project,
abstract   in Thai and in English.

2.4 Dedication

dedication   The format of the dedication is essentially free, but you may want to use the dedication
environment for this purpose. This environment will center the text of your dedication
vertically on the page. The dedication is optional.

2.5 Acknowledgments

acknowledgments   An environment acknowledgments is provided for the acknowledgments section.

2.6 Table of Contents, List of Figures, List of Tables

\contentspage   Use the macros \contentspage, \figurelistpage, and \tablelistpage, in this order,
\figurelistpage   to produce the required table of contents and lists of figures and tables.
\tablelistpage

2.7 List of Abbreviations, List of Symbols, Preface

\abbrlist   These sections are optional. Macros \abbrlist, \symlist, and \preface should be in-
\symlist   voked to indicate the beginning of each of these sections. These macros act much like
\preface   \chapter*, which they invoke. The main difference is that if the tocprelim option is
used, entries will be made into the table of contents.

2.8 Text

You should begin the text section of the report (normally divided into chapters) with the
following commands:

```
\normalspacing
\setcounter{page}{1}
\pagenumbering{arabic}
\pagestyle{cpecmu}
```

The last of these commands controls the way pages are numbered throughout the text,
ensuring that page numbers are placed at the bottom of the page, centered between the
margins.

plan   In the introduction chapter of your report, you should use the plan environment to
generate the Gantt chart describing your project plan. For each task in your plan, you
\planitem   should use the \planitem macro to generate each row. The syntax of \planitem macro
is

\planitem{⟨*start month (1–12)*⟩}{⟨*start year (in AD)*⟩}{⟨*end month (1–
12)*⟩}{⟨*end year (in AD)*⟩}{⟨*task description*⟩}

2.9 Bibliography

thebibliography   Use the thebibliography environment to generate the bibliography. Or have BiBTeX do the work for you. The cpecmu document class modifies this environment slightly. You probably shouldn't use the openbib option for production of the archival copies of your report.

\bibname   The default name for this section is **References**. You may change it by changing the expansion of \bibname, as in

```
\renewcommand{\bibname}{Bibliography}
```

2.10 Appendix

\appendix   As in the report style, use the \appendix macro to mark the end of the last ordinary chapter and the start of the appendices. Then use a new \chapter{⟨*title*⟩} to start each appendix. Appendices will automatically be "numbered" alphabetically.

2.11 Glossary, Index

\glossarypage   These sections are optional. Macros \glossarypage and \indexpage should be invoked
\indexpage   to indicate the beginning of each of these sections.

2.12 Biographical sketch

biosketch   A special environment biosketch is provided for the biographical sketch.

3 Configurable parameters

3.1 Interline spacing

The report is 1.5-spaced by default. If you want to modify the spacings, use the
\changespacing   \changespacing macro. For example,

```
\changespacing{\normalspacing}{1}
```

will cause everything to be single spaced, while

```
\changespacing{\singlespacing}{2}
```

will cause everything to be double spaced, even the text within footnotes and bibliography entries which is normally single spaced.

\singlespacing   The \singlespacing macro switches to single interline spacing. This can be useful within long tables that don't otherwise fit on a page. This is not true single spacing, which has six lines per inch (12 points apart) and appears too dense. Rather, it is single spacing as the LaTeX article class understands it, with lines 14.5 points apart.

\doublespacing   The \doublespacing macro switches to double spacing between lines, with six lines per inch and 24 points between lines. This is not double spacing as LaTeX typically understands it, but rather as the rest of the world does.

\normalspacing   The \normalspacing macro restores normal interline spacing, whatever that is (\singlespacingplus by default).

\footnotespacing   The \footnotespacing macro switches to footnote spacing. This is equivalent to \singlespacing by default, but you may want to redefine this with, *e.g.,*

\renewcommand{\footnotespacing}{\doublespacing}

\singlespacingplus   Four other macros are provided to set potentially useful line spacings. Ordinarily you
\realsinglespacing   should not need to use any of these macros. \singlespacingplus sets 1.5-spacing, while
\realdoublespacing   \realsinglespacing sets real six-lines-per-inch spacing. The \realdoublespacing
\listspacing   macro has the same effect as the \doublespacing macro and is included for backward
compatibility with old versions of this document class. \listspacing sets the spacing
between lines in various list-like sections of the thesis, such as the table of contents and
the lists of tables and figures. By default it is the same as \singlespacing.

3.2 Font sizes

\titlesize   The \titlesize macro lets you change the font size used for the title of your report on
the title page, should the default be unsuitable for any reason. For example, you could do

\titlesize{\LARGE}

\authorsize   Similarly, the \authorsize macro lets you change the size of font used to print the
author's name.

4 Internals

1 ⟨class⟩\NeedsTeXFormat{LaTeX2e}[2020/02/02]

2 ⟨class⟩\ProvidesClass{cpecmu}
3 [2020/05/13 v0.1.0
4 ⟨class⟩ Computer Engineering, Chiang Mai University senior report class]

4.1 Driver for this document

The docstrip program will extract the following driver from this file:

5 ⟨*driver⟩
6 \documentclass{ltxdoc}
7 \usepackage[english]{thaixelatex}
8 \EnableCrossrefs
9 %\DisableCrossrefs % Say \DisableCrossrefs if index is ready
10 \RecordChanges
11 %\OnlyDescription % Comment out for implementation details
12 \CodelineIndex
13 \begin{document}
14   \DocInput{cpecmu.dtx}
15 % \PrintIndex
16   \PrintChanges
17 \end{document}
18 ⟨/driver⟩

4.2 Option processing

First we set up conditionals to determine whether this is a CPE or ISNE report, and use CPE by default.

```
19 \newif\ifcpe
20 \DeclareOption{cpe}{\cpetrue}
21 \DeclareOption{isne}{\cpefalse}
22 \ExecuteOptions{cpe}
```

Next, we set up conditionals to determine whether this is a full or survey report, and use full report by default.

```
23 \newif\ifproject
24 \DeclareOption{project}{\projecttrue}
25 \DeclareOption{survey}{\projectfalse}
26 \ExecuteOptions{project}
```

The font size is mandated to be 12pt. If final is set, we override options 10pt and 11pt with a warning.

```
27 \DeclareOption{10pt}{%
28   \iffinal%
29     \OptionNotUsed%
30     \ClassWarningNoLine{cpecmu}{Font size 10pt not allowed; using 12pt}%
31   \else%
32     \PassOptionsToClass{10pt}{report}%
33   \fi%
34 }
35 \DeclareOption{11pt}{%
36   \iffinal%
37     \OptionNotUsed%
38     \ClassWarningNoLine{cpecmu}{Font size 11pt not allowed; using 12pt}%
39   \else%
40     \PassOptionsToClass{11pt}{report}%
41   \fi
42 }
```

We add options to include and exclude the preliminary sections in the table of contents. These are the options tocprelim and notocprelim. By default, the preliminary sections are included.

\prelim@contents   Internally, macro \prelim@contents is called with the title of the section as an argument to generate the table of contents entry. By default, this macro invokes \addcontentsline; with the notocprelim option it is changed to do nothing. Preliminary sections are treated as sections, not chapters, for the table of contents.

```
43 \newcommand{\prelim@contents}[2][section]{\addcontentsline{toc}{#1}{#2}}
44 \DeclareOption{tocprelim}{%
45   % included for backwards compatibility only.
46 }
47 \DeclareOption{notocprelim}{%
48   \renewcommand{\prelim@contents}[1]{}
49 }
```

```
50 \providecommand\phantomsection{}
```

Define the draft, semifinal and final options that create the \iffinal and \ifdraft
macros.

```
51 \DeclareOption{draft}{%
52   \let\ifdraft\iftrue%
53   \let\iffinal\iffalse%
54 }
55 \DeclareOption{final}{%
56   \let\ifdraft\iffalse%
57   \let\iffinal\iftrue%
58 }
59 \DeclareOption{semifinal}{%
60   \let\ifdraft\iffalse%
61   \let\iffinal\iftrue%
62   \PassOptionsToClass{draft}{report}%
63 }
```

Define the glossary option to enable glossary.

```
64 \newif\ifglossary\glossaryfalse
65 \DeclareOption{glossary}{\glossarytrue}
```

Define the idx option to enable index.

```
66 \newif\ifindex\indexfalse
67 \DeclareOption{idx}{\indextrue}
```

We pass all remaining options to the standard report class.

```
68 \DeclareOption*{%
69   \PassOptionsToClass{\CurrentOption}{report}%
70 }
```

All options must be processed now, so that we can load the report class right away.

```
71 \ExecuteOptions{final}
72 \ProcessOptions
```

4.3   Report class

We now load the report class, forcing the 12pt option as noted above. We then set A4 as
the paper size.

```
73 \iffinal%
74   \PassOptionsToClass{12pt}{report}%
75 \fi
76 \PassOptionsToClass{a4paper}{report}%
77 \LoadClass{report}[2019/12/20]%
```

We now apply our modifications to the standard report class.

4.4   Chapter headings

\@makechapterhead   We modify the commands which output the chapter headings.
\@makeschapterhead

```
78 \def\@makechapterhead#1{%
79   \begin{center}%
80     \singlespacing
81     \@titlesize\bfseries
82     \@chapapp\space \thechapter \\
83     #1
84   \end{center}%
85   \par\nobreak
86 }
87 \def\@makeschapterhead#1{%
88   \begin{center}%
89     \@titlesize\bfseries #1
90   \end{center}%
91   \par\nobreak
92 }
```

For CPE reports, set appendix number to be the Thai characters.

```
93 \ifcpe
94   \renewcommand\appendix{\par
95     \cleardoublepage
96     \thispagestyle{empty}
97     \vspace*{\fill}
98     \begin{center}
99       \huge\bf\appendixname
100      \vspace*{1in}
101    \end{center}
102    \vspace*{\fill}
103    \cleardoublepage
104    \setcounter{chapter}{0}%
105    \setcounter{section}{0}%
106    \gdef\@chapapp{\appendixname}%
107    \gdef\thechapter{\@thaiAlph\c@chapter}}
108 \fi
```

4.5 Footnotes

Footnotes should be the same size as the main text.

`109 \renewcommand{\footnotesize}{\normalsize}`

They can be single spaced.

\@makefntext We redefine the standard macro \@makefntext to use \footnotespacing (defined below as \singlespacing, but modifiable by the user) and to restore \normalspacing afterwards.

```
110 \renewcommand{\@makefntext}[1]{%
111   \parindent 1em%
112   \noindent
113   \footnotespacing
114   \hbox to 1.8em{\hss\@makefnmark}#1
```

```
115    \par\normalspacing
116 }
```

4.6   Subscripts

Subscripts should be made larger than the default, just to be on the safe side.

```
117 \renewcommand{\defaultscriptratio}{.75}
118 \renewcommand{\defaultscriptscriptratio}{.6}
```

4.7   Page layout

The interior margin must be increased to at least 1.5 inches. Various other page layout parameters are reset here.

This part of the code may not be very robust when twocolumn is used. (No attempt has yet been made to get the margins right in that case.) But then, reports really shouldn't use twocolumn.

```
119 \setlength\headsep{25\p@}
120 \if@twocolumn
121 \else
122    \setlength\topmargin{-0.4in}
123    \setlength\headheight{0.16667in}
124    \setlength\headsep{0.33333in}
125    \setlength\textheight{9.4in}
126    \setlength\footskip{0.5in}
127    \setlength\oddsidemargin{.5in}
128    \setlength\evensidemargin{0in}
129    \setlength\textwidth{5.8in}
130    \setlength\marginparsep{0.1in}
131    \setlength\marginparwidth{0.8in}
132 \fi
```

4.8   Page styles

\ps@cpecmu   We define a cpecmu page style. This has page numbers centered at the bottom of each page.

```
133 \newcommand{\ps@cpecmu}{%
134 \def\@oddhead{}
135 \def\@oddfoot{\hfil\thepage\hfil}%
136 \def\@evenhead{}%
137 \def\@evenfoot{\@oddfoot}%
138 \def\chaptermark##1{}%
139 \def\sectionmark##1{}%
140 }
```

We prefer predictable interline spacing over fixed page length. Thus:

```
141 \raggedbottom
```

Individual users are free to override this by using \flushbottom in the preamble.

4.9   Section names

The LaTeX default section names are acceptable, except for the table of contents which must be called "Table of Contents", not just "Contents". LaTeX 2_ε conveniently provides a macro to configure this.

```
142 \renewcommand{\contentsname}{Table of Contents}
```

LaTeX 2_ε also provides \bibname, \listtablename, \listfigurename; the default values are adequate for our purposes.

Preliminary sections are handled here.

```
143 \newcommand{\@titlesize}{\fontsize{14}{18}\selectfont}
144 \newcommand{\@subtitlesize}{\fontsize{12}{24}\selectfont}
145 \newcommand{\@authorsize}{\@titlesize}
146 \newcommand{\titlesize}[1]{\renewcommand{\@titlesize}{#1}}
147 \newcommand{\subtitlesize}[1]{\renewcommand{\@subtitlesize}{#1}}
148 \newcommand{\authorsize}[1]{\renewcommand{\@authorsize}{#1}}
149
150 \newcommand{\@projectNo}{??}
151 \newcommand{\projectNo}[1]{\renewcommand{\@projectNo}{#1}}
152
153 \newcommand{\@titleTH}{ชื่อโครงงาน}
154 \newcommand{\@titleEN}{Project Name}
155 \newcommand{\titleTH}[1]{\renewcommand{\@titleTH}{#1}}
156 \newcommand{\titleEN}[1]{\renewcommand{\@titleEN}{#1}}
157
158 \newcounter{@numauthors}\setcounter{@numauthors}{0}
159 \renewcommand{\author}[3]{%
160   \stepcounter{@numauthors}%
161   \expandafter\gdef
162     \csname @authorTH@\romannumeral\number\value{@numauthors}\endcsname
163     {#1}%
164   \expandafter\gdef
165     \csname @authorEN@\romannumeral\number\value{@numauthors}\endcsname
166     {#2}%
167   \expandafter\gdef
168     \csname @studentID@\romannumeral\number\value{@numauthors}\endcsname
169     {#3}%
170 }
171 \newif\if@printid\@printidtrue
172 \newcounter{@authorIdx}
173 \def\@listauthors#1#2#3{%
174   \stepcounter{@authorIdx}%
175   \csname @author#1@\romannumeral\number\value{@authorIdx}\endcsname%
176   #2%
177   \if@printid%
178     \csname @studentID@\romannumeral\number\value{@authorIdx}\endcsname%
179   \fi
180   \ifnum\value{@authorIdx}<\value{@numauthors}%
181     #3%
182     \@listauthors{#1}{#2}{#3}%
```

```
183    \fi
184 }
185 \newcommand{\@authorsTH}[2]{%
186    \setcounter{@authorIdx}{0}%
187    \@listauthors{TH}{#1}{#2}%
188 }
189 \newcommand{\@authorsEN}[2]{%
190    \setcounter{@authorIdx}{0}%
191    \@listauthors{EN}{#1}{#2}%
192 }
193
194 \newcommand{\@acadyearBE}{2563}
195 \newcommand{\@acadyearAD}{2020}
196 \newcounter{@acadyear}
197 \newcommand{\acadyear}[1]{%
198    \renewcommand{\@acadyearAD}{#1}
199    \setcounter{@acadyear}{#1}
200    \addtocounter{@acadyear}{543}
201    \renewcommand{\@acadyearBE}{\the@acadyear}
202 }
203 \newcommand{\@degreefieldAbbrTH}{\ifcpe วศ.คพ.\else วศ.สค.\fi}
204 \newcommand{\@degreefieldAbbrEN}{\ifcpe CPE\else ISNE\fi}
205 \newcommand{\@degreefieldTH}{%
206    \ifcpe%
207       วิศวกรรมคอมพิวเตอร์%
208    \else%
209       วิศวกรรมระบบสารสนเทศและเครือข่าย%
210    \fi%
211 }
212 \newcommand{\@degreefieldEN}{%
213    \ifcpe%
214       Computer Engineering%
215    \else%
216       Information Systems and Network Engineering%
217    \fi%
218 }
```

Title page

```
219 \ifcpe%
220    \RequirePackage{thaixelatex}
221 \else%
222    \RequirePackage[english]{thaixelatex}
223 \fi
224 \newcommand{\@maketitleTH}{%
225    \begin{titlepage}%
226       \begin{center}%
227          \hrule height 0.5in width 0pt % force vertical space at top
228          \@titlesize\bf
229          โครงงานเลขที่ \@degreefieldAbbrTH~\@projectNo/\@acadyearBE
230          \par\vspace*{0.5in}\par
```

```latex
231       เรื่อง
232       \par\vspace*{0.5in}\par
233       \@titleTH
234       \par\vspace*{0.75in}\par
235       โดย
236       \par\vspace*{0.75in}\par
237       {\@authorsize\@authorsTH{\quad รหัส~}{\\}}
238       \vfill
239       \ifproject%
240         โครงงานนี้ \\
241         เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรบัณฑิต \\
242       \else%
243         รายงานนี้เป็นส่วนหนึ่งของวิชาสำรวจเพื่อโครงงาน \\
244         ตามหลักสูตรปริญญาวิศวกรรมศาสตรบัณฑิต \\
245       \fi
246       ภาควิชาวิศวกรรมคอมพิวเตอร์ \\
247       คณะวิศวกรรมศาสตร์ มหาวิทยาลัยเชียงใหม่ \\
248       ปีการศึกษา~\@acadyearBE
249     \end{center}
250     \vspace{0.25in}
251   \end{titlepage}
252 }
253 \newcommand{\@maketitleEN}{%
254   \begin{titlepage}%
255     \begin{center}%
256       \hrule height 0.5in width 0pt % force vertical space at top
257       \@titlesize\bf
258       PROJECT No. \@degreefieldAbbrEN~\@projectNo/\@acadyearBE
259       \par\vspace*{1in}\par
260       \@titleEN
261       \par\vspace*{1.5in}\par
262       {\@authorsize\@authorsEN{\quad}{\\}}
263       \vfill
264       \ifproject%
265         A Project Submitted in Partial Fulfillment of Requirements \\
266         for the Degree of Bachelor of Engineering \\
267       \else%
268         A Report Submitted in Partial Fulfillment of Project Survey Course \\
269         as Required by the Degree of Bachelor of Engineering \\
270       \fi
271       Department of Computer Engineering \\
272       Faculty of Engineering \\
273       Chiang Mai University \\
274       \@acadyearAD
275     \end{center}
276     \vspace{0.25in}
277   \end{titlepage}
278 }
279 \renewcommand{\maketitle}{%
280   \typeout{Title page}
```

```
281  \pagenumbering{roman} % title page is counted but not numbered
282  \pagestyle{empty}
283  \ifcpe%
284    \@maketitleTH
285    \@maketitleEN
286  \else
287    \@maketitleEN
288    \@maketitleTH
289  \fi
290 }
291
292 \renewenvironment{titlepage}{%
293   \singlespacing
294 }{%
295   \normalspacing\clearpage
296 }
```

Signature page

```
297 \newcommand\cpefaculty[3]{%
298   \expandafter\gdef\csname @cpefacultyTH@#1\endcsname{#2}%
299   \expandafter\gdef\csname @cpefacultyEN@#1\endcsname{#3}%
300 }
301 \newcommand\deptChair[1]{
302   \@ifundefined{@cpefacultyTH@#1}
303   {\ClassWarningNoLine{cpecmu}{Unknown CPE faculty: #1}}{%
304     \gdef\@deptChairTH{\csname @cpefacultyTH@#1\endcsname}%
305     \gdef\@deptChairEN{\csname @cpefacultyEN@#1\endcsname}%
306   }
307 }
308 \RequirePackage{cpecmu-faculty}
309
310 \newcommand{\@advisorTH}{(waiting for an advisor)}
311 \newcommand{\@advisorEN}{(waiting for an advisor)}
312 \newcommand\advisor[2]{%
313   \gdef\@advisorTH{#1}%
314   \gdef\@advisorEN{#2}%
315 }
316 \newcommand\cpeadvisor[1]{%
317   \@ifundefined{@cpefacultyTH@#1}
318   {\ClassWarningNoLine{cpecmu}{Unknown CPE faculty: #1}}
319   {\advisor
320     {\csname @cpefacultyTH@#1\endcsname}
321     {\csname @cpefacultyEN@#1\endcsname}
322   }
323 }
324 \newcounter{@numcommittee}\setcounter{@numcommittee}{0}
325 \newcommand{\committee}[2]{%
326   \stepcounter{@numcommittee}%
327   \expandafter\gdef
328     \csname @committeeTH@\romannumeral\number\value{@numcommittee}\endcsname
```

```latex
329     {#1}%
330    \expandafter\gdef
331    \csname @committeeEN@\romannumeral\number\value{@numcommittee}\endcsname
332    {#2}%
333 }
334 \newcommand\cpecommittee[1]{%
335    \@ifundefined{@cpefacultyTH@#1}
336    {\ClassWarningNoLine{cpecmu}{Unknown CPE faculty: #1}}
337    {\committee
338      {\csname @cpefacultyTH@#1\endcsname}
339      {\csname @cpefacultyEN@#1\endcsname}
340    }
341 }
342 \newcounter{@committeeIdx}
343 \def\@listcommittee#1#2#3{%
344    \stepcounter{@committeeIdx}%
345    #2%
346    \csname @committee#1@\romannumeral\number\value{@committeeIdx}\endcsname%
347    #3%
348    \ifnum\value{@committeeIdx}<\value{@numcommittee}%
349      \@listcommittee{#1}{#2}{#3}%
350    \fi
351 }
352
353 \RequirePackage{tabularx}
354 \RequirePackage{ulem}
355 \newcommand{\@summaryTH}{%
356    \setlength\parindent{0pt}
357    \begin{tabularx}{\linewidth}{@{}l@{\quad: }X@{}}
358      หัวข้อโครงงาน & \@titleTH \\
359      & \@titleEN \\
360      โดย &
361      \begin{tabular}[t]{@{}ll@{}}
362        \@authorsTH{& รหัส~}{\\}
363      \end{tabular}
364      \\
365      ภาควิชา & วิศวกรรมคอมพิวเตอร์ \\
366      อาจารย์ที่ปรึกษา & \@advisorTH \\
367      ปริญญา & วิศวกรรมศาสตรบัณฑิต \\
368      สาขา & \@degreefieldTH \\
369      ปีการศึกษา & \@acadyearBE
370    \end{tabularx}
371    \par\bigskip\par
372    \hrule height 2pt
373 }
374 \newcommand{\@summaryEN}{%
375    \setlength\parindent{0pt}
376    \begin{tabularx}{\linewidth}{@{}l@{\quad: }X@{}}
377      Project Title & \@titleEN \\
378      Name &
```

16

```
379    \begin{tabular}[t]{@{}ll@{}}
380      \@authorsEN{& }{\\}
381    \end{tabular}
382    \\
383    Department & Computer Engineering \\
384    Project Advisor & \@advisorEN \\
385    Degree & Bachelor of Engineering \\
386    Program & \@degreefieldEN \\
387    Academic Year & \@acadyearAD
388    \end{tabularx}
389    \par\bigskip\par
390    \hrule height 2pt
391 }
392
393 \newcommand{\makesignature}{%
394    \cleardoublepage
395    \pagenumbering{\ifcpe thaialph\else alph\fi}
396                    % make sure all the page numbers in the
397                    % PDF document are unique, if PDF page
398                    % numbers generated
399    \pagestyle{plain}
400    \setcounter{page}{1}
401    \bgroup
402    \ifcpe\@summaryTH\else\@summaryEN\fi%
403    \par\vspace*{1cm}\par
404    \ifcpe%
405      ภาควิชาวิศวกรรมคอมพิวเตอร์ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยเชียงใหม่
406      ได้อนุมัติให้โครงงานนี้เป็นส่วน\-หนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรบัณฑิต
407      (สาขา\@degreefieldTH)
408    \else%
409      The Department of Computer Engineering, Faculty of Engineering,
410      Chiang Mai University has approved this project to be part of the
411      degree of Bachelor of Engineering (\@degreefieldEN)
412    \fi
413    \begin{flushright}
414      \begin{tabular}{@{}cl@{}}
415        \\[1cm]
416        \dotuline{\hspace*{3.5in}} &
417          \ifcpe หัวหน้าภาควิชาวิศวกรรมคอมพิวเตอร์\else Department chair\fi\\
418        (\ifcpe\@deptChairTH\else\@deptChairEN\fi)
419      \end{tabular}
420    \end{flushright}
421    \par\bigskip\par
422    \ifcpe คณะกรรมการสอบโครงงาน\else Project examination committee:\fi
423    \begin{flushright}
424      \begin{tabular}{@{}cl@{}}
425        \\[1cm]
426        \dotuline{\hspace*{3.5in}} &
427          \ifcpe ประธานกรรมการ\else Main advisor / Chair\fi \\
428        (\ifcpe\@advisorTH\else\@advisorEN\fi)
```

```
429     \setcounter{@committeeIdx}{0}%
430     \@listcommittee{\ifcpe TH\else EN\fi}{\\[1cm]
431       \dotuline{\hspace*{3.5in}} & \ifcpe กรรมการ\else Commitee member\fi \\
432       ()}
433     ()}%
434    \end{tabular}
435   \end{flushright}
436   \egroup
437 }
```

Abstract page

```
438 \newcommand\@abstract@begin[2]{%
439   \cleardoublepage
440   \typeout{Abstract}
441   {\csname @summary#1\endcsname}%
442   \par\vspace*{5mm}\par
443   \phantomsection
444   \prelim@contents{#2}
445   \begin{center}%
446     \@titlesize\MakeUppercase{\bfseries #2}
447   \end{center}%
448 }
449 \newenvironment{abstractTH}{\@abstract@begin{TH}{บทคัดย่อ}}{\cleardoublepage}
450 \renewenvironment{abstract}{\@abstract@begin{EN}{Abstract}}{\cleardoublepage}
```

Dedication

```
451 \newenvironment{dedication}{%
452   \phantomsection
453   \prelim@contents{Dedication}
454   \null\vfill
455   \begin{center}
456 }{
457   \end{center}
458   \vfill\null
459   \clearpage
460 }
```

Acknowledgments

```
461 \newcommand\strmnth[1]{%
462   \ifcpe%
463     \ifcase#1%
464     \or ม.ค.% 1
465     \or ก.พ.% 2
466     \or มี.ค.% 3
467     \or เม.ย.% 4
468     \or พ.ค.% 5
469     \or มิ.ย.% 6
470     \or ก.ค.% 7
471     \or ส.ค.% 8
472     \or ก.ย.% 9
473     \or ต.ค.% 10
```

```
474      \or พ.ย.% 11
475      \or ธ.ค.% 12
476      \fi
477    \else%
478      \ifcase#1%
479      \or Jan% 1
480      \or Feb% 2
481      \or Mar% 3
482      \or Apr% 4
483      \or May% 5
484      \or Jun% 6
485      \or Jul% 7
486      \or Aug% 8
487      \or Sep% 9
488      \or Oct% 10
489      \or Nov% 11
490      \or Dec% 12
491      \fi
492    \fi
493 }
```

\strmonth{month} returns month spelled out in Thai

```
494 \newcommand\strmonth[1]{%
495    \ifcpe%
496      \ifcase#1%
497      \or มกราคม% 1
498      \or กุมภาพันธ์% 2
499      \or มีนาคม% 3
500      \or เมษายน% 4
501      \or พฤษภาคม% 5
502      \or มิถุนายน% 6
503      \or กรกฎาคม% 7
504      \or สิงหาคม% 8
505      \or กันยายน% 9
506      \or ตุลาคม% 10
507      \or พฤศจิกายน% 11
508      \or ธันวาคม% 12
509      \fi
510    \else%
511      \ifcase#1%
512      \or January% 1
513      \or February% 2
514      \or March% 3
515      \or April% 4
516      \or May% 5
517      \or June% 6
518      \or July% 7
519      \or August% 8
520      \or September% 9
521      \or October% 10
```

```
522      \or November% 11
523      \or December% 12
524    \fi
525  \fi
526 }
527 \newcommand\Day[3]{%
528    \setcounter{@plan@y}{#1}%
529    \ifcpe\addtocounter{@plan@y}{543}\fi%
530    #3 \strmonth{#2} \the@plan@y%
531 }
532 \newcommand\acksign[3]{%
533    \@printidfalse%
534    \setcounter{@authorIdx}{0}%
535    \bigskip\par\noindent%
536    \begin{tabularx}{\linewidth}{@{\hspace*{2.5in}}>{\centering}X@{}}
537      \@listauthors{\ifcpe TH\else EN\fi}{\\}{}
538      \Day{#1}{#2}{#3}
539    \end{tabularx}
540    \par%
541    \@printidtrue%
542 }
543 \newenvironment{acknowledgments}{%
544    \pagestyle{plain}
545    \chapter*{\ifcpe กิตติกรรมประกาศ\else Acknowledgments\fi}
546    \prelim@contents{\ifcpe กิตติกรรมประกาศ\else Acknowledgments\fi}
547 }{%
548    \clearpage
549 }
```

    Table of contents, list of figures, list of tables

```
550 \newcommand{\contentspage}{%
551    \cleardoublepage
552    \pagestyle{plain}
553    \listspacing{toc}
554    \phantomsection
555    \prelim@contents{\contentsname}
556    \tableofcontents
557    \normalspacing
558    \clearpage
559 }
560
561 \newcommand{\figurelistpage}{%
562    \pagestyle{plain}
563    \listspacing{fig}
564    \phantomsection
565    \prelim@contents{\listfigurename}
566    \listoffigures
567    \normalspacing
568    \clearpage
569 }
```

```latex
570
571 \newcommand{\tablelistpage}{%
572   \pagestyle{plain}
573   \listspacing{tab}
574   \phantomsection
575   \prelim@contents{\listtablename}
576   \listoftables
577   \normalspacing
578   \clearpage
579 }
```

The following three sections are optional. We define macros to start new chapters, but that is all.

```latex
580 \newcommand{\abbrlist}{%
581   \pagestyle{plain}
582   \listspacing{abbr}
583   \chapter*{\ifcpe รายการคำย่อ\else List of Abbreviations\fi}
584   \prelim@contents{\ifcpe รายการคำย่อ\else List of Abbreviations\fi}
585 }
586
587 \newcommand{\symlist}{%
588   \pagestyle{plain}
589   \listspacing{sym}
590   \chapter*{\ifcpe รายการสัญลักษณ์\else List of Symbols\fi}
591   \prelim@contents{\ifcpe รายการสัญลักษณ์\else List of Symbols\fi}
592 }
593
594 \newcommand{\preface}{%
595   \pagestyle{plain}
596   \listspacing{pref}
597   \chapter*{\ifcpe คำนำ\else Preface\fi}
598   \prelim@contents{\ifcpe คำนำ\else Preface\fi}
599 }
```

Set up font size for section headings.

```latex
600 \RequirePackage{titlesec}
601 \titleformat*{\section}{\bfseries}
602 \titleformat*{\subsection}{\bfseries}
603 \titleformat*{\subsubsection}{\bfseries}
```

Command and environment for the work plan table.

```latex
604 \RequirePackage[final]{graphicx}
605 \RequirePackage[table,x11names]{xcolor}
606 \RequirePackage{rotating}
607
608 \newcounter{@plan@sm}
609 \newcounter{@plan@sy}
610 \newcounter{@plan@em}
611 \newcounter{@plan@ey}
612 \newcounter{@plan@m}
613 \newcounter{@plan@y}
```

```
614 \newcounter{@plan@colscount}
615 \newenvironment{plan}[4]{%
616   \setcounter{@plan@sm}{#1}
617   \setcounter{@plan@sy}{#2}
618   \setcounter{@plan@em}{#3}
619   \setcounter{@plan@ey}{#4}
620   \def\@plan@numcols{%
621     \stepcounter{@plan@colscount}
622     \ifnum\value{@plan@y}=\value{@plan@ey}%
623       \ifnum\value{@plan@m}<\value{@plan@em}%
624         \stepcounter{@plan@m}%
625         \@plan@numcols%
626       \fi
627     \else%
628       \stepcounter{@plan@m}%
629       \ifnum\value{@plan@m}=13%
630           \stepcounter{@plan@y}%
631           \setcounter{@plan@m}{1}%
632       \fi
633       \@plan@numcols%
634   \fi
635   }
636   \def\@plan@genheader{%
637     &
638     \begin{sideways}
639       \ifcpe\addtocounter{@plan@y}{543}\fi
640       \strmnth{\value{@plan@m}} \the@plan@y\hspace*{1ex}%
641       \ifcpe\addtocounter{@plan@y}{-543}\fi
642     \end{sideways}
643     \ifnum\value{@plan@y}=\value{@plan@ey}%
644       \ifnum\value{@plan@m}<\value{@plan@em}%
645         \stepcounter{@plan@m}%
646         \@plan@genheader%
647       \fi
648     \else%
649       \stepcounter{@plan@m}%
650       \ifnum\value{@plan@m}=13%
651           \stepcounter{@plan@y}%
652           \setcounter{@plan@m}{1}%
653       \fi
654       \@plan@genheader%
655     \fi
656   }
657   \setcounter{@plan@m}{\value{@plan@sm}}
658   \setcounter{@plan@y}{\value{@plan@sy}}
659   \setcounter{@plan@colscount}{0}
660   \@plan@numcols
661   \tabularx{\linewidth}{|X|*{\the@plan@colscount}{c|}}
662   \hline
663   \bf\ifcpe ขั้นตอนการดำเนินงาน\else Task\fi
```

```
664    \setcounter{@plan@m}{\value{@plan@sm}}
665    \setcounter{@plan@y}{\value{@plan@sy}}
666    \@plan@genheader
667    \\\hline
668 }{%
669    \endtabularx
670 }
671 \newcommand\planitem[6][gray]{%
672    \gdef\@plan@paint{%
673      &
674      \ifnum\value{@plan@y}<#3\else%
675      \ifnum#3=\value{@plan@y}%
676        % sy = y
677        \ifnum#5<\value{@plan@y}\else%
678        \ifnum\value{@plan@y}=#5%
679          % sy = y = ey
680          \ifnum\value{@plan@m}<#2\else%
681          \ifnum#4<\value{@plan@m}\else%
682            % sm <= m <= em
683            \cellcolor{#1}
684          \fi
685          \fi
686        \else%
687          % sy = y < ey
688          \ifnum\value{@plan@m}<#2\else%
689            % sm <= m
690            \cellcolor{#1}
691          \fi
692        \fi
693        \fi
694      \else
695        % sy < y
696        \ifnum#5<\value{@plan@y}\else%
697        \ifnum\value{@plan@y}=#5%
698          % sy < y = ey
699          \ifnum#4<\value{@plan@m}\else%
700            % m <= em
701            \cellcolor{#1}
702          \fi
703        \else%
704          % sy < y < ey
705          \cellcolor{#1}
706        \fi
707        \fi
708      \fi
709      \fi
710      \ifnum\value{@plan@y}=\value{@plan@ey}%
711        \ifnum\value{@plan@m}<\value{@plan@em}%
712          \stepcounter{@plan@m}%
713          \@plan@paint%
```

```
714        \fi
715      \else%
716        \stepcounter{@plan@m}%
717        \ifnum\value{@plan@m}=13%
718            \stepcounter{@plan@y}%
719            \setcounter{@plan@m}{1}%
720        \fi
721        \@plan@paint%
722      \fi
723    }
724    #6%
725    \setcounter{@plan@m}{\value{@plan@sm}}
726    \setcounter{@plan@y}{\value{@plan@sy}}
727    \@plan@paint%
728    \\\hline
729 }
```

Bibliography section

```
730 \addto\captionsenglish{%
731   \renewcommand{\bibname}{References}%
732 }
733 \let\cpecmu@bibliography=\bibliography
734 \def\bibliography#1{%
735   \cleardoublepage
736   \listspacing{bib}
737   \phantomsection
738   \prelim@contents[chapter]{\bibname}
739   \cpecmu@bibliography{#1}
740 }
```

Biographical sketch

```
741 \newenvironment{biosketch}{%
742   \typeout{Vita}
743   \chapter*{\ifcpe ประวัติผู้เขียน\else Biographical Sketch\fi}
744   \prelim@contents[chapter]{\ifcpe ประวัติผู้เขียน\else Biographical Sketch\fi}
745 }{%
746   \clearpage
747 }
748 \AtBeginDocument{%
749   \let\cpecmu@thebibliography=\thebibliography
750   \renewcommand\thebibliography[1]{%
751     \cpecmu@thebibliography{#1}%
752     \setlength{\itemsep}{18pt}%
753     \setlength{\parsep}{0pt}%
754     \setlength{\parskip}{0pt}%
755   }%
756 }
```

The glossary and index sections are optional. Package glossaries is required for generating the glossary. Package makeidx is required for generating the index.

```
757 \ifglossary
```

```
758  \RequirePackage[toc,numberline]{glossaries}
759  \makeglossaries
760
761  \newcommand{\glossarypage}{%
762    \pagestyle{plain}
763    \listspacing{glossary}
764    \printglossaries
765  }
766 \else
767  \newcommand\gls[1]{#1}
768 \fi
769
770 \ifindex
771  \RequirePackage{makeidx}
772  \makeindex
773
774  \newcommand{\indexpage}{%
775    \pagestyle{plain}
776    \listspacing{index}
777    \printindex
778  }
779 \else
780  \renewcommand\index[1]{}
781 \fi
```

This sets up the interline spacing for normal text, small text, and footnote text, and defines the various spacing macros. Because the interline spacing for normal text is set to 12 points, the spacing macros can do the straightforward thing, except for \singlespacing, which tries to be backward compatible with article.

```
782 \renewcommand\normalsize{%
783    \@setfontsize\normalsize\@xiipt{12}%
784    \abovedisplayskip 12\p@ \@plus3\p@ \@minus7\p@
785    \abovedisplayshortskip \z@ \@plus3\p@
786    \belowdisplayshortskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
787    \def\@listi{\leftmargin\leftmargini
788                \parsep 5\p@  \@plus2.5\p@ \@minus\p@
789                \topsep 10\p@ \@plus4\p@    \@minus6\p@
790                \itemsep \z@  \@plus2.5\p@ \@minus\p@}%
791    \belowdisplayskip \abovedisplayskip
792 }
793 \renewcommand\small{%
794    \@setfontsize\small\@xipt{11}%
795    \abovedisplayskip 11\p@ \@plus3\p@ \@minus6\p@
796    \abovedisplayshortskip \z@ \@plus3\p@
797    \belowdisplayshortskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
798    \def\@listi{\leftmargin\leftmargini
799                \topsep 9\p@ \@plus3\p@ \@minus5\p@
800                \parsep 4.5\p@ \@plus2\p@ \@minus\p@
801                \itemsep \z@  \@plus2\p@ \@minus\p@}%
802    \belowdisplayskip \abovedisplayskip
```

```
803 }
804 \renewcommand\footnotesize{%
805     \@setfontsize\footnotesize\@xpt\@xpt
806     \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
807     \abovedisplayshortskip \z@ \@plus3\p@
808     \belowdisplayshortskip 6\p@ \@plus3\p@ \@minus3\p@
809     \def\@listi{\leftmargin\leftmargini
810                 \topsep 6\p@ \@plus2\p@ \@minus2\p@
811                 \parsep 3\p@ \@plus2\p@ \@minus\p@
812                 \itemsep \parsep}%
813     \belowdisplayskip \abovedisplayskip
814 }
815
816 \newcommand{\realsinglespacing}{%
817     \let\CS=\@currsize\renewcommand{\baselinestretch}{1.0}\CS}
818 \def\singlespacing{%
819     \let\CS=\@currsize\renewcommand{\baselinestretch}{1.208333}\CS}
820 \newcommand{\singlespacingplus}{%
821     \let\CS=\@currsize\renewcommand{\baselinestretch}{1.5}\CS}
822 \def\doublespacing{%
823     \let\CS=\@currsize\renewcommand{\baselinestretch}{2}\CS}
824 \newcommand{\realdoublespacing}{%
825     \let\CS=\@currsize\renewcommand{\baselinestretch}{2}\CS}
826 \newcommand{\normalspacing}{\singlespacingplus}
827 \newcommand{\footnotespacing}{\singlespacing}
828 \newcommand{\listspacing}[1] % extra arg is extensibility hook
829     {\singlespacing}
830 \newcommand{\changespacing}[2]{%
831     \renewcommand{#1}{%
832       \let\CS=\@currsize\renewcommand{\baselinestretch}{#2}\CS}%
833 }
834 \ifdraft\changespacing{\normalspacing}{1}\fi
835 \newcommand{\changenormalspacing}[1]{\renewcommand{\normalspacing}{#1}}
836 \normalspacing
837
838 % redefine to do singlespacing
839 \def \@floatboxreset {%
840         \reset@font
841         \normalsize
842         \singlespacing
843         \@setminipage
844 }
```
    End (for now)