Abstract

Starting with the 2014/15 academic year, the Computer Science department at Bangor University have standardised the appearance, layout and formatting of all thesis/dissertation documents for all levels (undergraduate and postgraduate).

This package (containing a \LaTeX document class) is the embodiment of that standard. It includes all of the elements of a thesis, and supports a limited number of customisation options that individual students may choose (or their supervisors may insist upon). It also makes the process of creating a thesis very much simpler with the inclusion of several macros (\LaTeX commands) that streamline the process.

1 Usage - Class Options

The document class is activated (or loaded) using the usual \LaTeX command `\documentclass{bangorcsthesis}`. The class requires at least one of the following options to be specified, these dictate what type of thesis the document forms;

\begin{itemize}
  \item [(phd)] - Doctor of Philosophy / Doctorate \item [(pgcert)] - Postgraduate Certificate \item [(mphil)] - Master of Philosophy \item [(mscres)] - Master of Science by Research \item [(mres)] - Master of Research \item [(msc)] - Master of Science (Taught courses) \item [(ba)] - Bachelor of Arts (Undergraduate courses) \item [(bsc)] - Bachelor of Science (Undergraduate courses)
\end{itemize}

For example; an undergraduate dissertation for a Computer Science degree (a B.Sc. course) would start with a document class definition as follows:-
\begin{verbatim}
documentclass[bsc]{bangorcsthesis}
\end{verbatim}

There are also the following entirely optional modifiers that student’s can elect to use;

\begin{itemize}
  \item [(noindent)] - Suppress indentation of first lines of paragraphs. \item [(nohyphen)] - Attempt (as far as possible) to prevent \LaTeX hyphenating words at the ends of lines in the output. \item [(draft)] - Mark the document as draft, this includes adding a watermark to all pages. This is highly recommended until the document is final. \item [(serif)] - Convert the thesis to use serif fonts for the main body text. \item [(serifheadings)] - Convert the thesis to use serif fonts for the headings. \item [(twoside)] - Make the output ‘two-sided’, much like a book. This may only be required for the final copy to be deposited in certain libraries. \item [(nocentredcaptions)] - Make all captions left-aligned, including one line captions.
\end{itemize}

2 Usage - Preamble Macros

The class includes several macros that must be used in the preamble, the portion of the document before `\begin{document}`. These set several important parameters such as the degree scheme, supervisors and author details.
\title{⟨title⟩} The title of the thesis/dissertation. This macro is not provided by this class but is required in the preamble.

\author{⟨author⟩} The author of the document. Not provided by this class, but required in the preamble. It is recommended that the author name is specified as First M.I. Last.

\date{⟨date⟩} The date of the document. It is recommended that the date argument is set to the month and year of submission of the thesis in full, e.g. May, 2014. This macro is not provided by this class but is required in the preamble.

\degreeScheme{⟨scheme name⟩} This macro must be used to set the title of the student’s overall degree scheme. It has a single parameter, the name will be reproduced (verbatim) on the title/cover page of the thesis. Use of this macro is required.

\supervisor{⟨name⟩} The \supervisor macro adds a named supervisor to the student’s thesis. (In theory) an unlimited number of these commands can be used, although \LaTeX{} has internal memory limits. When there is more than one supervisor defined, the title/cover page changes to accommodate them appropriately. At least one supervisor must be included.

\bibliographySetup \[⟨compressed⟩]\] This macro configures BibLaTeX, the successor to BibTeX, to departmental standards. The Computer Science department have standardised on IEEE referencing, using Name, Year, Title ordering. This means that the first citation to appear may not be numbered [1] in the thesis. Use of this macro is required. If the compressed option is set the bibliography style will be altered to produce one set of brackets for multiple citations in one command. Please note, this violates the IEEE style guide.

\addbibresource{⟨name.bib⟩} The \addbibresource macro is not provided by this package, but is required in the preamble. The parameter is the name of the BibLaTeX/BibTeX database that should be processed for the document.

3 Usage - Other Items

\acknowledgements \[⟨quote text⟩\] \[⟨person quoted⟩\] \[⟨acknowledgements⟩\] The \acknowledgements macro creates the standard acknowledgments page for the front of the thesis. Use of this macro is optional although highly recommended as there is usually someone to thank for contributing to your work (including your supervisor). You can optionally include an inspirational and/or funny quote for the top of the page. If you do not wish to include the quote, simply omit the optional arguments.

\statements \[⟨signature image filename⟩\] This macro creates the required statements page for the front matter of a thesis. This must be included, failure to do so can result in the thesis being rejected as it cannot be accepted into the University library or other depositories. If the signature image filename parameter is included, this image is included instead of a white space for you to sign manually.

\tables The \tables macro creates the appropriate tables (of contents, of figures and of tables) for the front matter of the thesis. Tables of figures and tables of tables are only included when figures and tables are included in the document text respectively. If the thesis includes other items (for example code listings), you are responsible for including tables of these items yourself after the use of this macro.
This macro marks the start of the actual ‘content’ of the thesis, separate from the ‘front
matter’ (contents, etc.) and the appendices. Use of this macro is **required** to maintain
correct formatting.

This macro starts the appendices for the thesis and generates an appropriately formatted
‘References’ list. This differs from a Bibliography as it only contains items specifically cited
in the thesis text whereas a Bibliography should contain everything that has been read/used
during the preparation of the thesis. If the small parameter is included, the font and spacing
are altered for the references section to present a more compact form.

The `\chapterquote` macro can be used to produce ‘heading’ quotes for the start of
chapters, similar to that in the Acknowledgements. All three arguments are required,
however they can be supplied with `{}`, the empty block, to effectively remove them.

## 4 Document Section Order

The Computer Science Thesis has a very specific section order; this does not prescribe the
format of your thesis, just the front and back matter.

1. Title/Cover Page
2. Acknowledgments Page
3. Statements Page
4. Contents
5. Tables
6. Thesis Content
7. References
8. Other Appendices

## 5 Skeleton Thesis

A very much skeleton document is provided here as a starting point when using this
document class.

```latex
\documentclass[bsc,noindent,nohyphen]{bangorcsthesis}
\title{Thesis Title}
\author{Just A. Student}
\degreeScheme{Computer Science}
\date{May, 2015}
\supervisor{Dr. S.P.R. Visor}
\bibliographySetup
\addbibresource{file.bib}

\begin{document}
\maketitle
\acknowledgements\begin{quote}\begin{person quotes}\begin{reason noted}\end{reason noted}\end{person quotes}\end{quote}\end{acknowledgements}
\statements
\begin{abstract}
... thesis abstract...
\end{abstract}
\tables
\thesisContent
... document ...
\references
... other appendices ...
\end{document}
```
6 The Code

\def\version{1.5.1}
\NeedsTeXFormat{LaTeX2e}
\ProvidesClass{bangorcsthesis}[2016/08/24 \version C. Gray]
% Originally inspired by Clean Thesis
% - http://cleanthesis.der-ric.de/
% Developed further by C. Gray
\def\degreeScheme#1{\def\@scheme{#1}}
\RequirePackage{fifo-stack}
\FSCreate{supervisors}{ }
\def\supervisor#1{\FSPush{supervisors}{#1}}
\RequirePackage{ifthen}
\RequirePackage{xkeyval}
\RequirePackage[dvipsnames]{xcolor}
\RequirePackage[T1]{fontenc} % font types and character verification
\RequirePackage[UKenglish]{babel}
\RequirePackage[UKenglish]{isodate}
\RequirePackage[utf8]{inputenc}
\RequirePackage{xparse}

% **************************************************
% Degree Scheme Options
% **************************************************
\DeclareOption{bsc}{\newcommand{\degree}{Bachelor of Science}}
\DeclareOption{ba}{\newcommand{\degree}{Bachelor of Arts}}
\DeclareOption{msc}{\newcommand{\degree}{Master of Science}}
\DeclareOption{mscres}{\newcommand{\degree}{Master of Science by Research}}
\DeclareOption{mres}{\newcommand{\degree}{Master of Research}}
\DeclareOption{mphil}{\newcommand{\degree}{Master of Philosophy}}
\DeclareOption{phd}{\newcommand{\degree}{Bachelor of Science}}
\DeclareOption{pgcert}{\newcommand{\degree}{Postgraduate Certificate}}
\newboolean{@draft}
\setboolean{@draft}{false}
\DeclareOption{draft}{\setboolean{@draft}{true}}
\newboolean{@nohyphen}
\setboolean{@nohyphen}{false}
\DeclareOption{nohyphen}{\setboolean{@nohyphen}{true}}
\newboolean{@noindent}
\setboolean{@noindent}{false}
\setboolean{@noindent}{false}
\DeclareOption{noindent}{\setboolean{@noindent}{true}}
\newboolean{@centredcaptions}
\setboolean{@centredcaptions}{true}
\DeclareOption{nocentredcaptions}{\setboolean{@centredcaptions}{false}}
\define@choicekey*{bangorcs}{figuresep}{none,colon,period,space,quad,newline,endash}\[colon\]{\def\bangorcs@figuresep{#1}}
\setkeys{bangorcs}{figuresep=colon}
% **************************************************
% Font Definitions (see http://www.tug.dk/FontCatalogue/)
% **************************************************
\newboolean{@sansserif}
\setboolean{@sansserif}{true}
\DeclareOption{serif}{\setboolean{@sansserif}{false}}
\newboolean{@sansserifheadings}
\setboolean{@sansserifheadings}{true}
\DeclareOption{serifheadings}{\setboolean{@sansserifheadings}{false}}
\setboolean{@twoside}{false}
\DeclareOption{twoside}{\PassOptionsToClass{\CurrentOption}{report}\setboolean{@twoside}{true}}
\ProcessOptions\relax
\ifx\degree\undefined
\ClassError{bangorcsthesis}{A degree type option has not been defined; use ba, bsc, msc, mscres, mres, mphil or phd in the class options.}\fi
\LoadClass[l2pt]{report}
\if@nohyphen\tolerance=1\sloppy\emergencylength=\maxdimen\hyphenpenalty=10000\hbadness=10000\fi
\RequirePackage{parskip}
\setlength{\parskip}{1.5em}
\if@noindent\setlength{\parindent}{0in}\else\setlength{\parindent}{15pt}\RequirePackage{indentfirst}\fi
\RequirePackage[scaled]{berasans} % Font: Bera Sans, a a version of Bitstream Vera Sans slightly enhanced
\ifthenelse{\boolean{@sansserif}}\{%\textfamilydefault{fvs}\fontfamily{fvs}\selectfont\\tgherosfont{%\scalefont{1.1}}\textfont{1.1}\textsf{\selectfont}\endtextfont\% Using sans-serif fonts\renewcommand{\familydefault}{sfdefault}\%\newcommand{\tgherosfont}{\fontfamily{fvs}\selectfont}\% Using serif fonts\usepackage{newtxtext,newtxmath}\% font set: New TX\requirepackage{fourier}\% font set: (basically improved utopia)\newcommand{\tgherosfont}{\fontfamily{bch}\selectfont}%
\}
\ifthenelse{\boolean{@sansserifheadings}}{%
% Using sans-serif fonts
\newcommand{\tgherosfontfoot}{\fontfamily{fvs}\selectfont}
\else
\newcommand{\tgherosfontfoot}{\fontfamily{bch}\selectfont}
\fi
\RequirePackage{graphicx,url,csquotes,microtype,setspace,fancyhdr,enumitem,amsmath}
\RequirePackage[hideatlas,bookmarks=true,colorlinks=false]{hyperref}
\RequirePackage[nameinlink,capitalize]{cleveref}
\RequirePackage[%
% page layout modifications
%showframe,
%paper=a4paper,% - use A4 paper size
%scale={0.86,0.94},% - total body size (h,v)
%nohead,% - no header
%includefoot,% - include footer space
%includefb,% - include side note space
%bindingoffset=0.5cm,% - binding correction
%top=1.5cm,% - total body: top margin
%left=3.2cm,% - total body: left margin (odd pages)
%right=0.75cm,% - total body: right margin (odd pages)
%bottom=1.5cm,% - total body: bottom margin
%marginparwidth=1.75cm,% - width for side note
%marginparsep=10pt,% - space between notes and body text (content)
%footskip=1cm % - footer skip size
]{geometry}
\RequirePackage{draftwatermark}
\if@draft
\SetWatermarkText{DRAFT}
\SetWatermarkScale{1}
\else
\SetWatermarkText{}
\fi
% **************************************************
% Bibliography Options - use IEEE (NYT) Bibliography style.
% **************************************************
\DeclareDocumentCommand{\bibliographySetup}{ O{} }{%
\ifthenelse{\equal{#1}{compressed}}{%
\RequirePackage[%
backend=biber, % - use biber backend (bibtex replacement) or bibtex
bibencoding=utf8, % - use auto file encode
natbib=true, % - allow natbib commands
hyperref=true, % - activate hyperref support
backref=true, % - activate backrefs
urldate=long, % - display type for dates
style=ieee,
citestyle=numeric,%
sorting=nyt
}{(biblatex)
}(%
\RequirePackage[%
backend=biber, % - use biber backend (bibtex replacement) or bibtex
bibencoding=utf8, % - use auto file encode
natbib=true, % - allow natbib commands
hyperref=true, % - activate hyperref support
backref=true, % - activate backrefs
urldate=long, % - display type for dates
style=ieee,
sorting=nyt
}{(biblatex)
}%
\RequirePackage[%
backend=biber, % - use biber backend (bibtex replacement) or bibtex
bibencoding=utf8, % - use auto file encode
natbib=true, % - allow natbib commands
hyperref=true, % - activate hyperref support
backref=true, % - activate backrefs
urldate=long, % - display type for dates
style=ieee,
sorting=nyt
}{(biblatex)
}
\DefineBibliographyStrings{english} {  
  backrefpage = {p.}, \% for single page number  
  backrefpages = {pp.},% for multiple page numbers  
  bibliography = {References}  
}

\DeclareDocumentCommand{\references}{ O{} }{  
  \appendix  
  {  
    \ifthenelse{\equal{#1}{small}}{  
      \renewcommand*{\bibfont}{\footnotesize}  
      \linespread{1.0}  
      \setlength{\itemsep}{1ex}  
      \setlength{\bibitemsep}{0.7\itemsep}  
    }{}  
    \pagestyle{maincontentstyle}  
    \printbibliography[heading=bibintoc]  
  }  
}

% **************************************************  
% Text Format  
% **************************************************  
\setstretch{1.5} % value for line spacing, use \setstretch{} or  
\singlespacing or \onehalfspacing or \doublespacing  
\clubpenalty = 10000 % prevent single lines at the beginning of a paragraph  
\widowpenalty = 10000 % prevent single lines at the end of a paragraph  
\displaywidowpenalty = 10000 %

\definecolor{coloursgraylight}{gray}{.8}

% **************************************************  
% Header and Footer  
% **************************************************  
\pagestyle{fancy}  
\renewcommand{\chaptermark}[1]{%  
  \markboth{\footnotesize\hspace*{9pt}\makebox[1.4cm][l]{\textbf{\thepage}}}{}%  
}  
\renewcommand{\sectionmark}[1]{%  
  \markright{\footnotesize\textbf{\thesection}\hspace*{9pt}{#1}}%  
}

\ifthenelse{\boolean{@twoside}}{  
  \fancyfootoffset[RO]{1.75cm}  
  \fancyfoot[RO]{\tgherosfontfoot\footnotesize\hspace*{9pt}  
    \makebox[1.4cm][l]{\textbf{\thepage}}}  
}{}

% **********************************************
% fancypagestyle{plain} {  
  \fancyfoot{}  
  \fancyhead{}  
  \renewcommand{\headrulewidth}{0pt}  
  \renewcommand{\footrulewidth}{0pt}  
  \ifthenelse{\boolean{@twoside}}{  
    \fancybox{0pt}{\hspace*{9pt}\makebox[1.4cm][l]{\textbf{\thepage}}}  
  }{}

\begin{thebibliography}{99}

\end{thebibliography}
\newcommand{\helv}{\tgherosfontfoot\fontsize{9}{11}\selectfont}
\newcommand{\book}{\tgherosfontfoot\fontseries{m}\fontsize{11}{13}\selectfont}
\newcommand{\thesispartlabelfont}{\book\fontsize{60}{60}\selectfont}
\newcommand{\thesispartfont}{\huge \tgherosfont\selectfont}
\newcommand{\thesischapterfont}{\huge \tgherosfontfoot\selectfont}
\newcommand{\thesissectionfont}{\LARGE \bfseries \tgherosfontfoot}
\newcommand{\thesissubsectionfont}{\Large \tgherosfontfoot}
\newcommand{\thesisparagraphfont}{\tgherosfont\small\bfseries}

% **************************************************
% Sectioning
% **************************************************
% The package titlesec enables us to modify (style) the sectioning commands, i.e. \part, \chapter, \section, \subsection, \subsubsection, \paragraph
% -- usage: \titlespacing{\command}{left}{before-sep}{after-sep}[right-sep]
% -- usage: \titleformat{\command}{shape}{format}{label}{sep}{before}[after]
% -- usage: \titleclass{\command}{class}
% -- classes: page (single page), top (like chapters), straight (title in the middle)
\RequirePackage{titlesec}
\titleformat{\chapter}{display}{\raggedright\huge\thesischapterfont}{-4mm}{\Huge}
titlespacing*{\chapter}{0pt}{2mm}{10mm}
% The tocloft package enables us to control the typographic design of the
toc, list of figures and list of tables
\requirepackage{tocloft}
% > adjusts the indentation for figure and table entries (lof and lot)
% -- \cftsetindents{\command}{indent}{numwidth} sets the entry’s indent to
% the length indent and its numwidth to the length numwidth
\cftsetindents{figure}{0em}{3em}
\cftsetindents{table}{0em}{3em}
\renewcommand{\cfttoctitlefont}{\thesischapterfont}
\renewcommand{\cftloftitlefont}{\thesischapterfont}
\renewcommand{\cftlottitlefont}{\thesischapterfont}
% Clean chapter quotations
\newcommand{\hugequote}{\book\fontsize{75}{80}\selectfont\hspace*{-.475em}\color{\coloursgraylight}\textit{\glqq}
\vskip -.26em}
\renewcommand{\maketitle}{% 
\hypersetup{ % setup the hyperref-package options 
  pdftitle={\@title},% - title (PDF meta) 
  pdfsubject={\@scheme},% - subject (PDF meta) 
  pdfauthor={\@author},% - author (PDF meta) 
  plainpages=false,% - 
  pdfborder=(0 0 0),% - 
  breaklinks=true,% - allow line break inside links 
  bookmarksnumbered=true,\% 
  bookmarksopen=true % 
} 
%}
\pagenumbering{gobble} % gobble page numbering (invisible for empty page style) 
\pagestyle{empty} % no header or footers 
\begin{titlepage} 
%\pdfbookmark[0]{Title Page}{Title Page} 
%%\tgherosfont 
\centering 
\scalebox{0.38}{\bangorlogo} \ 
\vspace{-1.5mm} \ School of Computer Science \ 
\vspace{-1.5mm} College of Physical \& Applied Sciences \ 
\vfill \ 
\setstretch{1.0}\LARGE \tgherosfontfoot\textbf{\@title} \
[10mm]\ 
\begin{center}\vspace{-0.4cm} \rule{0.6\textwidth}{.4pt} \ 
\end{center} \vspace{-4mm} \ 
\Large \@author \ 
\vfill \ 
\setstretch{1.1}\footnotesize Submitted in partial satisfaction of the requirements for the\ 
\ifx\pgcert\undefined Degree of \fi\degree\ 
\vspace{-2.7mm} \vspace{1cm} \ 
\ifnum \FSSize{supervisors}>1 \textit{Supervisors} \else \textit{Supervisor} \fi \ 
\newcounter{l} \forloop{-1}{\FSSize{supervisors}}{\value{l}>0}{\ 
\FSBottom{supervisors}\FSShift{supervisors}\ifnum \FSSize{supervisors}>0 \textit{and} \fi} \ 
\vspace{1cm} \ 
\@date} \ 
\end{titlepage} 
\RequirePackage{framed} 
\DeclareDocumentCommand{\statements}{ O{} }{% 
  \ifthenelse{\equal{#1}{O}}{% 
  \newcommand{\sig}{\vspace{2cm}} \ 
  }{\newcommand{\sig}{\includegraphics[height=2cm]{#1}}} \ 
  \cleardoublepage \ 
  \pdfbookmark[0]{Statement of Originality \& Availability}{Statements} 
%\chapter*{Statements} 
\label{chp:statements} %
{\setstretch{1.1} \null\vfill \ 
\statements \ 
\flushleft 
\ifnum \FSSize{supervisors}>1 \textit{Supervisors} \else \textit{Supervisor} \fi \ 
\newcounter{l} \forloop{-1}{\FSSize{supervisors}}{\value{l}>0}{\ 
\FSBottom{supervisors}\FSShift{supervisors}\ifnum \FSSize{supervisors}>0 \textit{and} \fi} \ 
\vspace{1cm} \ 
\@date} \ 
\end{titlepage} 
\begin{titlepage} 
\centering 
\scalebox{0.38}{\bangorlogo} \ 
\vspace{-1.5mm} \ School of Computer Science \ 
\vspace{-1.5mm} College of Physical \& Applied Sciences \ 
\vfill \ 
\setstretch{1.0}\LARGE \tgherosfontfoot\textbf{\@title} \
[10mm]\ 
\begin{center}\vspace{-0.4cm} \rule{0.6\textwidth}{.4pt} \ 
\end{center} \vspace{-4mm} \ 
\Large \@author \ 
\vfill \ 
\setstretch{1.1}\footnotesize Submitted in partial satisfaction of the requirements for the\ 
\ifx\pgcert\undefined Degree of \fi\degree\ 
\vspace{-2.7mm} \vspace{1cm} \ 
\ifnum \FSSize{supervisors}>1 \textit{Supervisors} \else \textit{Supervisor} \fi \ 
\newcounter{l} \forloop{-1}{\FSSize{supervisors}}{\value{l}>0}{\ 
\FSBottom{supervisors}\FSShift{supervisors}\ifnum \FSSize{supervisors}>0 \textit{and} \fi} \ 
\vspace{1cm} \ 
\@date} \ 
\end{titlepage} 
\RequirePackage{framed} 
\DeclareDocumentCommand{\statements}{ O{} }{% 
  \ifthenelse{\equal{#1}{O}}{% 
  \newcommand{\sig}{\vspace{2cm}} \ 
  }{\newcommand{\sig}{\includegraphics[height=2cm]{#1}}} \ 
  \cleardoublepage \ 
  \pdfbookmark[0]{Statement of Originality \& Availability}{Statements} 
%\chapter*{Statements} 
\label{chp:statements} %
{\setstretch{1.1} \null\vfill \ 
\statements \ 
\flushleft 
\ifnum \FSSize{supervisors}>1 \textit{Supervisors} \else \textit{Supervisor} \fi \ 
\newcounter{l} \forloop{-1}{\FSSize{supervisors}}{\value{l}>0}{\ 
\FSBottom{supervisors}\FSShift{supervisors}\ifnum \FSSize{supervisors}>0 \textit{and} \fi} \ 
\vspace{1cm} \ 
\@date} \ 
\end{titlepage}
\begin{framed}
\noindent\bf Statement of Originality}\\
\noindent The work presented in this thesis/dissertation is entirely from the studies of the individual student, except where otherwise stated. Where derivations are presented and the origin of the work is either wholly or in part from other sources, reference is given to the original author. This work has not been presented for any degree, nor is it at present under consideration by any other degree awarding body.
\vspace{0.3cm}
\noindent Student: \sig
\noindent\@author
\end{framed}

\begin{framed}
\noindent\bf Statement of Availability}\\
\noindent I hereby acknowledge the availability of any part of this thesis/dissertation for viewing, photocopying or incorporation into future studies, providing that full reference is given to the origins of any information contained herein. I further give permission for a copy of this work to be deposited with the Bangor University Institutional Digital Repository, \ifdefined\phd the British Library ETHOS system, \fi and/or in any other repository authorised for use by Bangor University and where necessary have gained the required permissions for the use of third party material. I acknowledge that Bangor University may make the title and a summary of this thesis/dissertation freely available.
\vspace{0.3cm}
\noindent Student: \sig
\noindent\@author
\end{framed}